We are living in a time like no other in recent history. Climate change, water stress, biodiversity loss, and pollution continue to worsen rapidly, and our multilateral system urgently needs to transform and be better equipped to provide an integrated, equitable, sustainable, and systemic response.

Solid scientific evidence shows that the growing global ecological crisis undermines sustainable development efforts, profoundly affecting human security. Addressing this multi-pronged crisis, which touches practically every ecosystem and biome, demands a transformative shift from words to collective and concerted action backed by a robust, well-oiled multilateral system.

For the past 50 years, we have witnessed an incremental growth of international environmental agreements, norms and standards, coupled with more and better knowledge about the functioning of ecosystems. Nature-friendly technologies have flourished, and we have seen greater public awareness about the nexus between environmental integrity and human well-being. However, we are rapidly approaching a major ecological catastrophe requiring systemic transformations. Pollution, climate change, extinction, and water scarcity threaten the very existence of the human species. Young activists are in the streets and international negotiating spaces, calling for accelerated climate action to stop a preventable catastrophe. And yet the environmental crisis continues, becoming more acute and increasingly irreversible. So why is it that we are not exercising our instinct for individual self-preservation? What policies, regulatory frameworks, governance arrangements, and systemic transformations are needed to change course to guarantee that we will continue to exist as a species? And for that to happen, we must ensure that our life-supporting scaffolds and ecosystems are healthy and well-functioning.

Some of the many multilateral environmental agreements (MEAs) have succeeded in moving the needle on the ecological agenda. However, our findings are raising critical questions about how to translate international standards and commitments into policy and action. Issues of implementation, accountability and liability are also crucial. And there are, of course, answers to these and more questions that this chapter will respond to.

Against this backdrop, the chapter will address these critical questions. It begins with a succinct historical overview of the conceptual and political evolution of the international environmental agenda, briefly presents an outlook of the current ecological crisis, and uses some case studies on the achievements and challenges of some of the key MEAs. Finally, the chapter features some recent and promising developments in a new generation of environmental law and litigation and closes with recommendations for a structural and profound shift based on the requirements of a global environmental governance for epistemic and normative transformation.
The Starting Point: Brief History of the International Environmental Agenda

Understanding the contemporary achievements of global environmental governance, its limits and enduring challenges requires historical context. The imperative of the ecological crisis and its devastating effects on human security did not exist when the United Nations was founded in 1945. Global concern for the health and state of ecosystems and natural resources only emerged in recent decades. It was not until the early 1960s that public opinion became aware of the threats against our environment and the need to establish instruments of legal protection. One of the beacons of this initial movement was the book *Silent Spring* by Rachel Carson (1962).

The international community has recognised the environmental limits of economic growth and the impact of human activity on the conservation of nature since the 1970s. In the final declaration of the historic 1972 UN Conference on the Human Environment celebrated in Stockholm, the international community proclaimed: ‘A point has been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences’.

This landmark Conference on the Human Environment adopted the Stockholm Declaration in 1972, establishing 26 principles to guarantee the right to a healthy environment, which included the ground-breaking Principle 21, calling on states to refrain from activities under their jurisdiction that may cause damage to the environment of other states. This was the first time that conservation of the natural environment was considered to be an international, transboundary issue. Later, in 1987, *Our Common Future: Report of the World Commission on Environment and Development* succeeded that landmark declaration. It was produced by the UN Commission on Environment and Development, which, for the first time, coined the concept of sustainable development, defined in the report as ‘meeting the needs of the present generation without compromising the ability of future generations to meet their own needs’.

In 1992, 20 years after Stockholm, the Earth Summit in Rio de Janeiro established the scaffold for international environmental law with the Rio Conventions on Climate Change, Biodiversity, and Desertification. It also agreed on a political declaration containing the avant-garde Rio Principles, including the Precautionary Principle, the backbone of environmental law, based on the concepts of prevention and ‘no harm’. The Earth Summit also adopted the visionary Agenda 21, which brought together the need to protect ecosystems and natural resources to ensure sustainable development and combat poverty.

The subsequent environmental summit, Rio+10, held in Johannesburg, South Africa, in 2002, adopted the Declaration on Sustainable Development, with its strong focus on the connection between environmental protection and poverty eradication. This summit was followed by the 2012 Rio +20 Conference adopting the Future We Want, centred around the idea of a green economy and laying the foundations for the Sustainable Development Goals (SDGs), establishing an intergovernmental negotiation process, culminating three years later in the adoption of Agenda 2030 in 2015. Only last year, in June 2022, we commemorated the fiftieth anniversary of the first UN Conference on the Human Environment under the banner of Stockholm + 50 with a report, *Unlocking a Better Future*, produced to serve as a reference for the Conference. The report presents a bleak picture of the condition of the world’s environment and the need to change course. The report calls for systemic change based on the need to redefine the relationship between humans and nature and ensure that lifestyles, production, and consumption patterns can bring about well-being for all without trespassing on the
The current environmental crisis: symptom of a dysfunctional relationship between humans and nature

Almost 50 years after the first UN Conference on the Environment, and despite more than 1,400 MEAs (Mitchell 2020), including dozens of significant conventions on ozone, climate change, biological diversity, desertification, chemicals, and pollution, the world is on the verge of environmental collapse. All existing data point in that direction:

- Around one million animal and plant species are threatened with extinction, many within decades, more than ever in human history.
- Deforestation and forest degradation continue to occur at alarming rates. Since 1990, it is estimated that 420 million hectares of forest have been lost through conversion to other land uses.
- Three-quarters of the land-based environment and about 66 per cent of the marine environment have been significantly altered by human action.
- More than 8.3 billion tons of plastic have been produced since the 1950s. However, only 9 per cent of this plastic has been recycled; 12 per cent has been incinerated and 79 per cent has been disposed of in landfills and in the environment.
- Every year, eight million metric tons of plastic debris end up in the oceans, and if current trends continue, our oceans could contain more plastic than fish by 2050.
- The world is heading for a temperature rise above 3°C this century. Unless there are immediate, rapid and large-scale reductions in greenhouse gas (GHG) emissions, limiting warming to 1.5°C will be beyond reach.
- Disasters resulting from extreme weather events are causing 60,000 deaths annually and pushing 26 million people into poverty annually. If these trends continue, by 2050, climate change will displace close to one billion people.
The most recent UN Environment Programme (UNEP) Emissions Gap Report from 2022 clearly states that policies currently in place are projected to lead to a 2.8°C temperature rise by the end of the 21st century (UN Environment Programme 2022a). Specifically, the newly submitted and revised nationally determined contributions (NDCs) from various countries since the climate Conference of the Parties (COP) 26 reduce projected global GHG emissions in 2030 by only 0.5 gigatons of CO$_2$ equivalent (GtCO$_2$e). Moreover, GHG emissions are highly uneven across regions, countries and households. As a result, as emissions continue to increase, we are getting further and further away from the goals agreed to in Paris and the Net Zero target for 2050.

Hundreds of MEAs have not prevented environmental damage and worsening climate change, biodiversity loss and water scarcity, leading to severe, compounded food, water, health, and livelihood crises. For example, the Red List of species about to go extinct has increased significantly. In addition, the acceleration of human development is pushing our planet dangerously close to its boundaries (Galaz 2022). The dichotomy of ‘humans’ and ‘nature’ is no longer defensible (Biermann 2021).

Climate-induced displacement risks will dwarf the current flow of migrants. Food and water supplies will be affected globally. Fossil fuels must be replaced rapidly as our primary energy source. The integrity of the biosphere is also in danger, requiring international, concerted efforts beyond the capacity of many countries. Existing global regulation of dangerous chemicals needs to be strengthened, and transboundary air pollution brought under control. A global approach is also required for equitable and sustainable

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**Figure 21.1** Total and per capita GHG emissions (including land use, land use change and forestry (LULUCF)) of major emitters in 2020 and since 1990.

*Source: UNEP Emissions Gap Report (2022a).*
Figure 21.2 The global Living Planet Index 1970 to 2018.

Note: The Living Planet Index allows us to see how species are faring by measuring trends in monitored populations of vertebrate species. It reports the average change in the size of these populations around the world. Source: WWF, Living Planet Report (2022).

Figure 21.3 The world map of drought risk.

Source: Statista, Aqueduct by World Resource Institute.
Figure 21.4 Percentage increase or decrease of deaths since 2016.

management and use of our ecosystem services. An integrated approach is necessary, as
the environmental crisis requires an integrated, holistic approach leading to collective
action. A multilateral system is where this transformation must happen, in addition to
regional, national and local action. The risks of a catastrophic ecological collapse are
increasing, and we are reaching a point of no return if we do not act now.

The explanation is that the environmental crisis, the climate emergency is not the
problem but rather the symptom of a more profound systemic, civilizational crisis that
requires a radical transformation of the relationship between society, the economy, poli-
tics, and nature.

Therefore, the critical question is, How can we govern our global commons so as to
ensure that the human species can continue to exist and ecosystems are kept healthy? The
complexity and urgency of this issue are even greater, given that ecosystems and the earth
system do not recognise national boundaries. When we speak about the high seas, outer
space and the atmosphere, it is clear that we need to rethink the current institutional
governance designs and build alternative normative and legal frameworks based on our
responsibility to keep a safe and well-functioning earth system as a common good.

In sum, after 50 years of existence, international environmental law has not been able
to protect, let alone restore, depleted resources and ecosystems. This brings us to the
question: what is failing in our international environmental regime? What must we do to
turn this situation around, repair the environmental damage we have caused and ensure
a sustainable development that respects planetary boundaries? The concept of 'planetary
boundaries' is especially pertinent since it has dramatically changed how we view policy
and governance responses to the ecological crisis. It will be addressed later in this chapter.

Fifty Years of International Environmental Law: Some Examples

For the past 50 years, we have witnessed the exponential growth of environmental agree-
ments and the increasing sophistication of norms and standards, constituting a solid re-
pository of international law. Some success stories demonstrate that concerted action and
multilateralism can significantly reduce environmental threats.

**Climate COPS: History, Outcomes and Results**

The climate COP has a history of almost 30 years. The core principle of the COP on
common but differentiated responsibilities has been not only the engine for reaching
agreements but also the source of dissent. Tensions between high CO₂ emitters and the
countries bearing the burden of climate-related impacts have created a whole diplomatic
culture with crucial milestones such as establishing the Green Climate Fund or adopting
the Paris Agreement in 2015 and the recent creation of the Loss and Damage Fund. But
we have also witnessed severe disagreement over critical issues, such as low-carbon tech-
nology transfer to developing countries and unresolved discussions related to intellectual
property rights, compliance with financial commitments under the Green Climate Fund,
or greater clarity of timelines for the phasing out of fossil fuels and the sizeable subsidies
that accompany them.

In 1992, the Intergovernmental Negotiating Committee (INC) adopted the United
Nations Framework Convention on Climate Change (UNFCCC). In 1994, the UNFCCC
entered into force, and in 1995, the first COP took place in Berlin. The UNFCCC has a
near-universal membership today, with 195 countries having ratified the Convention. In
1997, the Kyoto Protocol to the Convention was adopted, calling industrialised countries to adopt measures to limit and reduce GHG emissions, adopt mitigation measures and report periodically to the COP. It also established flexible market mechanisms based on the trade of emission permits. The Protocol entered into force in 2005 and was ratified by 192 parties.

It is well known, however, that the Kyoto Protocol failed. One of the essential elements of the Protocol was the establishment of flexible market mechanisms based on the trade of emission permits. However, implementation was increasingly faulty, and there was an ever-lengthening list of dissenters among many of the signatories. Even if the Protocol was a key landmark in international climate history and has never formally ended, it was technically superseded by the Paris Agreement.

In 2015, the Paris Agreement was adopted as a decision under the UN Convention on Climate Change during COP 21. The goal of the Paris Agreement is to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels. In addition, the Paris Agreement requires each Party to prepare, communicate and maintain successive NDCs that it intends to achieve.

However, the Paris Agreement calls for developed countries to take the lead in providing financial assistance to less endowed and more vulnerable countries. Despite intense lobbying by the Alliance of Small Island States (AOSIS) members, the Paris Agreement failed to acknowledge loss and damage. Though the issue of loss and damage was addressed in the inclusion of Article 8, it came with a clause insisting that there was no ‘basis for any liability or compensation’. At the Paris Climate Summit in 2015, large emitters shifted the legal conversation away from ‘compensation’ for climate-related loss and damage in heavily affected states towards ‘voluntary aid’ (Busby 2019).

Subsequent efforts by states parties to fill the emissions and finance gap have been weak and have yet to be implemented. In 2018, COP 24 in Katowice, Poland, had difficulty reaching an agreement between parties. As a result, there are many difficult questions, such as ways to scale up existing commitments on cutting emissions, ways to provide financial support for developing countries, means to avoid double counting, and whether countries need to scale up their commitments to reduce emissions, etc. These vital decisions were postponed. The results from COP 25 were less than fruitful, as the decisions about the carbon market and emissions cuts were delayed. In 2021, the Glasgow Climate Pact in COP 27 failed to include a formal and binding mechanism to deliver loss and damage financing and witnessed saw some heavy emitters successfully water down a pledge to ‘phase out’ fossil fuels, replacing that wording with the more ambiguous ‘phase down’. In 2022, COP 28 in Sharm El Sheikh only gave an empty box of ‘loss and damage’ funds to developing countries, dodged commitments, and did not touch on ‘phase[ing] out fossil fuels’, which remains a critical issue on the urgent need to curb emissions.

Despite the ups and downs of almost 30 years of climate COP, there is a need to recognise the importance of having an intergovernmental platform to commit, negotiate, agree, and disagree. Climate COPs have increasingly gone beyond the mere government-to-government negotiation to become the venue for multiple voices and actors with a voice in climate decisions. Indigenous Peoples, women, youth, scientists, civil society organisations, multilateral banks, the financial and insurance companies, the philanthropic sector, and the private sector gather in climate COPs, which has become ‘the place to be’ if you are involved not only in climate but also in world politics.

The downside is that despite all the fanfare and having climate occupy a privileged space in world headlines, the pace of transformative action and core responsibility is far
behind in the task of stabilising our climate. Emissions continue to rise steadily, and the human and economic costs of inaction profoundly impact the living conditions and security of hundreds of millions of people and countries, especially in Small Island Developing States and other vulnerable countries in the Global South that are disproportionately affected.

Looking at the prolific yet convoluted climate COP history, we can conclude that the Climate Convention COPs have helped raise the political profile of, and the world’s attention to, the climate crisis; they have put under scrutiny the decisions and commitments of world leaders and decision-makers, and it has awakened the voices of activists and climate justice defenders from around the globe. However, the arithmetic of emissions reduction, the delivery of sufficient climate adaptation and resilience-building funds for vulnerable countries, and the transfer of low-carbon technologies and capacity to the countries in need have not happened at the scale and speed needed.

The Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol

The Vienna Convention for the Protection of the Ozone Layer, signed in 1985, is one of the most compelling instances of global environmental action (Downie 2019). The Convention is among the very few successful MEAs. The Convention provides a framework that lays out general principles, later translated into more specific action in the Montreal Protocol, signed in 1989, requiring countries to undertake concrete regulatory steps to phase down the consumption and production of ozone-depleting substances (ODS) to protect the ozone layer. The Vienna Convention and the Montreal Protocol are, to this date, some of the rare treaties that have achieved universal ratification, which showed the gravity of ozone depletion at the time it was conceived and the willingness of countries around the world to work together to address this crisis. All parties have specific responsibilities related to phasing out the different groups of ODS, control of ODS trade, annual reporting of data, national licensing systems to control ODS imports and exports, and other matters.

Moreover, developing and developed countries have equal but differentiated responsibilities. Nevertheless, both groups of countries have binding, time-targeted and measurable commitments. The Vienna Convention and the Montreal Protocol succeeded because of political will, aligned with a shared objective, clear targets and timelines and available and affordable replacement technologies.

The United Nations released a report in early 2023 on the progress of the Montreal Protocol, which has been in place for 35 years. The report shows that nearly 99 per cent of ODS have been phased out globally. The expert panel in the report predicts that if current policies continue, the ozone layer will return to 1980 levels by 2040. The Montreal Protocol has also helped reduce global warming by an estimated 0.5°C.

Furthermore, if countries comply with the Kigali Amendment (to the Montreal Protocol), which entered into force on January 1, 2019, and calls for a more significant reduction in the production and use of certain hydrofluorocarbons (HFCs), it could prevent an additional 0.3°C to 0.5°C of warming by 2100 (UN News 2023).

The positive impact of the Montreal Protocol on the global struggle against climate change is evident through current facts and future projections. Notably, the agreements made under the Protocol are unique in that they address a long-term problem, where the cause of the damage is taking place today, but the effects will not be seen for decades
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This means that the international community made decisions based on science and evidence at the time of the negotiations. Still, even though the impact was not widely felt and experienced, as with the effects of climate change, yet action and resolution did occur. What is clear is that no single country could have solved the problem of the depletion of the ozone layer, demonstrating that international cooperation and effective multilateral action are possible when there is strong political will.

The CITES Convention on Protecting Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty signed in 1973 to protect endangered plants and animals from the threats of international trade. There are 184 member parties, and trade is regulated for more than 38,000 species. The Convention works by listing species on one of three appendices, depending on the level of protection required. The listing system is regularly updated to adapt to the changing situation of each species. CITES has succeeded as one of the cornerstones of international conservation, considering that no species listed under CITES has gone extinct in the last 30 years. CITES also brings together law enforcement officers from wildlife authorities, national parks, customs, and police agencies to collaborate in the efforts to combat wildlife crime targeted at animals such as elephants and rhinos. This cooperation has helped to reduce the illegal trade in many species and to protect their populations. However, it is worth noting that scholars have suggested reforms to CITES to improve the monitoring of illicit trade and the demand and prices for wildlife (Challender, Harrop and MacMillan 2015).

Concrete and often-cited success stories of CITES include the preservation of the South American vicuña and the crocodile from the Nile. In addition, there have been some plausible initiatives, such as the BioTrade, initiated by UNCTAD, which allows sustainable supply chains to develop market access for rural communities. In addition, the FairWild standard from IUCN/TRAFFIC certifies wildlife products from rural communities based on CITES’s needed role in certification schemes.

Issues concerning the use of biodiversity-related traditional knowledge and benefit-sharing mechanisms remain critical, emphasising the need to reconcile existing environmental legal frameworks. The connection and needed coherence and coordination between the CITES Convention with the UN Convention on Biological Diversity and its Nagoya Protocol becomes evident. Still, it does not happen systematically and predictably. The Nagoya Protocol is an international instrument under the Convention of Biological Diversity aiming to establish mechanisms to ensure benefit-sharing arising from using genetic resources fairly and equitably (UN Environment Programme 2022c).

Ramsar Convention: Five Decades of Wetlands Conservation

The Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat, also known as the Convention on Wetlands, is an international treaty for the conservation and sustainable use of Ramsar sites. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971. It is among the first modern agreements between nations to conserve natural resources. It has been considered a precursor of international environmental law and a diplomatic success story since the Convention was signed during the Cold War, with its continuing political tensions and economic competition following World War II.
The Ramsar Convention’s broad objectives are to halt the worldwide loss of wetlands and conserve those that remain through more sensible use and management. In addition, the Ramsar Convention has been considered a valuable tool to raise awareness about the importance of wetland conservation. However, there is still a long way to go, as wetland destruction persists in many parts of the world. A key contribution of the Convention is the adoption of the ‘Wise Use Principle’, which recognises the physical limits of ecosystems and the role of wetlands as regulators of the water cycle, besides their contribution to improving the quality of life and fostering the culture, knowledge and livelihoods of Indigenous peoples and local communities.

After Ramsar’s five decades of operation, 174 contracting parties have prioritised the conservation and wise use of wetlands by listing wetlands assessed as internationally essential and committing to maintaining their ecological character (Davidson et al. 2019). The designation of Ramsar sites has helped protect and conserve important wetland habitats and species. However, ecological character, the combination of ecosystem components, processes and benefits, is increasingly deteriorating in Ramsar sites (ibid.: 127–38). Key ecological indicators measured these deteriorations, including threats that cause degradation (Davis and Brock 2008).

Overall, the Ramsar Convention’s framework for cooperation among countries has facilitated the exchange of information and best practices for wetland conservation and management. It can also be considered a partial success in international environmental law, even if the challenges to wetland ecosystems remain. Since 1970, we have lost 35 per cent of global wetlands and 25 per cent of freshwater species face extinction (Ramsar Convention on Wetlands 2021).

Outlook for the Future of Global Environmental Governance

The existing conventions are part of the history of international environmental law. They have served as platforms for negotiation, as benchmarks for national law and policy and have produced, benefited from and contributed to increasing ecological knowledge and science.

Despite increasing geopolitical tensions and a rarefied international diplomatic environment, progress continues. There is room for optimism concerning future conventions to come in response to the triple planetary crisis on climate change, loss of biodiversity and pollution and waste which we are now experiencing. For example, the concerted effort to phase out single-use plastics offers hope for improvement!

There are new treaties under negotiation. In early March 2022, at the UN Environment Assembly (UNEA-5) in Nairobi, member states passed a resolution to combat plastic pollution and create an international legally binding agreement by 2024. This new Convention aims to address the entire lifecycle of plastics, promote the design of reusable and recyclable products and increase international collaboration to provide access to technology, capacity building and scientific and technical cooperation. However, the UN resolution is not calling for a two-year pause in global efforts to beat plastic pollution. To this effect, the UNEP pledged to work with any willing governments and businesses across the plastic value chain to move away from single-use plastics, to mobilise private finance and remove barriers to research and investment in a new circular economy until the new agreement is ready (UN Environment Programme 2022b).

In December 2022, a significant step was taken to stop and reverse biodiversity loss by 2030. At the COP 15 Biodiversity Conference in Montreal, member states agreed to
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protect at least 30 per cent of land, freshwater and ocean globally. This goal will be achieved while respecting the rights of Indigenous peoples and local communities and recognising the role of Indigenous and traditional territories to attain this new target. The new Biodiversity Framework is considered a breakthrough in biodiversity conservation, as significant as the climate 1.5°C goal (WWF 2022).

Another reason for optimism is the historic adoption of a new High Seas Treaty in March 2023, following decades of negotiations. The agreement aims to protect 30 per cent of the seas by 2030 and safeguard and recover marine ecosystems (United Nations 2023).

Despite recent developments, we also know that there are many deficiencies related to implementation, accountability and liability mechanisms and the need for coherence and complementarity among existing instruments. We have created a complex web of a siloed, issue-based, fragmented body of international instruments related to the environment, and this, in turn, makes implementation and compliance increasingly difficult. How to factor these commitments into national legislation, policy, and planning, and furthermore, how to create or strengthen the national capacities and the resources, both financial and human, to deliver?

There is a crying need for greater coherence, a more holistic approach to environmental regulation, and for addressing the financial and capacity gap seriously. Notably, such holistic regulation should integrate diverse perspectives, including those of women and underrepresented groups, to ensure fair and comprehensive solutions. This requires greater cooperation, shared responsibilities and concerted environmental action. In short, there is a need for a more robust multilateral scaffold and better governance arrangements. The proposal for a new Global Pact for the Environment was an initiative in the right direction.

The Rise and Fall of the Global Pact for the Environment

The United Nations General Assembly requested the Secretary-General to prepare a report by 2018 on gaps in international environmental law and environment-related instruments towards a Global Pact for the Environment (GPE) (UN General Assembly 2018). The Secretary-General’s report clearly states that the ‘structure of international environmental governance is characterised by institutional fragmentation and a heterogeneous set of actors, revealing important coherence and coordination challenges. Moreover, international courts and tribunals often stress the lack of international consensus concerning environmental principles’. Following the report, the General Assembly established an intergovernmental negotiation working group. Four negotiations were conducted in Nairobi to reach an outcome containing recommendations. Unfortunately, the negotiation and outcome failed, owing to the lack of political support. Some countries’ open and frank opposition presented concerns over the legal implications on compliance and liability. Others discussed the need to avoid duplication and overlap with existing MEAs.

Despite the divergent positions on the outcome of the negotiations, in August 2019, the General Assembly adopted a procedural resolution endorsing the working group’s recommendations, but with no mention of the GPE. The original draft proposed negotiating modalities for the 50th commemoration of the Stockholm Conference in 2022, including recommendations concerning the right to a healthy and sustainable environment, changes to our economic system, accelerating the implementation of existing commitments, rebuilding trust, and strengthening multilateralism (UN Environment Programme 2022d).
The GPE project stems from an international civil society initiative. Aiming to be the first international treaty to address the environment from an integral, holistic perspective, the GPE is intended to be a declaration of principles to redefine, rethink and transform the relationship between society, the economy, politics and nature. It is not designed to overlap or duplicate but rather to be an umbrella, an overarching scaffold to address the current fragmentation in international environmental law and provide a coherent, consistent and accountable framework for the already existing MEAs. The main objective of the pact is to bolster the environmental law system at all levels and achieve the SDGs, the 2030 Agenda.

The original text for negotiation starts by establishing that every person has the human right to live in an ecologically sound environment that promotes their health and well-being. Then, it highlights critical concepts such as the Precautionary Principle, the principle of no regression and intergenerational equity, among others. The provision on liability and redress is one of the critical issues since it provides a window of opportunity to establish follow-up and oversight mechanisms. However, this possibility is a matter of concern for some member states.

Countries can be and are sometimes parties to literally hundreds of environmental agreements. However, there is no mechanism for addressing international environmental law from an interconnected and holistic perspective to enhance enforcement and accountability. Moreover, there is no monitoring mechanism for implementing MEAs and ensuring coherence and interconnectedness. This dilemma is contradictory since nature and the environment are systemic, indivisible and interdependent.

Much has already been said about the earth system as our common heritage. Suppose we were to compare the GPE to our current human rights architecture, for example. In that case, we have the Universal Declaration of Human Rights, two overarching Covenants on civil and political rights, and a second one on economic, social and cultural rights. These overarching frameworks are complemented by seven fundamental conventions, including those on genocide, refugees, discrimination in employment, discrimination against women, etc. In addition, there are eight Treaty Bodies of experts. Using the same logic of the need for an overarching structure, the GPE may be a supporting framework of principles to shelter the specific treaties or conventions.

There are several important reasons to back the call for a GPE. First, the pact could be a valuable tool to help states and societies enhance integrated sustainable development policy and planning; second, the pact could help establish coherence and complementarity to avoid fragmentation and duplication in the implementation efforts of existing MEAs. Third, the pact could set norms and standards to enhance and develop national legislation. Fourth, the pact could provide a platform to protect the rights of particular groups or persons affected by environmental degradation or specific types of pollution and provide guidance on issues of liability and redress. Finally, a global pact could also serve as a multilateral platform to strengthen international cooperation, boost investment and establish mechanisms to protect common environmental goods such as the atmosphere, oceans, genetic resources, and the water cycle.

Finally, the pact may be closely connected to the 2030 Agenda. SDGs straddle key, interconnected areas such as environmental sustainability, job creation and governance, food security and water and sanitation, women’s rights and empowerment, poverty, biodiversity, migration, partnerships, and education. A GPE could serve as a catalyst for better and more effective policies, planning and investment in sustainable development models.
Since environmental problem-solving concerns the overall relationship between humans and natural systems, the GPE will allow the emergence of a global legal framework that better protects our planet while filling the gaps and overcoming unnecessary duplication and contradictions in international environmental law.

Recent Developments in Environmental Law

Cases of Environmental Litigation at the National Level

In recent years, the role of climate change litigation has become increasingly prominent. Since 2015, the number of climate change cases brought to the courts worldwide has more than doubled. Several vital trends in environmental litigation at the national level include lawsuits alleging state inaction violating fundamental human rights, cases challenging domestic enforcement of climate-related laws and policies, cases targeting large private firms, claims alleging failures to adapt to climate change, and cases concerning the accuracy and transparency of climate risks.

For example, in February 2020, a group of German youth filed a legal challenge to Germany’s Federal Climate Protection Act (‘Bundes-klimaschutzgesetz’ or ‘KSG’) in the Federal Constitutional Court, arguing that the KSG’s target of reducing GHGs by 55 per cent by 2030 from 1990 levels was too low. The complainants alleged that the KSG violated their human rights as protected by the Basic Law, Germany’s constitution since KSG’s 2030 target did not consider Germany’s and the EU’s obligation under the Paris Agreement to limit global temperature rise to ‘well below 2 degrees Celsius’. The young litigants argued that Germany would need to reduce GHGs by 70 per cent from 1990 to 2030 to ‘do its part’ to achieve the targets.

On April 29, 2021, Germany’s High Court published a decision striking down parts of the KSG as incompatible with fundamental rights for failing to set sufficient provisions for emission cuts beyond 2030. The Court found that the Basic Law obliges the legislature to protect the climate and aim towards achieving climate neutrality but ‘also concerns how environmental burdens are spread out between different generations’. Furthermore, the Court stated for the first time that ‘the fundamental rights —as intertemporal guarantees of freedom—afford protection against the GHG reduction burdens imposed by Art. 20a of the Basic Law being unilaterally offloaded onto the future’ (Columbia University 2023). It further stated that the KSG’s emission provisions constituted an ‘advance interference-like effect’, potentially violating the complainants’ fundamental rights and thus rendering the complaints admissible.

The Court found that legislature had not proportionally distributed the budget between current and future generations, writing,

One generation must not be allowed to consume large portions of the CO₂ budget while bearing a relatively minor share of the reduction effort, if this would involve leaving subsequent generations with a drastic reduction burden and expose their lives to serious losses of freedom.

The Court also highlighted that the fact that ‘no state can resolve the problems of climate change on its own ... does not invalidate the national obligation to take climate action’ (Columbia University 2023). The Court ordered the legislature to set clear rules for emission reduction targets from 2031 onward by the end of 2022. In response to the decision,
the federal lawmakers passed a bill approving an adapted KSG that requires a minimum reduction of 65 per cent in GHGs from 1990 levels by 2030. It has been in effect since August 31, 2021. However, the law only outlines how emissions will be reduced over the next decade. Decisions on how and by how much to reduce carbon emissions between 2031 and 2050 have yet to be decided and will be made in 2025.

Another example, in New Zealand, in March 2022, saw a Māori landowner and tribal climate spokesperson argue that successive New Zealand governments had failed to adequately address the effects of climate change on New Zealand and its citizens, especially the Māori. Specifically, the plaintiff argued that the government had been unable to incorporate international obligations into domestic law and to reduce the carbon emissions produced by government activities. Furthermore, the complainant argued that the overall emissions cap was set too high and contained unjustifiable exemptions.

In March 2023, New Zealand recently passed legislation recognising Mountain Taranaki Maunga subject of rights, restoring the original Māori name, which replaced the Egmont colonial name. The mountain is part of a National Park that also becomes a legal person named Te Kahui Yupua and will have an entity to act as its voice made up of Indigenous and government representatives (Roy 2017). This concept is also included in Article 71 of the Ecuadorian Constitution (2008) (Republic of Ecuador 2011), which was the first to grant nature constitutional rights. In September 2008, the people of Ecuador voted overwhelmingly for a new constitution that gives nature—its mountains, rivers, forests, air, and islands—legally enforceable rights to ‘exist, flourish and evolve’. Article 71 of the Constitution states, ‘Nature, or Pacha Mama, where life is reproduced and occurs, has the right to integral respect for its existence and the maintenance and regeneration of its life cycles, structure, functions, and evolutionary processes’. This provides grounds for legal action from citizens against the state for activities or interventions that may cause grave environmental damage. A case in point is the ruling from the Constitutional Court of Ecuador in November 2021 calling for the immediate suspension of mining activities in ‘Los Cedros’ Protected Forest, in which the rights of nature, the right to a healthy environment, the right to water and environmental consultation were alleged to have been violated. The Constitutional Court, therefore, developed a binding jurisprudence on this issue (Corte Constitucional del Ecuador 2021).

The New Portuguese Climate Law

In November 2021, the Portuguese Parliament approved a new Climate Law that calls for recognising a stable climate as a common heritage of humanity. This law came to fruition after a Recommendation was presented by the National Commission for the Environment and Sustainable Development, along with a petition assembled by more than 260 Portuguese academics, including the Common Home of Humanity, and a public request with thousands of signatures.

The law defines the United Nations’ recognition of a stable climate as a common heritage of humankind as a diplomatic objective and priority. The law defines climate stabilisation as a shared responsibility. It represents a significant conceptual step forward, recognising a stable climate as a common good under international law. It also acknowledges and values the economic and social benefits of living in an ecological safe space.
The backbone of this proposal was the concept of planetary boundaries science (Rockström et al. 2009) that enables a clear definition of a safe operating space for humankind and the bounty of a well-functioning earth system that depends on having a stable climate and healthy ecosystems. The attractive edge of this proposal is that it counters the alleged call by some countries on sovereignty and national interest since climate stability becomes a common good and, therefore, a shared responsibility. Still, it refers to non-territorial, intangible commons that determine the future and well-being of humankind. This law is, undoubtedly, an avant-garde piece that deserves attention and may be used as a reference for future multilateral discussions on how to govern our environmental commons.

The Human Right to a Clean, Healthy and Sustainable Environment

A clean, healthy and sustainable environment is essential for survival. On July 28, 2022, the UN General Assembly declared that for people to have access to a clean, healthy and sustainable environment is a universal human right. As a landmark development, the resolution demonstrates that member states can come together in a collective response against the planetary climate change crisis, biodiversity loss, pollution, conflict, pandemics, unsustainable debt, significant inflationary pressures, and environmental degradation.

Initially proposed by Costa Rica, the Maldives, Morocco, Slovenia, and Switzerland and later co-sponsored by more than 100 countries, the UN General Assembly decision reflects the resolution adopted by the UN Human Rights Council (UNHRC) in October 2021, which represented the first formal recognition at the global level of the right to a healthy, sustainable environment.

Five decades after the 1972 Stockholm Declaration, member states recognised the right to ‘an environment of a quality that permits a life of dignity and well-being’ (UN News 2022). This right has been integrated into constitutions, national laws and regional agreements, and is now integral to the international legal framework. This resolution notes that the right to a clean and sustainable environment is ‘related to other rights existing international law’. It affirms that its promotion ‘requires the full implementation’ of the MEAs ‘under the principles of international environmental law’.

While the UN General Assembly resolution is not legally binding, it can still catalyse action. Governments now must promote, protect and fulfil this right. A clean, healthy and sustainable environment is a matter of justice, and such a resolution promotes an optimistic outlook and will likely result in a cascade of positive changes.

The Advisory Opinion to the International Court of Justice on Climate Change

Aside from environmental litigation efforts at the national level, there has also been growing interest in the role of international courts and tribunals in addressing climate change, including the International Court of Justice (ICJ), regional and human rights bodies, and the International Tribunal for the Law of the Sea. The current design of global environmental governance has proven that enforcement and compliance mechanisms are one of the Achilles’ heels in contemporary global environmental governance.

Inspired by civil society activists and lawyers from around the world, the Vanuatu Government took up the leadership of a campaign to request an advisory opinion from the ICJ regarding the obligation of states concerning climate change. After many months of negotiations, Vanuatu and a core group of more than 133 countries tabled a resolution
at the UN General Assembly on March 29, 2023. The resolution asks the ICJ to clarify
the obligations of states in protecting the rights of current and future generations from
the adverse effects of climate change. The resolution was adopted by consensus by the
General Assembly.

Although the ICJ’s advisory opinion is non-binding, it helps to bring clarity to how
existing international laws and instruments, including under the UN Convention on Cli-
mate Change and the Paris Agreement, can be enforced and strengthened to boost cli-
mate action and protect people’s lives and livelihoods. The resolution also addresses
intergenerational climate justice by explicitly calling for the rights of current and future
generations to live in a safe environment.

The advisory opinion can also help shed light on thorny and unresolved climate dis-
cussions, such as liability and compensation for loss and damages associated with global
warming. The recently established Loss and Damage Fund is a step in the right direction,
but its operation and effectiveness remain to be seen. Responsibility and accountability
have long been a sticking point in climate diplomacy and a centrepiece of the agenda of
civil society advocacy. Despite well-established principles such as ‘polluter pays’, there
exists not only a dense web of rules that assign liability for foreseeable harm and demands
that it be remediated but also a network of courts and tribunals to uphold these laws. The
advisory opinion—expected to be delivered in 2024 by the ICJ may contribute to improv-
ing climate liability and redress mechanisms.

Four Shifts to Transform the Global Environmental Architecture

However, global environmental governance goes beyond mere multilateral environmen-
tal treaties. It depends on converging elements, including institutions, laws, regulations
and an informed and active citizenship. Additionally, it mandates inclusive representa-
tion, such as ensuring the active participation of women in decision-making roles to drive
balanced and effective outcomes. It encompasses a shared narrative and a conceptual
scaffold that supports decisions on regulation, policy and practice. It involves a multiplic-
ity of actors making decisions that affect the integrity or contribute to preserving or re-
storing our environmental commons, including governments, civil society, Indigenous
peoples and local communities, science, and the private sector. It includes citizens making
decisions as consumers and voters.

This means that redesigning environmental governance on a global scale is not a simple,
technocratic undertaking. It entails a series of transformations with different rhythms and
requires the alignment of political will and agreement of vision and priorities. It involves a
combination of short-term incremental changes and more profound structural transforma-
tions. More immediately actionable changes may require optimising the enforceability of
existing MEAs, mapping existing obligations to avoid duplication and inconsistencies, and
identifying regulatory gaps. Adopting the GPE can be an opportunity to advance efforts
towards greater coherence and consistency in international environmental law.

However, as the world faces escalating environmental challenges, global environmen-
tal governance requires addressing more structural shifts to reconcile human societies
with nature itself. And that entails more than simply improving our existing instruments
or agreeing on new ones. Instead, it requires a profound transformation in how we gov-
ern the environment as a common good, the foundation for our survival as a species. And
for that to happen, we need at least four fundamental shifts.
The Epistemic Shift

First, it is vital to fix the conceptual framework. We need to go from considering nature as a repository of unlimited resources and its use and depletion as externalities of economic activity. This chrematistic view of nature, merely measuring in monetary terms, is replaced by a conception of nature as a rights holder, as a complex system, supporting the web of life, seeing it as the earth system that humanity must protect so it can continue to exist and regenerate. This means considering the earth as our most essential commons. Only in this way can the atmosphere, a stable climate, the water cycle, and biodiversity be appreciated as common goods that require concerted global action and the legal and policy instruments to protect and govern—not particular biomes, ecosystems or species but the entire complex earth system.

For the earth system to maintain its balance, nine processes are required to regulate its stability and resilience. These nine processes are translated into nine quantitative planetary boundaries that humanity must respect to ensure the system continues to function and sustain human life (Stockholm Resilience Centre 2022). Trespassing these boundaries increases the risk of large-scale abrupt or irreversible environmental changes. Scientists have warned that humanity has already crossed five of these boundaries: climate change, loss of biodiversity, loss of the integrity of the biosphere, land-system change, and altered bio-geochemical cycles (phosphorus and nitrogen); moreover, recent findings have added a sixth: the freshwater cycle (Rockström et al. 2009).

This means that we are evolving from our earlier ‘resource’ approach to one of thinking in terms of systems, from managing a particular species or biome to maintaining cycles and processes. This conceptual shift will have profound implications for policy, economics, regulation, and international law. The idea of considering the earth system and its processes and cycles as a common good also implies that there is a need to have the right institutions and legal frameworks to ensure cooperation and responsibility to govern our environmental commons. Concerns over sovereignty and national interest regarding using natural resources are often raised in the discussion about the commons. However, the concept of the earth system as part of our commons refers to a non-territorial category, an intangible heritage that must be preserved by and for humanity. Paulo Magalhães explains this in his work on a stable climate as a common heritage of humanity (Magalhães 2020).

The concept of an interconnected and interdependent earth system is an excellent foundation for strengthening the implementation of existing MEAs by integrating and mainstreaming environmental obligations in overarching policy and law.

The Implementation and Enforcement Shift

We have argued that there is already a plethora of global and regional environmental treaties, protocols, laws, and standards, but a wide implementation gap caused by the complex, fragmented and often inconsistent understanding of our obligations. There is an urgent need to streamline existing commitments in order to identify overlaps, inconsistencies and gaps and design accelerators for implementation, including financial and human resources and enhanced institutional capacity. It is understood that this is not only a technocratic exercise but requires the active engagement of scientists, lawyers, practitioners, and, above all, the political will to carry it out.
If we are to overcome the implementation deficit of MEAs, robust and actionable enforcement mechanisms with clear targets and social oversight need to be put in place. For this to happen, the political will of governments and an enabling political environment are critical. The responsibility and active engagement of the private sector, civil society and the corporate sector are equally important. Whether we are thinking about pollution, GHG emissions, water use, or deforestation, they are all critical for any accountability and compliance system. Needless to say, well-informed and active citizenship for oversight and public awareness-raising are also crucially important factors for implementation and accountability.

In addition to accelerating the implementation of existing MEAs and establishing clear enforcement and accountability systems, there is a need to strengthen environmental litigation instruments and establish solid jurisprudence using the success stories of Germany, Ecuador and New Zealand (Ramos et al. 2023). The Advisory Opinion of the ICJ on climate may also indicate some avenues for advancing environmental litigation.

In summary, accelerating implementation, designing well-oiled enforcement systems and strengthening liability instruments will be vital in ensuring that MEAs keep humanity within planetary boundaries.

The Shift to a New Economics for the Earth System

The epistemic shift from a siloed and resource-based approach to the environment to one of an interconnected and interdependent earth system necessarily leads to a new economics that goes far beyond the conventional linear economies conceived in terms of accumulation, growth and wealth. For well-functioning ecosystems are a common good. Such a new conception will translate into concrete policy shifts from ‘polluter pays’ and offsetting carbon emissions and pollution, to one of valuation and compensation for preserving environmental services such as forests, rivers and biodiversity for the well-being of the whole of humanity. There is an abundance of literature on new economics for the earth system, including works on the circular economy (Geissdoerfer et al. 2017)—based on principles of reuse and recycling—and on regenerative economy, which examines further austerity in lifestyles and reducing consumption (Climate-KIC 2023).

In this sense, linear, conventional economics based on growth and profit is evolving towards a new earth system economics and metrics. Conventional economics measures the performance of an economy through growth and GDP. Earth system economics requires three major transformations: first, expanding current categories to measure the ‘Wealth of Nations’ as described by Adam Smith in the 18th century to encompass the social and ecological dimensions of wealth. There has been significant progress in conceptual thinking and new forms of nature valuation, including the works of Stiglitz and Fitoussi (Stiglitz, Fitoussi and Durand 2018), who call for new social and environmental parameters and indicators in National Accounts and Statistics to better inform public policies. Ongoing efforts to go beyond GDP aim at measuring human well-being by including ecological footprints and planetary boundaries, examining the carrying capacity of our ecosystems. An example is natural capital accounting through the System of Environmental-Economic Accounting (SEEA), adopted in 2012 as an international statistical standard for natural capital accounting. Currently, 90 countries worldwide are using this system, which has proven to be extremely useful when making national economic and policy decisions.
Second, we must internalise nature’s value as central to the welfare of human societies. Global supply chains should include carbon and nature footprints in the commodity cycle. Interesting developments and new thinking call for ‘Global Responsibility Chains’, which consider a set of socio-environmental relations and variables that link commodity producers to consumers, from the source of finance and primary production to extraction and manufacturing, exporting and importing, all the way to final consumption. These variables would allow us to trace and account for the ecological footprint of all goods and services traded, bought and sold, including carbon, water, biodiversity, and other ecosystem goods and services.

Third, the new economics must inform ongoing discussions and negotiations on the reform of the international financial and trade architecture. Two recent forward-looking initiatives deserve attention: Debt Relief and Green and Inclusive Recovery (DRGR) and Bridgetown, both described in the following sections.

The DRGR Initiative

Spearheaded by the Heinrich Boell Foundation, Boston University and the University of London, the DRGR initiative calls for comprehensive debt relief to enable developing countries, especially those under debt distress, to invest in sustainable development, climate adaptation and resilience-building.

There is broad acknowledgement that climate-related shocks are hitting developing countries the hardest, despite their low contribution to climate change. Notwithstanding the urgency to invest in green development, debt overhangs and limited fiscal space jeopardise their efforts. Emerging markets and developing economies (excluding China) need at least $1 trillion annually in external flows to achieve development and climate goals (Songwe, Stern and Bhattacharya 2022). But about two-thirds of low-income countries have a high risk of, or are already in, debt distress (IMF 2023), and rising debt risks are not restricted to the poorest nations (Ramos et al. 2023).

Clearly, solving the climate crisis will involve addressing the debt crisis in the Global South. But the current framework for solving it, the G20 Common Framework for Debt Treatments, is unfit for at least three reasons: it excludes middle-income countries; the process is exceedingly slow, as countries that applied have yet to see a debt reduction, and there are no incentives to compel private creditor participation.

Bearing these challenges in mind, the DRGR project proposes an ambitious, concrete and comprehensive debt relief initiative, to be adopted on a global scale, that frees resources to support sustainable recoveries, boosts economic resilience and fosters just transitions to low-carbon economies (Ramos et al. 2023; Volz et al. 2021).

The DRGR is composed of three pillars: (a) including comprehensive debt relief for eligible heavily indebted countries by public creditors, analogous to but improving upon the Heavily Indebted Poor Countries (HIPC) Initiative of the 1990s; (b) commercial and private-sector creditors would exchange old debt holdings for new Green and Inclusive Recovery Bonds, creating a type of sustainability-linked debt; and (c) allowing debt-for-climate or debt-for-sustainability swaps for countries that are not heavily indebted but have reduced fiscal space. With a clean balance sheet, countries can unlock new investments to achieve the SDGs and the Paris Agreement on climate change.

This initiative calls for a profound retooling of the G20 Common Framework. In doing so, it also highlights the need to rethink the overall international financial architecture and the practical and political impossibility for international financial actors to continue doing business as usual.
Like the Bridgetown Initiative (Barbados Ministry of Foreign Affairs 2022), the DRGR project functions according to the same principle by assisting climate-vulnerable countries facing debt and fiscal distress and in need of greater fiscal space and liquidity to meet their development and climate goals. It calls for a shift in the lending clauses and frameworks of multilateral banks and the inclusion of a climate or disaster vulnerability clause leading to a temporary suspension of interest-rate payments on the debt by the country hit by a climate-related disaster. Bridgetown also asks for a re-channelling of at least US$100 billion of unused Special Drawing Rights to countries in need and expands concessional lending to US$1 trillion for especially climate-vulnerable countries. Finally, the initiative requests new low-interest, low-term instruments of at least $500 billion to accelerate private investments in the low-carbon transition and mitigation efforts.

This proposal addresses the immediate liquidity needs of climate-vulnerable countries but also lays a path for transforming the international financial system so as to channel the needed resources for climate adaptation, resilience-building and energy transition. The resources also allow for the scaling-up of investment to achieve the SDGs, including in health and education.

In addition to the aforementioned initiatives, several other proposals are on the table, including the compliance of commitments on Overseas Development Assistance (ODA) by industrialised countries to climate-vulnerable countries and other measures, such as a Green Global Tax Pact.

These illustrate the fact that we are not short of proposals and ideas for crafting the new economics for the earth system, using the right measuring tools, valuation instruments, justice and equality indicators, and institutions and governance arrangements.

The Institutional Shift

The three aforementioned critical shifts to reform global environmental governance: conceptual, legal and normative, coupled with a valuation and economics transformation require a retooled institutional scaffold. We need upgraded global institutions, policy and normative frameworks and justice systems in order to be equipped to govern the environmental commons. Several voices are calling for an upgrade to the UNEP to be transformed into a fully specialised agency in the system. The UN Secretary-General Report, ‘Our Common Agenda’, includes a proposal to repurpose the UN Trusteeship Council, one of the principal organs of the organisation, so it can address responsibilities for global public goods and intergenerational justice (United Nations 2021).

To fully address these necessary transformations, we must also acknowledge the vital role that women, including Indigenous and rural women, play in environmental governance. Ensuring equal representation in climate and environmental negotiations is essential; their unique perspectives and insights can facilitate nuanced understanding and more robust solutions. Gender-sensitive environmental investment and policy design can result in policies that better address the needs of all populations. By bolstering the participation of women in environmental diplomacy, we enrich the diversity of voices and perspectives, enabling a more comprehensive approach to tackling our global environmental challenges. This should serve as an essential aspect of the reimagined multilateral architecture that we strive for.
Transformative Shifts for a New Global Environmental Governance

Changing and rejuvenating institutions is a major endeavour and yet possible. We are experiencing a vibrant global conversation about reforming environmental institutions and rethinking and reimaging the overall multilateral architecture, including international financial and trade regimes. There are calls for a Review Conference of the UN founding Charter, and preparations for a UN Summit of the Future in 2024 are underway. A ‘Pact for the Future’ will emerge from the Summit, which will serve as a compass and roadmap to reimagine multilateralism so as to better address the great grievances of our time, including the ecological crisis. Surely, we are living in a time of great distress, but also one of great opportunity where hope and responsible transformative action should be the path and the engine.

Note

1 The Living Planet Index allows us to see how species are faring by measuring trends in monitored populations of vertebrate species. It reports the average change in the size of these populations around the world.

Bibliography


