# Keeping the World's Environment under Review

Jan Bakkes
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Nora Mžavanadze
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GEO

## An Intellectual History of the Global Environment Outlook

CEU PRESS

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This book is dedicated to current assessment practitioners as well as those in future generations the world over.

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# Preface

Three decades are a nanosecond in planetary history. This is so as long as Earth's life support systems function properly, its vital signs remain stable, and symptoms of trouble appear only occasionally. However, during the last thirty years, the cascading ramifications of accelerated change in Earth systems have become apparent within half a human lifetime. Like a patient in acute care, the vital signs and prospects of the planet under such conditions need to be closely monitored and acted upon expeditiously.

The establishment of the Global Environment Outlook (GEO) three decades ago marks the moment when the United Nations Environment Programme (UNEP) created a new instrument for taking the vital signs of the planet and assessing its prospects. This initiative was significant because of its historical timing and UNEP's signature mandate to keep the world's environment under review. It was also significant because it represented the first attempt of the international community to create an instrument with such a purpose and such a daring level of ambition.

This 30th anniversary of GEO is also the 50th anniversary of the establishment of UNEP. Despite the dire evidence of global environmental unsustainability, these anniversaries represent an opportunity and a need to review how this ambitious GEO experiment has functioned and what lessons it offers. Global assessments are complex, ambitious and costly undertakings. They are begun with the expectation of definitive, relevant, and actionable results. They can also set the standard for how assessment is to be done in many other contexts where more focused assessments need to happen. Answers to the question of whether GEO managed to achieve these objectives – and, if so, how and why – should have material consequences for how assessment is to be done in decades ahead and for environmental sustainability at the global level.

This *Intellectual History of the Global Environment Outlook* results from a fully independent inquiry by five veterans of GEO, who recognized the importance of learning from three decades of the assessment programme as a whole. The memory of particularly the early times of GEO was fading fast. The authors took note of the inevitable: institutions shift their

attention and get disengaged, experts move on and retire. The authors also noticed that most attempts to understand the contribution of GEO had focused mainly on its flagship global report, with little regard for its extensive effect on assessment practices and products at regional, national and local levels. We found that many useful assessment products, created with great effort and significant cost, can be forgotten after only a few years. We recognized the importance and the urgency of documenting what we still could from the collective memory of those who imagined, built and managed this exceptional process from its early days.

What did it take to reconstruct the history of GEO from its start? It involved assembling possibly the most extensive collection of GEO and GEO-related assessment products and reports. It involved interviewing 40 insiders of the assessment, including UNEP executive directors and senior staff, country representatives, staff of GEO collaborating centres and others. The authors consulted the published, peer-reviewed and grey literature on GEO and reconstructed a timeline of GEO-related events. Throughout this work, the authors kept in focus that GEO must be understood not only through its products but also through its processes, built around the methodology of integrated environmental assessment. But perhaps most importantly, GEO was conceived of and practiced as a learning-by-doing process. Instead of leaving institutions with limited assessment capacity but legitimate interests and credibility behind, it took on the task of bringing them on board.

This book is intended for multiple audiences, including the assessment practitioner community, researchers interested in mapping and understanding how assessments work and why, and particularly those involved in redesigning existing or designing new environmental assessment and reporting systems. Perhaps most importantly, the authors hope the book will be of interest to other practitioners and participants in the GEO process, including those interested in reflecting on its past, so that we may learn what is needed to ensure its future.

# Acknowledgements

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† Deceased

# About the Authors


**Jan Bakkes** (1950; The Netherlands; chemistry) assisted in the preparations for GEO from late 1992. He participated in the design and compilation of GEO-1 through GEO-3, focusing on GEO's overall structure, outlook component and conclusions. From OECD, he organized a light-footed coordination among global environment assessments, 2005–2008. He is staff member of PBL and vice-president of TIAS.

**Ronald G. Witt** is an expert in integrated environment assessment and a geographer, in nearly 30 years with UNEP and its Division of Early Warning and Assessment (DEWA). From 1998-2014, he was director of the GRID centre in Geneva, Switzerland and UNEP/DEWA's Regional Coordinator for Europe. In these roles, he was responsible for a broad range of activities in the pan-European region, focusing on assessment and early warning, and capacity building for the same in Eastern Europe and the Caucasus.

**Marion Cheatle** joined the Division of Early Warning and Assessment (DEWA), UNEP, Nairobi in 1993. Involved with the Global Environment Outlook from GEO-1 onwards, she coordinated the global process from 1999–2004. Other work included global observing systems, environmental indicators and the UNEP Year Book series. She subsequently held various senior management posts in DEWA including Chief of Early Warning and Capacity Development Branches, and Acting Division Director before retiring in 2010.

**Nora Mžavanadze** (1982, Lithuania, economics and environmental science) is a researcher and a consultant. She has assisted the GEO process since 2008 through UNEP's capacity building programmes in the region of Caucasus and South-Eastern Europe. She is a lead author of the GEO-5 (2012) and the pan-European GEO-6 (2016) reports and helped to coordinate the GEO-Cities Tbilisi report (2011).

**László Pintér** was involved in GEO since GEO 1 as a representative of the International Institute for Sustainable Development (IISD) and after 2010 also through CEU. Between GEO-2000 and GEO-4 he led the work on capacity building and training materials and activities on integrated environmental assessment, using the GEO approach. His PhD dealt with the design and effectiveness of global environmental assessments, focused on GEO. Currently he is Professor at CEU and Senior Fellow at IISD.

# Introduction to the book

The Global Environment Outlook (GEO) has been the flagship publication of the United Nations Environment Programme (UNEP) since the mid-1990s. It is the most comprehensive, regular review of the state and trends of the global environment. GEO was introduced at a time when governments and other stakeholders lacked a common information basis to develop a broad and comprehensive view of environmental issues, following the 1992 Rio Conference on Environment and Development. Six global editions of GEO have been published over the past quarter-century. And while GEO is a global process, its underlying integrated environmental assessment approach has inspired countless assessment and reporting processes at regional, national and local levels around the world. Over and above providing analyses of environmental state and trends, related policy responses and a future-oriented outlook from which it derives its name, GEO systematizes and frames its analysis in the context of sustainable development.

This book is the result of an independent project of research into UNEP's GEO, conducted by five long-term veterans of global integrated environmental assessments. The purpose of this research has been to document and critically analyse the history of GEO as the most comprehensive, ongoing global environmental assessment process ever undertaken by the international community. It is driven by a recognition that the need for understanding the global environmental and sustainability dilemma is more urgent than ever, and with the belief that recording this history will serve as an essential resource for future integrated environmental assessment practitioners.

This book covers the evolution of the GEO processes and products over approximately 30 years, from experimental pieces in the early 1990s through to the recent GEO-6. It documents for the first time:

- the origins of GEO as linked with UNEP's mandate from its governing body to "keep the global environment under review"
- GEO's widely adopted conceptual framework based on an integrated environmental assessment methodology
- the highly collaborative and participatory approach undertaken by GEO
- how GEO's comprehensive contents evolved from one report to the next, in the application of the Drivers – Pressures – State – Impacts – Responses framework

- the evolution of the unique and widely noted outlook component in GEO reports, which helped introduce scenarios of potential future development into policy and societal discourses around the world
- the full and unexpectedly extensive range of GEO and GEO-inspired outputs at many geographic levels, from global to regional and even down to local reporting
- its multiple support systems, including that of the UNEP Secretariat, data systems, capacity building and development at various levels, and evaluation and financing mechanisms
- GEO's outreach to and interaction with stakeholders around the world
- the multiple impacts of GEO, including strengthened integrated environmental assessment capacities, and how various stakeholder groups have perceived it around the world and in different regions
- an exposé of four potential futures for GEO itself, depending on how global political will and UNEP's future status might evolve in coming years

The authors have jointly participated in over 25 years of GEO history. For this book, they relied on many sources, including their own memory and archives. These included, for example, GEO outputs, methodological guidance documents and internal and external evaluation reports. An inspiring and unique wealth of information was derived from interviews with 40 individuals involved in at least two editions of GEO. They spoke from various roles, including as users, regional champions, former heads of UNEP, project managers and lead authors, and government representatives.

Navigating the increasingly complex landscape of risks associated with global change requires not only assessment approaches that focus on specific themes such as climate, biodiversity or chemicals. There is also a need for assessments covering the full spectrum of key themes, an integrated picture of their compounding consequences and the necessary responses. Put another way, the recognition of how different environmental changes affect each other, driven by human activities and well-intended but segmented policies, is an essential feature of GEO. It is one global tool for helping to penetrate silos in governance and to assist in tracking and reporting cross-influences.

This need for comprehensive assessments was one important motive for writing this book. It is also a primary consideration for the book's timing, as UNEP and governments have been rethinking the future of GEO (UNEP, 2019j, 2022b). GEO's history can provide relevant, previously undocumented insights and save valuable time for those who will commission, design and conduct, as well as critique and improve, such environment-development assessments in the decades to come. For all of these reasons, the authors anticipate that the next wave of assessment practitioners will be the main audience for this book.

Chapter

1

# Keeping the World's Environment Under Review

## 1.1 Introduction

Since its establishment in 1972, the United Nations Environment Programme (UNEP) has had prime responsibility in the international arena for keeping the world's environment under review. The organization took up the task early on and continues it to the present day. However, the approach used by UNEP for global environmental assessment in the early days changed significantly in the 1990s and, after further evolution, bears little resemblance to today's integrated environmental assessment approach (Box 1.1.1). This chapter looks at why, when and how the process evolved into a new way of doing business and provides the starting point for a more in-depth exploration in subsequent chapters of the rationale, evolution, outcomes and impacts of what is now known as the Global Environment Outlook (GEO).

**Box 1.1.1: What is integrated environmental assessment?**

"A process of producing and communicating future-oriented, policy-relevant information on key interactions between the natural environment and human society" (Pintér et al., 1999, p. ix).

Alternatively: "the 'meta-discipline' that integrates knowledge about a problem domain and makes it available for societal learning and decision-making processes. Public policy issues involving long-range and long-term environmental management are where the roots of integrated assessment [on environment and sustainable development] can be found. However, today, integrated assessment is used to frame, study and address other issues at other scales (i.e. local, regional, global)...The field of integrated assessment engages stakeholders and scientists, often drawn from many disciplines, as well as policymakers." (TIAS, 2018)

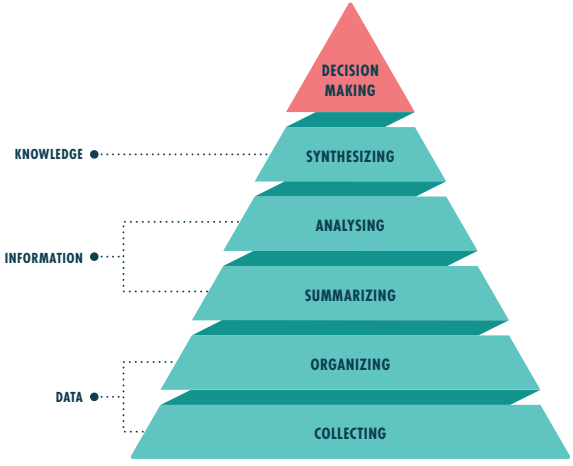
Reflecting on the evolution of thinking on GEO is important, given its broad scope and mandate in the family of global environmental assessments. But it is even more important because of the complex interplay between how assessments are designed and run, what they find, and how relevant actors subsequently adopt or reject their findings. Issues such as knowledge framing, selection and use of assessment methods, and the determination of representation have been shown to influence the understanding and shaping of global environmental problems (Scoones, 2009). Given the example it set for a large number of integrated environmental assessments at global, regional, national and local levels, documenting and analyzing these relationships will enable understanding of not only the role of the GEO at the global level but its influence as an important model of these assessments across scale.

During the preparation of *The Intellectual History of the Global Environment Outlook,* the authors interviewed almost 40 individuals who had many different connections with the GEO process over the years. The interviewees contributed invaluable additional views and insights on the issues being analysed, and many of these are included in the various chapters of the book. The complete list of interviewees and their affiliations can be found in Annex VI. All extracts from the interviews are also acknowledged in the relevant text.

## 1.2 Global environmental assessment: initial insights

Environmental assessment is the overall term for the process and scientifically credible products that reveal, explain and document what is happening to the environment in which we live. It entails sourcing the best available quantitative and qualitative data and information, undertaking a rigorous analysis, and packaging and reporting the findings in clear and relevant formats for a target audience. Figure 1.2.1 illustrates the key stages in this process. One important purpose of environmental assessment is to focus the attention of decision makers on environmental issues that have received substantive scientific investigation but are not being adequately addressed in the policy arena. By linking across the science-policy divide, environmental assessment can keep policymakers updated on the critical environmental issues already trending, make them aware of new and emerging issues that urgently require their attention, and provide a rational basis for getting those issues onto national and international policy agendas. An added benefit is that environmental assessment can also be forward-looking, thus offering insight on possible consequences of current and future action or inaction.

**Figure 1.2.1. The data-information-knowledge management pyramid that forms the basis of environmental assessment**




*Environmental assessments typically adhere to the data-information-knowledge scheme as their basis.*

Notes: Processing can take place along multiple dimensions. Alternative theoretical knowledge frameworks exist.

Environmental assessment is carried out at many levels, ranging from local to global. An early example of a global assessment was the *Founex Report* (Ozorio, 1972) documenting the outcome of an in-depth seminar on environment and development issues held in Founex, Switzerland, in mid-1971. The innovative and influential report played a critical role in laying the groundwork for the United Nations Conference on the Human Environment held in Stockholm in June 1972. When the United Nations General Assembly (UNGA) established UNEP in December of 1972 as an outcome of the Stockholm Conference, one of the main functions and responsibilities assigned to UNEP's new Governing Council (GC)[1] was to "...keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance receive appropriate and adequate consideration by Governments" (UNGA, 1972). In effect, this required a global environmental assessment to be carried out on a regular basis. To support the GC in meeting this commitment, the Environment Secretariat of UNEP[2] quickly established a global monitoring and assessment programme called Earthwatch.[3] This programme took responsibility for producing a series of state of the environment reports (Box 1.2.1).

### Box 1.2.1: UNEP establishes its global environmental assessment activities

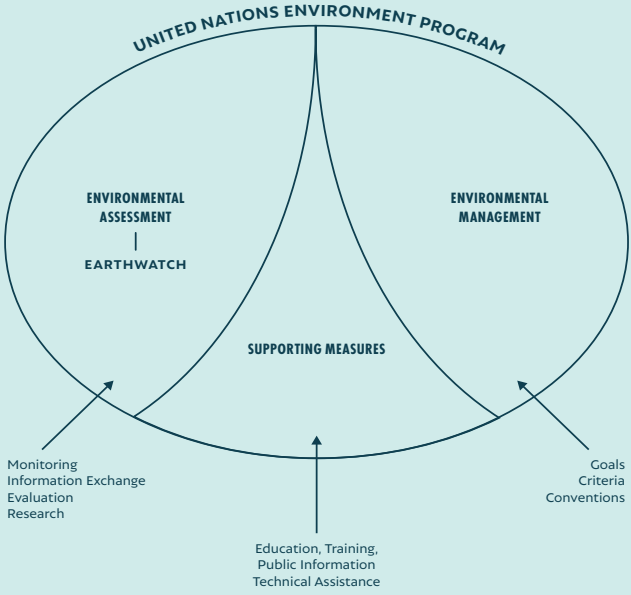
Succinct state of the environment reports were produced annually from 1974 by the UNEP Earthwatch programme. Earthwatch was envisioned as a major mechanism to take the lead on monitoring, information exchange, evaluation and research, complementing UNEP's environmental management and supporting measures, as shown in Figure 1.2.2 (Jensen et al., 1975).

[1] The GC of UNEP was composed of 58 member states elected by UNGA for three-year terms (UNGA, 1972).

[2] UNGA decided that "a small secretariat shall be established...to serve as a focal point for environmental action and coordination within the UN system." The Environment (UNEP) Secretariat, which continues to oversee the Programme of Work and other functions of UNEP, is headed by the Executive Director of UNEP and comprised of international staff based at UNEP headquarters in Nairobi and at other UNEP offices around the world.

[3] The Earthwatch Programme of global assessment and monitoring had actually been approved under the Stockholm Action Plan adopted by the United Nations Conference on the Human Environment. It was considered a priority action by Maurice Strong, the Secretary General of the conference and subsequently the first Executive Director of UNEP - from 1972 to 1975 (Johnson, 2012).

**Figure 1.2.2. The functional framework for UNEP**




Source: Jensen et al. (1975)

The first three reports (1974–76) discussed a spectrum of broad environmental issues, including water and land resources, climate change, the condition of the biosphere, energy, population growth, toxic substances and pollution. At its fourth session in 1976, the UNEP GC decided that the annual State of the Environment report should be more selective and that an analytical, comprehensive state of the environment would be prepared every five years. However, they were not restricted to covering just a five-year time frame.

Accordingly, while the annual reports remained short and specific (focusing on topics such as the ozone layer, environmental cancers, soil degradation, noise pollution, and tourism and the environment), a much wider range of issues was dealt with in much greater depth in the five-yearly reports. The first of these, *The World Environment, 1972–1982* (Holdgate et al., 1982), was published on the tenth anniversary of the Stockholm Conference. It took stock of the developments of the 1972–1982 decade, analysing the changes that had taken place in the human environment over this period. Ten years later, *The World Environment, 1972–1992: Two Decades of Challenge* (Tolba et al., 1992) was published. In between the two, UNEP prepared the volume *Environmental Perspective to the Year 2000 and Beyond* (UNEP, 1988).

*The World Environment* reports were indeed much more comprehensive than any other UNEP reports to date. At 637 and 884 pages, respectively, they analysed the state and trends of the main environmental components, explored a wide range of causes, looked at impacts on humans, documented the responses taken during the previous decade/s and outlined some prospects and opportunities for future action. The reports covered the entire globe and provided data and examples from all regions. By contrast, the *Environmental Perspective* was much more of a typical United Nations (UN) document. In 41 pages, it concisely outlined ten sectors and issues of global concern and provided a short outlook for each together with a goal and recommended action. The report ended with a section on instruments for environmental action.

As early examples of UNEP's comprehensive efforts to keep the world environment under review, it is interesting and pertinent to revisit the processes used to prepare these three reports. *The World Environment* reports used a participatory process involving expert contributors – 47 individuals and institutes are listed for the 1972–82 report; 34 for the 1972–92 report – and both listed over 100 workshop participants and reviewers. The 1972–82 report engaged a Senior Scientific Advisory Board, made up of 14 members from 12 different countries, while the 1972–92 report noted the involvement of 28 international organizations and permanent missions to UNEP. Small, erudite editorial teams consolidated both reports.

In contrast, the *Environmental Perspective* was proposed by the UNEP GC, approved by the Second Committee of the UNGA in 1983, and prepared by an Intergovernmental Inter-sessional Preparatory Committee based on government inputs. The Committee held eight regular and three consultative sessions during the preparation of the report and ran in parallel with the United Nations World Commission on Environment and Development, which was preparing *Our Common Future* (United Nations, 1987).[4] As directed by the GC, these two complementary reports drew from each other's proposals and, after GC consideration, both reports were subsequently transmitted to the UNGA in 1987.

But UNEP wasn't the only body carrying out global environmental assessments during those 20 years from 1972 to 1992. An overview of the assessment landscape up to the early 1990s reveals an impressive range. Some were series productions, including the Forest Resource Assessments produced by the United Nations Food and Agriculture Organization at five

[4] This report is also known as the Brundtland Report, after Gro Harlem Brundtland - the Chair of the World Commission on Environment and Development.

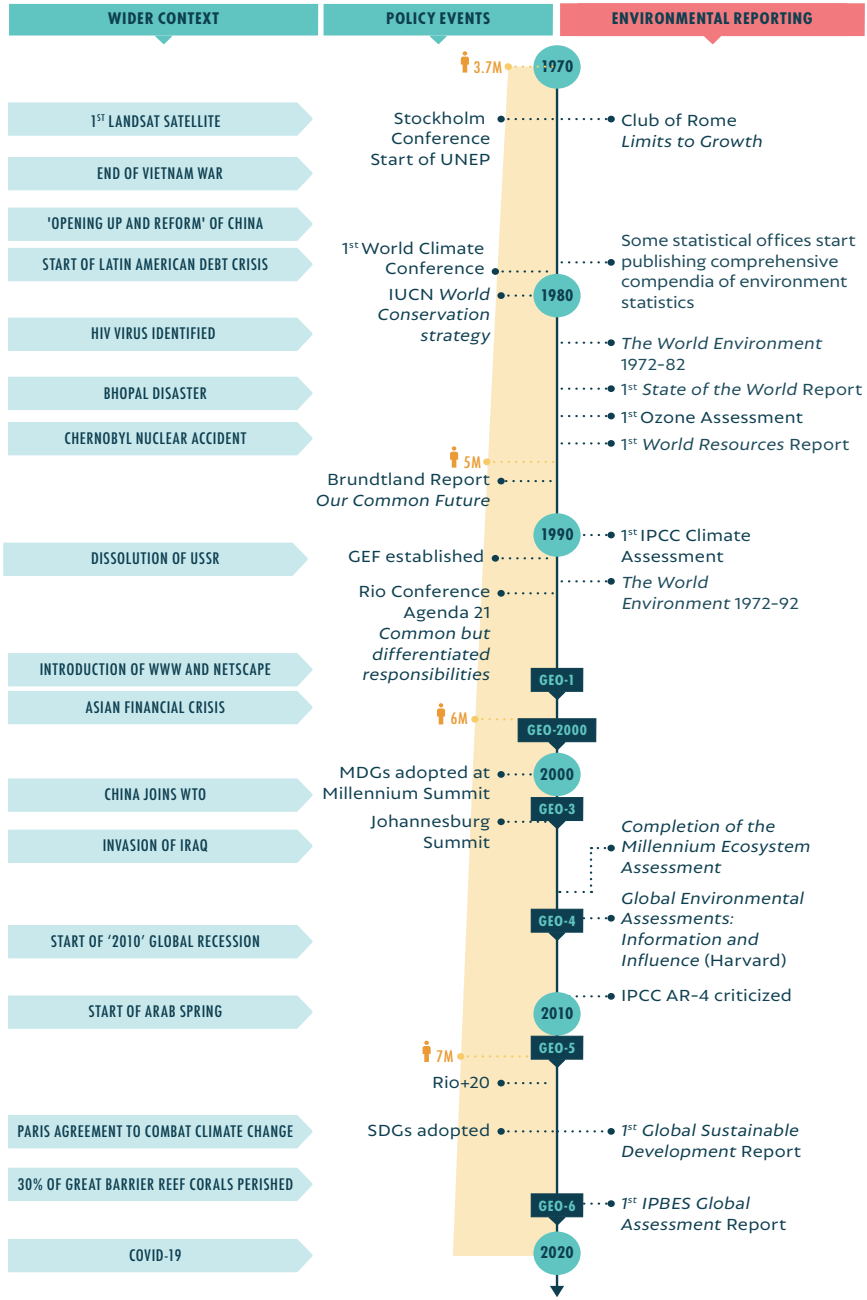
to ten-year intervals since 1948 (FAO, 2021); the assessments carried out since 1975 by the Group of Experts on the Scientific Aspects of Marine Environmental Pollution (GESAMP, 2021); and the international stratospheric ozone assessment process, reporting periodically since 1985 (WMO and UNEP, 2020). The Worldwatch Institute launched the annual *State of the World* reports in 1984 (L. R. Brown et al., 1984) and the World Resources Institute and partners published the first of the *World Resources Reports* in 1986 (WRI, 2021) In 1988, UNEP and the World Meteorological Organization set up the Intergovernmental Panel on Climate Change, and its first report on climate change debuted in 1990 (IPCC, 2021).

There were also influential one-off reports such as the 1980 *World Conservation Strategy,* prepared by the International Union for the Conservation of Nature (IUCN, 1980) in addition to *Our Common Future* (United Nations, 1987) and the report from a small conference of prominent scientists in Villach, Austria in 1985 that is seen as a turning point in recognizing climate change as a key global issue (Franz, 1997). These reports played a major role in introducing the world to the concept of sustainable development.

Collectively these analyses provided an impressive knowledge base for the global community.[5] A visual representation of the 'assessment landscape' before and during the existence of GEO is offered in the timeline (Figure 1.2.3), based on data from The Future of Global Environmental Assessment Making project (Jabbour and Flachsland, 2017) and from this book. Many of the reports, including those that targeted multilateral environmental agreements, were focused on a relatively narrowly defined topic while going into considerable depth on the subject matter. Others had a much broader scope. Decadal UNEP *The World Environment* reports clearly fell in the latter category, being more comprehensive in terms of the range of issues covered than most of their counterparts at the time. In addition, the mandate from UN member states gave the UNEP reports a clear target audience and a gateway to international environmental agenda-setting.

[5] The knowledge base has grown considerably since the early 1990s. Additional global environmental reports include the *Global International Waters Assessment*, the *Land Degradation Assessment of Drylands*, the *Global Biodiversity Outlook,* the *World Water Development Report*, the *Millennium Ecosystem Assessment*, the *International Assessment of Agricultural Science and Technology for Development*, the *Global Marine Assessment* and the *Global Assessment Report on Biodiversity and Ecosystem Services*.

## Figure 1.2.3. GEO's context




*GEO developed in a time of change in terms of globalization, regional struggles and worldwide information.*

## 1.3 UNEP meets its mandate to keep the world environmental situation under review – and explores alternative models

It is clear from the respective UNEP GC outcome documents for 1982 (UNGA, 1982) and 1992 (UNGA, 1992) that *The World Environment* reports had largely succeeded in providing member states with a clear and unequivocal description of the state of the global environment. The first contributed to the GC's stocktaking of UNEP's performance and influence over its first ten years. The second coincided with the deliberations surrounding the United Nations Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro in June 1992. *Agenda 21*[6] was the main outcome document of the conference (UNCED, 1992).

UNEP's second Executive Director Mostafa Tolba drew the following conclusions from these major reports: "The problems which overwhelm us today are precisely those which through a similar approach we failed to solve decades ago" (Holdgate et al., 1982, p. xvii) and "Three times since its inception (1982, 1987 and 1992) UNEP has undertaken a more wide-ranging study. The results of the present study are the most disturbing of the three" (Tolba et al., 1992, p. vii).

As of 1992, it is clear that environmental problems were continuing to worsen and that maintaining a close eye on the state of the global environment remained an imperative.

But even before the second of *The World Environment* reports was published, UNEP had begun to consider new ways of doing business. Aware of the growing importance and influence of the more robust science-based, participatory assessment processes that were under way, such as the work on ozone depletion and climate change; the need for greater policy relevance and action; the recognition of an essential and increasingly important role for the environment in sustainable development; and the expectations generated by the impending 1992 Rio Conference, the UNEP Secretariat started consultations with some key partners in the early 1990s to conceptualize a possible new approach to meeting its global assessment mandate.

[6] *Agenda 21* was a non-binding action plan for sustainable development in the 21st century adopted by 178 countries. The 40 chapters of Agenda 21 were grouped into four sections: Social and economic dimensions; Conservation and management of resources for development; Strengthening the role of major groups; and, Means of implementation.

This initiative was instigated and spearheaded by the then head of the Global Environment Monitoring System (GEMS)[7], Veerle Vandeweerd. She believed that UNEP was, at that time, in a difficult situation with many questions being asked about its role and whether it should continue as an institution.

> We had many sectoral and scientific assessments in UNEP but none that was a bridge between policy and science, none that was global in scope, none that tried to cover the different topics (climate, water, biodiversity, etc.)...there was really no coherent scientific assessment to allow UNEP to set its priorities...UNEP needed a flagship assessment. It didn't have something that everybody recognized as the top UNEP product, and that was the idea of making GEO. We needed to invent a structure by which we co-opted our colleagues from the Regional Offices [and] our colleagues from the other divisions into contributing to a UNEP-wide global assessment (Veerle Vandeweerd interview).

Drawing on the specialized expertise of several partners – in modelling, indicators, scenario development and other assessment methods and tools – new process and analytical approaches were explored through a number of technical reports.[8] Some scientific advances and revolutionary technology developments taking place simultaneously in the wider world likely also contributed to this out-of-the-box thinking and in a fortuitous way. Progress in policy science, the advent of the Internet, growing scientific standardization and data sharing, and rapidly improving access to geospatial information may all have presented serendipitous opportunities and enabling conditions for the envisaged global assessment process.

Also, by this time, UNEP itself had several well-developed support systems it could mobilize to contribute to its future assessments. These included the well-established GEMS network and a growing network of Global Resource Information Database (GRID) centres.[9] In addition, in early 1992 in

[7] The GEMS Programme Activity Centre was set up by UNEP in 1975 to coordinate collective environmental monitoring activities around the world. By 1985 there were up to 22 global monitoring networks and activities, albeit for a limited number of environmental sectors, some of the most well known being GEMS/AIR (for urban air quality), GEMS/FOOD (for food contamination) and GEMS/WATER (for freshwater quality) (UNEP, 1980).

[8] Two such reports commissioned by UNEP were Bakkes et al. (1994) which provided an overview of environmental indicators and Swart and Bakkes (1995) which explored a possible framework and methodology for IEA drawing on other global assessment activities.

[9] The first GRID centres were established in mid-1985, with others set up in the late 1980s and early 1990s. Their main objective was to provide up-to-date, reliable and

the run-up to the United Nations Conference on Environment and Development, UNEP had begun to revitalize Earthwatch and to strengthen its inter-agency role in particular. A Coordination Secretariat was established in Geneva to provide leadership, and the newly-named UN System-Wide Earthwatch was mandated to coordinate, harmonize and integrate observing, assessment and reporting activities across the UN system (United Nations, 2011). In effect, this put UNEP in a stronger position to engage with and enlist support from other UN agencies in its own assessment activities.

A report commissioned by UNEP Executive Director Tolba, but submitted to Executive Director Elizabeth Dowdeswell in 1993 once she led UNEP, may have helped to catalyse further ideas (Coopers and Lybrand, 1993).[10] Taking into consideration the implications of *Agenda 21* for UNEP's future work, the report suggested that, among other tasks, UNEP should:

- Improve participation by the UN system agencies in Earthwatch activities
- Expand relations with scientific and non-governmental research institutes
- Consider some decentralization of its global activities
- Focus more strongly on the regional dimension of its work, reiterating the importance of this perspective which had previously been identified by the GC as important
- Strengthen technical assistance to countries, including in the fields of environmental monitoring and assessment

The plenary GC of 1993 got a heads-up from UNEP's Executive Director that the Secretariat was working on possible ways to improve the documentation provided to it for keeping the world environmental situation under review. GC Decision 17/6 of 21 May 1993 encouraged the Executive Director to continue examining ways to do this (UNGA, 1993).

easily understandable environmental information to decision makers and the public, primarily using geographic information systems and remote sensing. GRID centres were eventually established for many regions and in many countries, with the overall network at its maximum comprising some 15 centres. Over time, the functions of GRID centres became greatly diversified (Mooneyhan, 1993; UNEP, 1980).

[10] The 16th Governing Council of UNEP had invited the ED to engage an internationally recognized consultancy firm to assess UNEP's management and organization.

## 1.4 UNEP gets the green light for its new global environmental assessment

A new, future-oriented pilot assessment, which would also reflect regional realities, was outlined in 1993–4. A concept note[11] was used to test the potential policy relevance of a proposal elaborated by UNEP, individual experts and potential collaborating institutes. It was discussed during international meetings held in Bilthoven, The Netherlands, and Cali, Columbia. At the meeting in Cali, a pilot version of the future-oriented component of the envisaged assessment was tabled as a strawman for discussion. It was an elaboration of the methodology paper, focusing on scenarios, model results and their interpretation and was primarily structured around environmental themes. These were illustrated with developments in a few sample regions. For example, water issues were illustrated with projections for the catchment areas of the Ganges and the Nile. This pilot version served as input to a discussion on the type of scenarios, a reflection of regional realities, and how to kick-start all of this in the new assessments.

Additional funding opportunities were actively sought, as some foresaw that introducing a new approach could divert limited resources from existing programme activities such as GEMS and GRID. Possible overlap with ongoing data-reporting initiatives, such as those of the World Resources Institute, was also a concern. "One of our biggest problems within UNEP was arguing why we needed our own UNEP-wide assessment report… while, in fact, we had the World Resources Report" (Veerle Vandeweerd interview). From an external viewpoint, an interviewee closely associated with both reports commented that

> [Veerle Vandeweerd] was quite savvy about the real-world forces and the institutional context. And she was quite skilful about dealing with people like me who might have said, 'why should I help a competing report?' But she persuaded me that this was going to happen anyway, so we should make it be useful and help each other out, and so I did (Allen Hammond interview).

Veerle Vandeweerd had a clear vision for the new report:

> From the very beginning GEO was to have this global birds-eye overview of what was happening. It would bring together the many topic-specific assessments in UNEP and be this bridge between the scientific knowledge

[11] This was formally published as Swart and Bakkes (1995).

> and the political decision-making. GEO also needed to differentiate between – and reflect – the regional priorities and geopolitical realities." In terms of timing and ownership, she stated that "We realized that, in the short time span available, we were not going to produce the perfect, global, all-encompassing, environmental assessment. But we decided to try to have a first comprehensive environmental assessment within two years for the next upcoming Governing Council and to ensure that this first GEO assessment was useful for translating environmental science into concrete policymaking. For this, you have to have the policymakers as owners of the [scientific] assessment" (Veerle Vandeweerd interview).

By the following GC in May 1995, a new proposal was on the table and ready for consideration. It received the Council's backing through Decision 18/27 that was adopted on 25 May 1995 (UNEP, 1995). The Council endorsed the refocused strategy of UNEP to "undertake policy-relevant assessment and reporting of environment and development issues of international significance through cooperating networks of appropriate national and regional agencies, organizations or institutions, and to promote the development of data and information management capacity in those bodies situated in developing countries as necessary and appropriate to ensure their full participation." The decision called for a "...new comprehensive report on the state of the world environment..." which would help build consensus and guide crucial decision-making on the environment and the implementation of *Agenda 21*.

No explicit mention of a new report series appears in the decision, but the Executive Director was requested to submit a first report to the GC at its 19th Session, so a series may well have been already envisaged. Part C of the decision laid out a number of expectations for the new report, including cooperation with other organizations and institutions, Drivers-Pressures-State-Impacts-Responses analytical components, coverage of multiple environmental themes and concerns drawing on available data and research findings, an outlook component, policy relevance and an integrated sustainable development context (Box 1.4.1).

### Box 1.4.1: An extract from Governing Council Decision 18/27 of 25 May 1995

**Earthwatch**

**C. New state-of-the-environment report**

The Governing Council,

1. Requests the Executive Director to prepare a new, comprehensive report on the state of the world environment, which will consist of the following three parts:

(a) The present state of the global environment;

(b) The state of the global environment in the year 2015;

(c) The response: findings, conclusions and recommendations;

2. Recommends the inclusion in parts (a) and (b) of the report all essential problems of and threats to the environment, inter alia, the environmental status of the main components of the global ecosystem (waters, forests, soils and farming lands, ozone layer, etc.), basic trends in environmental change (for example, climate change, coastal and marine degradation, desertification, deforestation and habitat loss, pollution, soil degradation, ozone depletion, etc.); and the global effects of expected development growth, population increase and main trends in consumption, production and urbanization patterns (for example, energy consumption, transportation and sanitation problems, waste disposal, land reclamation and destruction, etc.);

3. Also recommends the inclusion in part (b) of the report of the expected impact of population increase, consumption and production patterns and economic development on the environment;

4. Further recommends the inclusion in part (c) of the report recommended measures and actions that could effectively reverse unwelcome trends and challenge principal threats to the environment and also specific institutional and legal measures for the implementation of proposed actions;

5. Requests that preparation of the report, which shall be undertaken within existing resources, be based primarily on the existing data collected and prepared by the UNEP, in close cooperation with the United Nations Development Programme, the World Health Organization, the Food and Agriculture Organization of the United Nations, the World Bank and other UN agencies and bodies, and on the results of research and studies by public and private scientific and statistical institutions engaged in formulation of environmental and development assessments and forecasts.

Work got under way almost immediately, as the report had to be ready by the next GC meeting, which had been brought forward to January 1997 to allow the Council to provide substantive inputs to the session of the United Nations Commission on Sustainable Development later that year. Drawing on positive experiences recently gained through other international assessments, a six-person 'GEO Team' in the UNEP Secretariat set up and coordinated a collaborative, participatory process, interfacing science and policy, which delivered the first GEO (*GEO-1*) in just over a year.

> One of the major reasons for initiating the first GEO report was UNEP itself. We made GEO as a rallying point to get all the assessment work at UNEP together to provide a global overview of the state of the global environment and to provide clear, actionable scientific guidance to policymakers setting the global environmental agenda in the late 1990s through the UNEP Governing Council decisions (Veerle Vandeweerd interview).

Many aspects of that first process, meeting the expectations of the GC, became characteristic threads that continue to run through the report series (Box 1.4.2).

### Box 1.4.2: The essential characteristics of the GEO process and report series

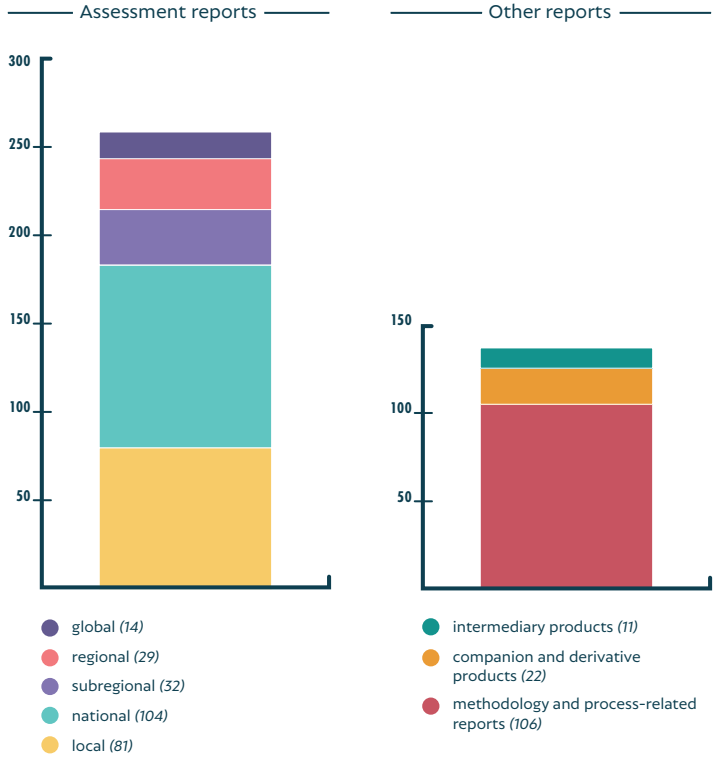
1. Integrated analysis in a sustainable development context
2. Broad spectrum of themes and issues, including humanity's dependency on a healthy natural environment
3. Global and regional
4. Collaborative, participatory and multi-stakeholder
5. Science-based and policy-relevant
6. Past, present and future perspectives
7. Learning-by-doing and actively developing assessment capacity

Throughout its nearly three decades of history, GEO has retained its collaborative, participatory approach and continues to be science-based and policy-relevant. The ongoing process, elaborated in later chapters, has engaged a worldwide network of partner institutes and experts; established advisory groups to ensure its relevance, credibility and quality control; interacted at many levels with other UN bodies; and provided individual and institutional capacity-building through both formal training and learning-by-doing. These elements, together with the multidimensional analysis encompassing a broad spectrum of issues and their interlinkages, global and regional perspectives, and a past/present/future timeframe – all within the context of sustainable development – have established GEO as a pioneer and champion of integrated environmental assessment.

## 1.5 Conclusion

While GEO was already envisaged as an ongoing process and an umbrella for global and regional assessments by the time *GEO-1* was published, no one foresaw the major influence it would have on many environmental assessment processes around the world, down to the national and even local scale, or the diversity of support tools and spin-off products that have been associated with GEO over the past 25 years (Figure 1.5.1). Through its sixth iteration, released in 2019, GEO continues its dynamic evolution to keep the world environment under review, helping to fulfill a significant component of UNEP's mandate. Whether it has actually made a significant or sufficient contribution to the policies and actions that are currently in place to safeguard and sustain our natural environment within planetary boundaries is another question.[12] The answer to that question is ultimately a major rationale for considering GEO's continuation.

**Figure 1.5.1. GEO-related reports – total numbers from 1994 to 2020**




Note: The reports other than assessments comprise all geographical levels.

[12] - This subject is covered at length in Chapters 9 and 10 on GEO's impact at various levels.

The chapters that follow provide a thorough exploration of the GEO evolution and further insight into how and why it has occurred, as well as what it has achieved. Box 1.5.1 provides a foretaste of what these chapters reveal. Annex I provides a narrative overview of the decisions made by UNEP's governing body since the first GEO was mandated in 1995, that have given new directives for UNEP's ongoing environmental assessment process. Over that same period, UNEP's governing body has itself evolved. In June 2012, during the United Nations Conference on Sustainable Development held in Rio de Janeiro, world leaders called for UNEP to be strengthened and upgraded. This was approved by UNGA Decision A/RES/67/213 in December of the same year (UNGA, 2013). One outcome was to establish universal membership of the GC. Formerly comprised of 58 member states, in March 2013 the name of UNEP's governing body was changed to the United Nations Environment Assembly; it is now made up of all 193 member states of the UN.

### Box 1.5.1: A Glimpse of What's to Come

Chapter 1 has provided a brief introduction to how the GEO story has unfolded since the early 1990s, building on earlier initiatives. Adapt, adjust and innovate have been long-term mantras, along with an approach that can be characterized as learning-by-doing.

At the very least, GEO accomplished all of the following successes over its 25 years:

- It has taken on board a range of innovative analytical perspectives and shown great ability to adapt to changing circumstances and demands and adopt what can be considered the best practices of environmental assessment (Chapters 2 and 3). It has not only grasped and analysed the existing environmental knowledge base to enlighten policymakers but also, through out-of-the-box forward-thinking, revealed a range of possible futures that could be influenced by today's decisions and actions. Connecting regional realities with global policymaking has clearly demonstrated the critical role that the environment plays in achieving development goals (Chapters 4 and 5).
- By *GEO-6*, one hundred and twenty-nine different partner institutes have taken part in the global GEO process since 1995, as well as an uncountable number of experts in their individual capacities. Without their participation and contributions, GEO would not have become such a respected, high-quality report. In return, the participants have benefitted from the additional understanding, capacity and kudos

gained by being part of GEO. Many have been able to take ownership of related processes and products in their own work arena and advance their individual careers (Chapters 3 and 9).

- A range of support systems has acted as critical gears in the process. The importance of strong day-to-day management and institutional memory to guide the process, adequate and reliable financing, open and easy access to essential data, a dynamic and diverse capacity-building programme and timely, unbiased project evaluations cannot be overstressed (Chapter 7).
- From relatively humble beginnings as a global report series, the GEO has become a formula for a multiplicity of related products and processes that have exceeded all expectations. More than 250 reports worldwide now represent the GEO brand after having applied the GEO approach in various ways. Some 100 national and 80 local GEO-type reports were produced in the 20 years from 1999 to 2018, enabling many countries to meet reporting obligations that they had not previously achieved. The Latin America and the Caribbean region proved to be a living laboratory for GEO innovation, supported by enthusiastic governments, a strong regional UNEP team and willing donors (Chapters 6 and 10).
- GEO has helped position UNEP as a global player in various international policy development forums. It has raised the visibility of the environment to international policymakers and highlighted limited and too-slow progress and action. Ministries of the environment have reported the use of the GEO reports in many contexts and for multiple purposes. Specialized products have targeted other user groups, while there have also been missed opportunities for reaching wider audiences. But to a certain extent, GEO has had outreach and influence well beyond its anticipated horizons. The early GEOs received considerable attention from mass media, while the education community has probably been the biggest unintended user group of the GEO 'encyclopedias' and training materials. (Chapters 8 and 9)

GEO remains the only comprehensive, integrative, forward-looking, stand-alone assessment of the environment at a global level. It connects the dots in the grand scheme of things. But is there still a place for GEO in tomorrow's world? In true GEO fashion, four possible GEO scenarios with very different outcomes are explored in Chapter 11. And more significantly, since GEO-6 the Future of GEO has also been considered by UNEA. The outcome of their deliberations was finally agreed in March 2022 (Annex I).

Chapter

2

# The Conceptual Framework of the Global Environment Outlook Reporting System

## 2.1 Introduction: Conceptual framework—a foundation for global environmental assessments

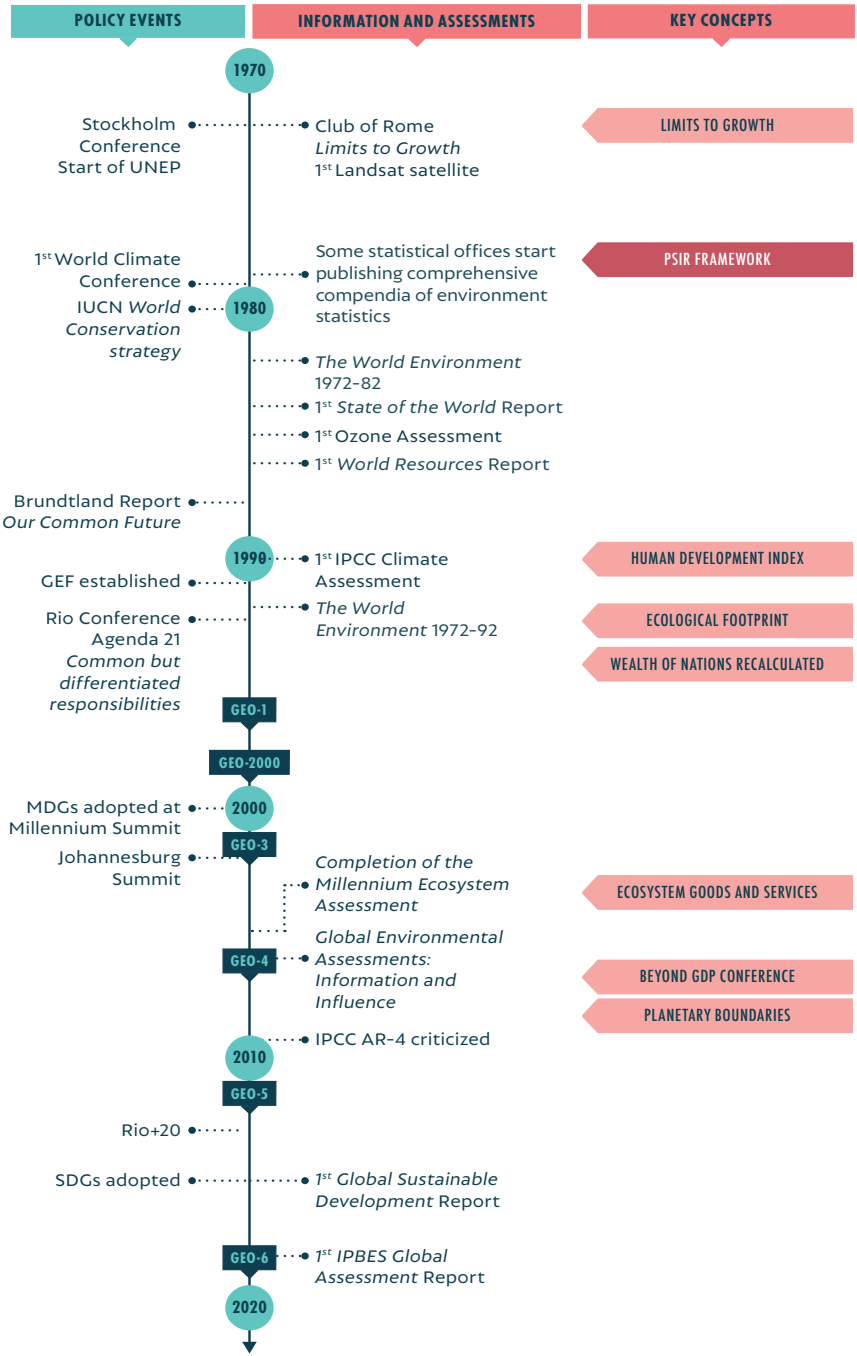
For the purposes of integrated environmental assessment (IEA), conceptual frameworks are analytical tools and symbolic, high-level, easy-to-remember representations of how the world is structured and works. Framing has been identified as a critical component for studying science-policy controversies that are often at the heart of IEAs (Rein and Schön, 1996). Formal conceptual frameworks for analysing environment-society interactions have been in place for several decades and used in various contexts – organizational, such as place-based with ecosystem or administrative boundaries;

functional, such as supply-chain related; thematic and problem-oriented such as climate change, biodiversity; or sectoral, such as agriculture or industry. (Figure 2.1.1) They may also embrace and integrate different theoretical and policy perspectives, such as sustainability, resilience or transitions.

Having a common conceptual framework is important for global assessments in general, and the Global Environment Outlook (GEO) in particular, for several reasons. As noted by long-standing contributors to GEO, a framework helps people involved have a common axiomatic understanding of things (Ruben Mnatsakanian interview), pose robust questions, organize ideas, provide a common language and facilitate communication at the science-policy interface (Rosario Gómez interview). Of all the institutionalized global assessments initiated to date, GEO probably has one of the broadest scopes in terms of the range of environment and development issues covered; the past, present and future timescales considered; the geographic regions surveyed; the stakeholder perspectives noted; and the integration among these attempted. A common framework provides a high-level entry point into the assessment topics by considering the world as an interconnected whole. This common framework approach can identify key domains of environment and society while highlighting and visualizing interlinkages among different components as parts of the same coupled socio-ecological system. This contrasts with the compartmentalized worldview still dominating assessments that are mandated to focus on a specific economic sector such as mining, agriculture and energy or a specific environmental element such as air, water, land or biodiversity.

As a global but regionally differentiated assessment, GEO needs to report not only on different economic sectors and environmental elements but also at different scales. From this point of view, it needs a framework that can be consistently applied at and across different spatial and temporal scales (Pintér et al., 2012). This includes global problems originating in planetary-level processes such as the atmospheric circulation of synthetic chemicals or climate change. In contrast, GEO's regional and subregional assessments need to cover problems that appear in many places, such as groundwater depletion, but have strong context-specific features and require responses tailored to that local context (Levien, 1997).

**Figure 2.1.1. Relevant key concepts, information technologies and policy events emerging before and alongside GEO**



## 2.2 The role of science

In contrast with representations developed in other domains for religious, political or other purposes, conceptual frameworks for IEA are typically grounded in a scientific and positivist worldview. While the environment can be absent or under-emphasized in traditional economics-focused frameworks and models, the conceptual framework for global IEAs makes the environmental context explicit and outlines the interconnections with non-environmental domains.

GEO was conceptualized from its start as an assessment grounded in data and scientific evidence. Data are the facts or statistics collected through monitoring and can be quantitative or qualitative, while indicators are succinct representations of data that facilitate data's use in analysis – for example, a Gini coefficient of household incomes, distance-to-target in projected national emissions of greenhouse gases, or gross domestic product. The importance of data and indicators has been repeatedly highlighted in GEO-related decisions by the governing bodies of the United Nations Environment Programme (UNEP) and emphasized by many of GEO's government sponsors, who pointed out that governments as the primary clients of GEO required findings directly backed up by data and indicators (Nicolas Perritaz interview). During the lifetime of GEO, these expectations were met by two countervailing forces of change. Due to the improvements of monitoring and data-collection systems, the evidence base has significantly improved, even though many problems persist. At the same time, researchers presented new ways to integrate many of these accelerating changes. Prominent among these advances are post-normal science, defined as issue-driven knowledge produced in a context of hard political pressure, disputed values, high-stake decisions and highly uncertain epistemological and ethical systems (Funtowicz and Ravetz, 1993). They also include sustainability science, which seeks to understand the fundamental character of interactions between nature and society and encourage those interactions to follow more sustainable trajectories (Kates et al., 2001). These innovative analytical perspectives allowed for an increasing realization of the value of – and the need for taking into account – non-standard and qualitative data in the assessment, for instance, those generated by crowdsourcing or qualitative research, and acknowledgement of the validity of alternative sources of information such as traditional knowledge.

Embedded in, but from the start aspiring to go beyond, state of the environment (SoE) reporting, GEO required an assessment framework with an integrated character. The framework needed to account for different types

of data and systems of knowledge and the integration of local and global perspectives. It also had to combine the perspectives that cut across sectors and multiple environmental themes with cause-effect linkages that are consequential for environmental change and human well-being. Ultimately, underlying these perspectives is a worldview, emerging from a philosophical tradition and interdisciplinary science, that considers the Earth as an integrated whole and a socio-ecological system (Berkes and Folke, 1998; Gallopin et al., 1989; Young et al., 2006). The unified perspective applies at all scales, from communities to regions and to the planetary level, with complex cross-scale interlinkages.

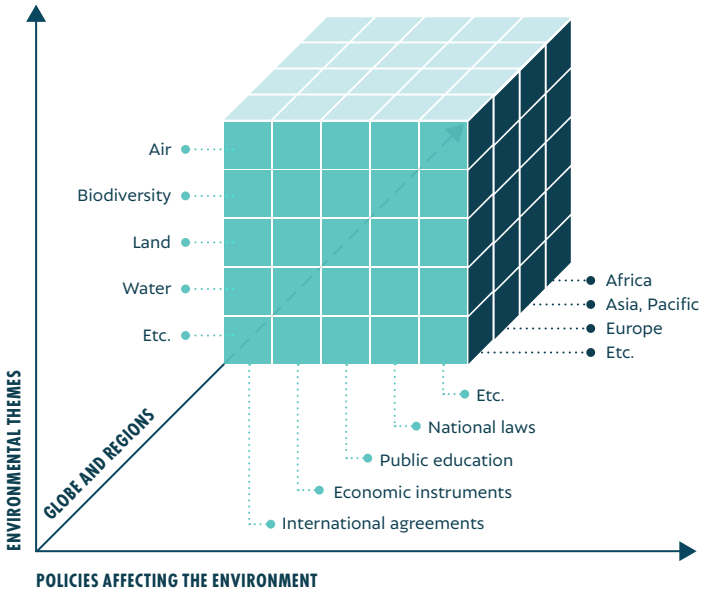
An additional element of integration is related to the emphasis on participation and consultation during the assessment process, including during the preparation of summaries for policymakers. Driven by both policymakers' needs and scientific interest in using transdisciplinary methods, reconciling different perspectives represents an increasingly important element of integration, as the impacts of environmental change in the present, and even more so in the future, continue to mount. Participation is also important for building ownership of the assessment process, outputs and findings and strengthening legitimacy as one of the criteria of making use of the assessment (Cash et al., 2003). This is increasingly important due to growing risks, costs and the urgency associated with many issues covered by GEO.

## 2.3 From GEO's mandate to its assessment framework

The choice of GEO's integrated assessment framework is ultimately rooted in the way its mandate has been defined, first by the UNEP Governing Council and then continued by the United Nations Environment Assembly after 2014. The original mandate characterized GEO as a report on the state and trends of the global environment. However, over time the mandate and the conceptual framework put increasing emphasis on understanding the effectiveness of policy responses and transition pathways to agreed-upon environmental goals. As an outlook, by definition GEO's framework requires that the assessment includes projections, which in policy terms was often interpreted as reporting on progress towards commitments made in environmental conventions or, more recently, the environmental components of the Sustainable Development Goals.

The mandate is directly reflected in the structure of most GEO reports. This structure was captured by 'the GEO juggernaut' in GEO parlance (Figure 2.3.1). While it did not appear in actual GEO reports, the diagram helped communicate the level of ambition and the underlying complexity of the assessment. It laid the foundation for working with the assessment's more elaborate and formal conceptual framework that goes beyond a simple structural identification of the issues and levels covered. It also aims to help identify functional cause-effect type interlinkages where possible.

**Figure 2.3.1. Components of the GEO Juggernaut**




*The dimensions of GEO directly reflect its mandate*

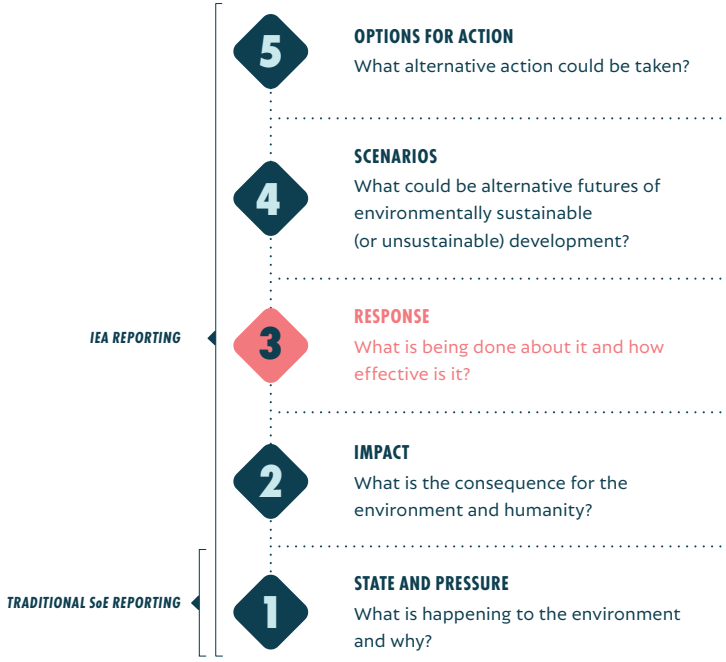
Source: (UNEP and AIT, 2000)

## 2.4 The evolution of GEO's conceptual framework

The conceptual frameworks of GEO went through several iterations during the history of the assessment, but essentially all versions are rooted in a set of common questions. As shown in Figure 2.4.1, IEA grew out of an SoE practice that evolved since the early 1970s in response to legislative requirements and mounting concerns about environmental change. As the first question indicates, these practices mainly focused on documenting changes in traditionally recognized environmental conditions such as air, water, biodiversity and others. The assessments were science-based and,

to the extent possible, built on monitoring data and indicators. Going beyond the question of what is happening to the environment, SoE reports from an early stage also started to look into the underlying causes of environmental change, mainly direct causes rather than broad societal patterns that underpin direct causes.

**Figure 2.4.1. Key questions to be answered by GEO assessments**




*Integrated Environment Assessments address a wider range of questions than traditional state of the environment reporting*

Source: (UNEP and IISD, 2007)

Another important part of the IEA conceptual tradition was the organization of information in terms of a Pressure-State-Response model. Since the late 1970s, this was commonly used in official statistics to organize comprehensive data collecting and reporting mainly on the environment and the forces contributing to environmental change.

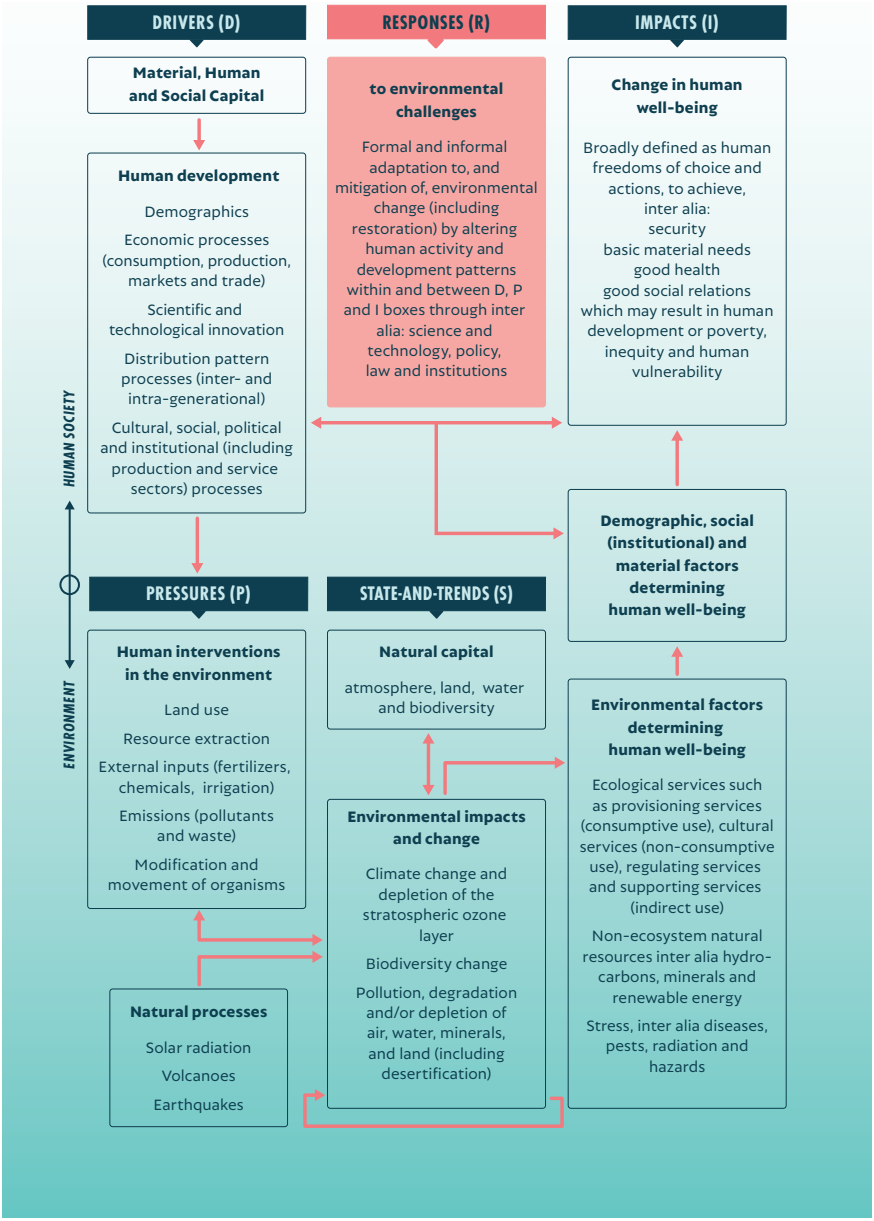
Statistics Canada explicitly connected these traditions, and they were also adopted by the United Nations (Rapport and Friend, 1979; UNDESA, 1984). The Pressure-State-Response model differentiates between pressures as human activities that – in combination with natural forces – result in

stress on the state of the environment, and that, in turn, elicits human responses in the form of policies and actions. Understanding interlinkages in the form of feedback loops and emergent dynamics is important for the model, as environmental outcomes often result from the complex interplay of multiple factors and cannot simply result from the total of their causes. Limitations of the framework arising from such potential over- simplifications and the role of power relationships have been part of the criticism of the framework (Carr et al., 2007).

When elaborating a framework for UNEP's new assessment series, the Dutch National Institute for Public Health and the Environment (RIVM) built on this tradition, modifying it to the Drivers-Pressures-State-Impacts-Responses (DPSIR) framework (Swart and Bakkes, 1995). The framework differentiated between drivers or driving forces as deep underlying macro trends, such as demographic change or economic growth, and more specific human practices or pressures contributing to environmental change. It also identified impacts of environmental change on socio-economic conditions and compounding environmental consequences as a separate analytic category. Responses were conceptualized as policy measures or direct action addressing drivers, pressures, states or impacts. Linkages between the different elements of the framework – Drivers, Pressures, State, Impacts and Responses – were important to support the proposed forward-looking component of the new assessment series via scenarios and modelling. Chapter 4 explores the evolution of the five DPSIR elements through the six global GEOs.

While *GEO-1* referenced the Pressure-State-Response framework with some mention of driving forces (UNEP, 1997c), the DPSIR framework was fully adopted by GEO from *GEO-3* (UNEP, 2002e). However, the framework had to be expanded according to GEO's overall design and mandate over time. Figure 2.4.2 shows the framework diagram from *GEO-4*. In terms of its overall structure, the framework differentiates between human society and the environment. Cross-scale dimensions and the applicability of the DPSIR logic across scale are noted by the local-regional-global labels for three overlapping sheets. The axis below the diagram shows the temporal dimension, a continuum from retrospective analysis to foresight. DPSIR components are placed either entirely in the human society domain (Drivers and Responses), the environment (State) or on the interface (Pressures and Impact). The connection between responses and other domains is not shown but implied. Figure 2.4.3 shows the DPSIR approach used in *GEO-6*, where the links from responses to pressures, state and impacts are shown.

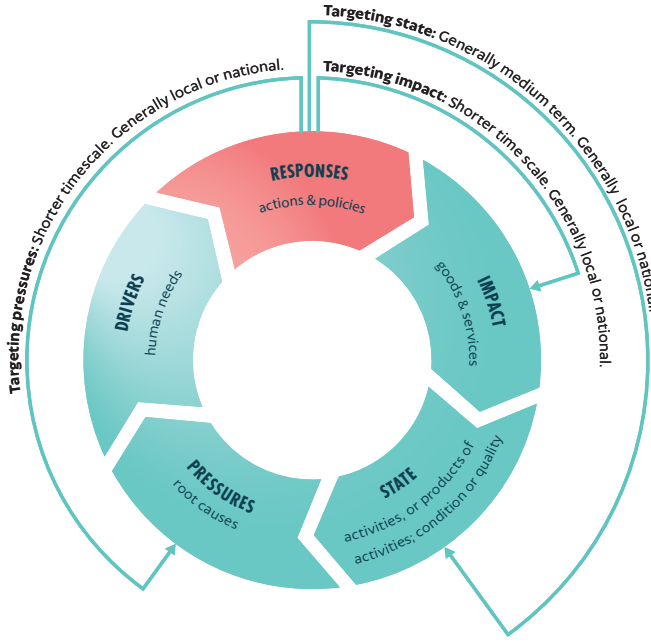
## Figure 2.4.2. *GEO-4* conceptual framework




*GEO is about understanding interactions between human society and the environment across scales and over time.*

Source: (UNEP, 2007b, p. xxii)

**Figure 2.4.3. Representation of the DPSIR framework in *GEO-6***




*Response options have become more prominent in GEO-5 and GEO-6*

Source: (UNEP, 2019e, p. 13)

In terms of methodological steps and assessment structure, the analysis of the state is the common starting point, meaning an evidence-based retrospective assessment of environmental conditions until the present time, based on environmental elements. This is followed by the analysis of drivers as macro trends, including demographic change or economic growth, for example. Drivers underpin pressures, which are more specific processes that lead to changes in the state of the environment. While drivers are considered predominantly the result of human activities, pressures can also result from natural processes, such as earthquakes. Also to be noted is the bidirectional arrow between environmental state and pressures, indicating that changes in environmental conditions can positively or negatively affect human activities that lead to pressures. Examples include how the decline in soil productivity resulting from intensive farming on marginal land may in the short term lead to even further attempts of the same or different types of intensification or increased fishing pressure resulting from the decline of fish density resulting from overfishing. Put together, the analysis of environmental state, drivers and pressures addresses the first step in Figure 2.4.1 by describing what is happening to the environment and why.

The following assessment step considers the consequences of environmental change. Starting with *GEO-4*, the framework adopted the concept of ecosystem goods and services[1] as mediating factors between environmental conditions and human well-being, shown as the component of impacts in the environment domain. In Figure 2.4.2, the top part of impacts in the human society domain includes the impact related to broader drivers and the combined impact on human well-being. Some of the GEO reports, particularly *GEO-3*, frame the impact on humanity through the lens of vulnerability (Chapter 5), which takes into account not only environment-related stress but also exposure, sensitivity and adaptive capacity. By analysing the impacts, the assessment addresses the second step by describing the consequences for the environment and humanity.

To look at responses and their effectiveness, GEO reports experimented with separate policy response chapters and policy report cards, as well as their integration with the assessment of state and trends, in a single chapter. As explicitly shown in Figure 2.4.3, responses can be directed at driving forces, pressures, states and impacts. The framework in *GEO-6* excluded the link between responses and drivers, understood as non-negotiable human needs. Policy assessment was always seen as crucially important, but also as one of the more challenging aspects of GEO, given the complex interlinkages within and among policies, environmental states and impacts themselves. In some cases, a distinction was made between policy effects, as outcomes, and policy effectiveness, where progress towards established targets in multilateral environmental agreements or the Millennium Development Goals and Sustainable Development Goals, for instance, could be assessed. Some later GEO reports featured chapters on linkages to emphasize systemic connections, while *GEO-6* had a chapter covering 12 cross-cutting issues.

The fact that many environmental trends have continued to deteriorate – and significant new problems such as microplastics or the decline of pollinators have emerged – during the lifetime of GEO made understanding how human policies and actions forestall or compound the deterioration a critically important objective of the report. However, it is also one of the most challenging objectives. First, even though policymakers request information on policy outcomes and effectiveness, policies often fail, and reporting on that may be politically or diplomatically difficult. *GEO-6* made major strides in this respect by systematically discussing experiences with

[1] The concept of environmental goods and services was pioneered by the Millennium Ecosystem Assessment, and then adopted by *GEO-4*; the two processes were essentially being carried out at the same time and had some of the same participants.

various environmental policies in their regional contexts. Second, as all changes in the environment and their repercussions result from many factors, not all of which are known or understood, policy assessment is typically inexact. This can conflict with some GEO audiences expecting evidence-based assessment with minimal levels of uncertainty. In fact, for some issues, the uncertainty surrounding policy effectiveness and outcomes is precisely the point.

Beyond policies, other broad forces that shape human behaviour have been recognized in more recent versions of GEO. They include identifying socio-cultural patterns associated with unsustainable production, consumption and lifestyles. With or without formal policies, but often amplified through formal and informal media, these are powerful in influencing the environmentally consequential decisions of individuals and social groups. On the other hand, GEO and other related assessments also started paying more attention to ways of knowing beyond Western science, including traditional and local knowledge and citizen science (Bäckstrand, 2003; Tengö et al., 2017). While both are recognized as having value in their own contexts, their contribution and place in global assessment processes are still evolving (IPBES, 2021).

## *The outlook component of the GEO framework*

The next step of a typical GEO assessment, addressing question 4 in Figure 2.4.1, requires a forward-looking perspective. It requires imagining the future, desired or undesired, as a function of the interplay between human choice and environmental dynamics. This outlook part of a GEO leads directly into the final step, dealing with the question of which alternative actions could be taken.

From the start, GEO included an outlook component as an inherent element. Like every other component, it grew more complex over time and changed, catering to more complex and varied information needs. Chapter 5 describes the evolution of the outlook component in more detail.

In line with GEO as a whole, the emphasis of the outlook chapter shifted from what could happen to what should happen. For example, *GEO-1* tabled a single baseline scenario, illustrating what would happen if we continued along the path of conventional development. The report looked at alternatives to the baseline only in the context of a few selected policies, not as a synthetic whole. In contrast, *GEO-3* featured four contrasting scenarios, each richly elaborated and jointly exploring 'what if...'. *GEO-6* sketched

pathways to sustainable development and sought to identify key changes and conditions associated with transitions. The scenarios were framed around sustainability themes reflected in global commitments such as the Sustainable Development Goals and relevant multilateral environmental agreements, emphasizing the importance of their interconnections.

The significance of the outlook component to the conceptual framework of GEO is arguably five-fold:

1. It bridges from GEO's body of factual, retrospective information to future-relevant illustrations arguing for or against certain approaches, based on which policymakers and stakeholders might develop commitments for the future.
2. It is a potential entry point for the engagement of a wide variety of stakeholders and the development of projections that are well attuned to conditions at the regional level.
3. It provides an opening to address important details that would have been easily missed in conventional SoE reports, such as near-term decision points determining long-term effects by locking societies into given development pathways.
4. It provides the reader, in principle, with a tool to recognize and label contemporary developments in a certain sector or region, or globally, as characteristic of a certain path into the future.
5. It provides an opportunity for the integration of quantitative and qualitative methods and perspectives that allows the construction and exploration of future trajectories with a richer texture and a better sense of possible implications.

In the GEO conceptual framework, scenarios are not predictions. Instead, they are exercises in storytelling, informed by the insights of GEO collaborators and the rigour of quantitative modelling. The outlook part of GEO is typically about larger-scale issues with much inertia, such as agricultural systems, urban development, poverty, education or energy systems and ocean management. Thus, the time-horizon of its outlook component typically lies decades into the future: at least one – or for some societies two – human generations. But implications for policymaking often occur much sooner than that. Identifying these implications – including physical and social impacts and costs – and how they follow from policy choices is a key function of GEO, with practical relevance for policymaking.

## 2.5 Beyond DPSIR

The DPSIR framework did not begin with GEO, and even though it has served GEO well over many assessment cycles, its use in future GEOs is not a given. The design of upcoming GEOs always involved discussions about the conceptual framework as a prominent element. Such discussions also took place as part of the Future of GEO process that started after *GEO-6*. Even though past considerations of the conceptual framework typically led only to adjustments in the DPSIR framework, more profound changes cannot be excluded.

Since the creation and adoption of the DPSIR framework, a number of key concepts have emerged on the interface of the scientific and policy fields directly relevant for GEO. While recognized, and to some extent even addressed, by GEO reports, these are not explicitly reflected in the DPSIR framework. Examples of such concepts include ecosystem goods and services, planetary boundaries, resilience and transition theory in the sphere of science and governance in the sphere of global policy goals.

While assessments like GEO need to learn and evolve, changes in their frameworks and methods need to be weighed against the value of maintaining consistency over time, as observed by Elizabeth Dowdeswell, a former Executive Director of UNEP (Elizabeth Dowdeswell interview). Is the methodology sound enough to ensure consistency, from early GEOs to future editions in the 2020s? Consistency also matters across the many spatial scales where GEOs have been produced and where framing an IEA around specific political and social realities may deliver ancillary benefits. At the same time, it means that interpretations of some of GEO's facts reflect changing viewpoints, which may be a concern for consistency over time. Ideally, GEO would offer both a layer of comparable measurements and a layer of interpretation, depending on political and social contexts, both of which may vary and change.

Chapter

3

# Collaboration and Participation in the Global Environment Outlook Process

## 3.1 Introduction

Collaboration and participation have always been essential elements of the Global Environment Outlook (GEO) process. This chapter explores how GEO has enabled and evolved a collaborative, participatory approach over time, along with the various roles that multiple organizations and individuals have played in the process. A network of independent partner institutions from around the world has formed the core of the GEO assessment process from its start. But as the GEO series has progressed, individual experts have taken over a much greater proportion of the analysis and preparation of report contents.

The next three sections of this chapter look at the respective roles of these two critically important groups and the reasons for the progressive transfer of responsibilities from one to the other. But participation in the process has extended well beyond these two groups. The penultimate section summarizes the additional key roles that other participants have carried out for GEO – some through collaboration in a group context and others who have acted in an individual capacity based on their specialized knowledge and experience. This chapter does not cover the multiple tasks and responsibilities undertaken by United Nations Environment Programme (UNEP) Secretariat staff in Nairobi and the regions.[1] Instead, their major support function in coordinating and contributing to the overall process is covered in Chapter 7.2.

Useful insights into the evolution of the GEO process were provided by those persons interviewed by the authors during the preparation of this book, all of whom had participated in GEO in one capacity or another over the years. They were asked what significant changes they were aware of and whether these had been positive or negative. The responses were diverse, but nearly everyone had strong views one way or another. Many of their responses have been quoted or paraphrased in different parts of this chapter to provide an additional dimension to the analysis.

## 3.2 Partner institutions

From the beginning, producing GEO was envisaged as a participatory process. One of the first organizational steps in 1995 was to identify a range of partner institutions to undertake various functions. Governing Council Decision 18/27C, which initiated GEO, specifically requested basing the report on existing data in close cooperation with several other United Nations (UN) agencies and on the research results of relevant public and private institutions. Beyond the UN, several institutes that had assisted UNEP in formulating the new assessment proposal were obvious choices. They included the National Institute of Public Health and the Environment in Bilthoven, The Netherlands; the Stockholm Environment Institute; and the World Resources Institute in Washington, DC. Each of these institutions had people with considerable knowledge of, and experience in, global processes. They also had specialized environmental expertise as well as strong links to the policy arena.

[1] UNEP maintains regional offices in six regions: Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, North America and West Asia.

Specialized institutes have continued to play a critical role in every GEO to date, performing complementary functions such as scenario development, modelling and the analysis of global change processes, earth system complexities and environmental sustainability. Without their willing participation, many of GEO's analytical and global dimensions would not have materialized.

The greater challenge was identifying a group of reputable, multidisciplinary institutions that were knowledgeable and active at regional, or sometimes national, level – and considered to be at the cutting edge of the environmental science-policy interface. It was crucial to have a broad geographical distribution of these institutes to be representative as a network and collectively cover the entire globe. Partners with particular thematic focus were also needed to encompass all major disciplines relevant for a global integrated environmental assessment. While partners were expected to represent the highest level of scientific credibility, there was also a recognition that capacities often vary significantly from region to region. In some, the choice of partners was limited, and involvement in GEO was considered a learning and capacity-building process.

## *The Collaborating Centre Network*

*GEO-1* ended up with 20 partner institutions, selected by UNEP staff at headquarters and regional offices and recognized as GEO collaborating centres (CCs) after that. In terms of regional distribution, there were three CCs in Africa, five in Asia and the Pacific, four in Europe, three in Latin America and the Caribbean, three in North America and two in West Asia. The report of the March 1997 formal inauguration of the network reads like a catalogue of diversity in terms of expertise and institutional position (UNEP, 1997e). Regarding specific geographical coverage, gaps were noticeable – including the Polar regions and Pacific and Caribbean islands – requiring six additional institutes during parts of the process.[2] There were also challenging expectations for some of the CCs that were, for example, tasked with drafting state-of-environment perspectives on parts of the world for which they had no first-hand knowledge.

In the ideal case, a partner institution would involve several of its staff in the GEO process, delivering multiple skills and perspectives:

[2] While their contributions were acknowledged, they were not officially designated as CCs for *GEO-1*.

> In the collaborating centre, we are experts from different specialties and each one of us is supposed to have a team that consists of people from inside or outside the university. We have a lead author write the report and we sit together and review each part to have at least a respectable zero draft (Asma Ali Abahussain interview).

Quite often, however, the onus fell upon a single person, which was very challenging for the individual concerned and most likely overlooked the full range of relevant expertise of the institute. "It seemed to be individuals who carried the responsibility of the chapters in the end…it would be the personal thrust and motivation of an individual to get the chapter done" (Jane Barr interview).

Subsequent GEOs saw a major expansion in the global network of partner institutions, called collaborating and associated centres in *GEOs-1* to *4* and contributing institutions and organizations in *GEOs-5* and *6*. Whatever the name, 37 partner institutions participated in *GEO-2000*, 37 in *GEO-3*, 54 in *GEO-4*, 57 in *GEO-5* and 43 in *GEO-6* (Table 3.2.1 and Annex II). The increase in numbers undoubtedly strengthened scientific, technical and policy expertise in the process and filled in geographical gaps. By *GEO-4*, for instance, the number of regional partners had increased to six in Africa, 11 in Asia and the Pacific, nine in Latin America and the Caribbean and seven in West Asia.

The designation of partners was not entirely formal. Some CCs – especially in earlier GEOs – received a letter from UNEP's Executive Director identifying them as a CC or a Memorandum of Understanding setting out their responsibilities and the agreed funding. Others were simply invited to send participants to meetings or requested to provide inputs. Although UNEP normally covered their meeting expenses, significant in-kind contributions – services provided without receiving payment from UNEP – were made by individuals or institutes. A post-*GEO-3* evaluation from the perspective of CCs, with 28 of the 36 CCs responding, found that in terms of in-kind contributions 64 per cent had provided staff time for GEO, 28 per cent had hosted meetings, and 20 per cent had covered overhead costs like office space (UNEP, 2004d).

## *The Role of Collaborating Centres*

The role of GEO CCs tended to evolve, and often diversify, from one iteration to the next, especially if they participated on a long-term basis. A participant from the Arabian Gulf University, one of only three partner institutes to work on all six global GEOs, noted the evolution of their contributions

to regional content development. For *GEO-1,* they just reviewed the report. For *GEO-2000,* they developed draft material, and by *GEO-4,* they were working together on the same agenda with other CCs at an institutional level (Waleed Khalil Zubari interview). "So, the evolution of GEO started from more internally being put together to a more decentralized approach...through the regional offices and the collaborating centres in different regions. I think that was central to GEO being successful" (Munyaradzi Chenje interview).

But the task was not always easy. For example, the Head of Information Exchange at the Regional Environmental Center for Central and Eastern Europe reported that their task for *GEO-2000* to compile, summarize and edit much of the information received from their own centre as well as from other European partners was frustrating due to new decisions made between UNEP and CCs, changes in methodology and format, poor quality inputs from other institutions and guidelines not being followed (REC, 1999).

But content development was not the only way that CC staff participated in GEO. Being a GEO CC meant interaction and collaboration – participating through planning, drafting and consultation in regional and global meetings and communicating throughout the process, not just with UNEP offices but also with each other. At the regional level, interviewees stated that CC staff "also took some coordinating role geographically or technically, often because of their knowledge of the GEO methodology and the participatory process" (Kakuko Yoshida interview), so the more experienced CCs were able to guide the newer partners. Knowledge based on experience at the regional level was also a considerable benefit for ensuring that the best available regional and subregional information was being used in GEO. "I thought that establishing a network of collaborating centres who are working on these topics on a continuous basis is actually the best way of getting the most up-to-date information" (Peter Noel King interview).

### Box 3.2.1: Being Part of GEO

The most detailed evaluation from the perspective of GEO CCs was carried out after *GEO-3* when CCs were still the backbone of the report's preparation (UNEP, 2004d). Collectively they rated their experience in integrated assessment, institutional capacity, regional level expertise, communications and networking, and multidisciplinary teams as the top five strengths that they brought to GEO.

Some UNEP staff who worked closely with the CCs and were interviewed for this History look back with appreciation:

- "GEO and its early success were in large part thanks to the network of collaborating centres we put together."
- "Really, without the collaborating centres there would have been no GEO. We had fantastic collaborating centres…whatever successes we had, it was because of them, their hard work and dedication and willingness to do all that work for nothing or very little."
- "To get GEO to be a good piece of work…it is the goodwill of institutions, the goodwill of collaborating centres, the goodwill of researchers who feel that it's …a public service…it takes people who are driven."

In the early years of GEO, there was no formal training for anyone involved, whether they worked for UNEP or came from outside. For all, it was entirely a learning-by-doing process, although key individuals drew upon and contributed their prior experience with global reports or scenarios and modelling, for example. And while learning-by-doing continued right through to the latest *GEO-6*, UNEP also set up a more formal capacity-building programme to enhance the integrated environmental assessment abilities of both GEO partners and a much broader group of practitioners in the regions. "The GEO process brings together the experts. The training programme produces new experts" (Michael Keating interview). The steps and efforts taken to do this are summarized in Chapter 7.4.

## *Partner Institutions – Evolving Numbers*

Altogether some 129 different institutes from around the world have participated in the GEO process between 1995, when work began on *GEO-1*, and 2019, when *GEO-6* was launched (Figure 3.2.1 and Annex II). Without a doubt, the GEO process benefited hugely from the contributions of this diverse network of partners: there is no way that the process outcomes would have been achieved without them. They have provided not only an immense amount of knowledge and expertise but also donated an immeasurable amount of staff time, and sometimes much more, as in-kind contributions to the process. Their participation has helped ensure that the three essential attributes of integrated environmental assessment – relevance, credibility and legitimacy – have been met through all iterations of the GEO process and products to date.

**Figure 3.2.1. GEO collaborating entities**


*GEO collaborating centres and other contributing institutions have existed in all world regions, except the polar region.*

(Source of information: Annex II)

From a different perspective, there are some possibly unexpected, and likely significant, implications resulting from the changes in the GEO partner networks over the years. Table 3.2.1 provides some insightful statistics. As mentioned earlier, the total number of partner institutions more than doubled between *GEO-1* (26) and *GEO-5* (57). For *GEO-6,* there were 62 partner institutes listed, but 19 of these were government ministries and offices and not included in this analysis due to their very different status to the other types of partner institutions.

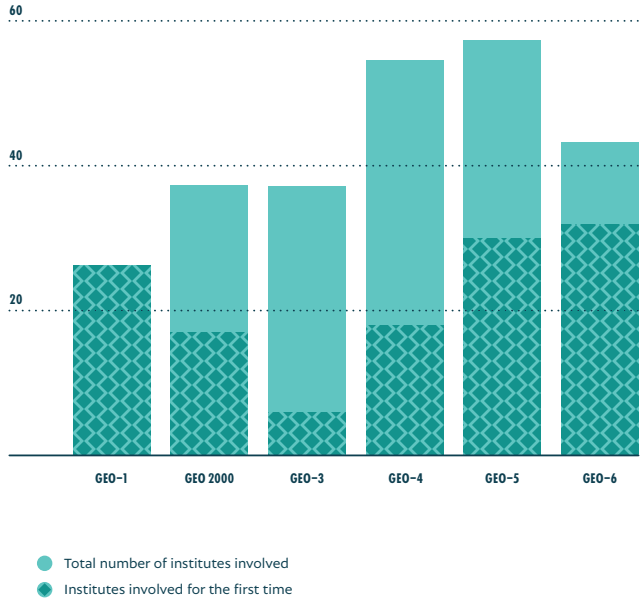
Partner institutes involved in a previous GEO could add value to the process. Obviously, all of the 26 partner institutes involved in *GEO-1* were first-timers (Table 3.2.1 and Figure 3.2.2). In *GEOs-2000*, *3* and *4*, more than half of the partner institutes had been involved in at least one previous GEO, enabling them to contribute process understanding, product experience and lessons learned to the next round. In the two latest GEOs, the number of repeat partner institutes fell below 50 per cent, reaching a low of 26 per cent for *GEO-6*, with only 11 of the 43 partner institutions involved in any previous GEO. There could be many reasons for this, including a shift in report focus requiring alternative institutional expertise, waning interest of institutes in continuing their engagement due to the repetitive nature of GEO, or the extended periods between successive GEOs.

**Table 3.2.1. Involvement of partner institutes in global GEO Reports**

| | Partner institutes involved | Partner institutes involved for the first time | | Partner institutes also involved in an earlier GEO | |
|---|---|---|---|---|---|
| *GEO edition* | *number* | *number* | *%* | *number* | *%* |
| 1 | 26 | 26 | *100* | 0 | *0* |
| 2000 | 37 | 17 | *46* | 20 | *54* |
| 3 | 37 | 6 | *16* | 31 | *84* |
| 4 | 54 | 18 | *34* | 35 | *66* |
| 5 | 57 | 30 | *53* | 27 | *47* |
| 6 | 43* | 32 | *74* | 11 | *26* |

*This excludes the 19 government offices/ministries listed as 'contributing institutions and organizations' for *GEO-6* (UNEP, 2019e, p. 686).

**Figure 3.2.2. Involvement of collaborating centres and other contributing institutes in global GEO Reports**




*Continuity of involvement was strongest for GEO-3 but greatly reduced by GEO-6.*

(See Annex II for details and sources)

In addition, any personnel changes in UNEP or the partner institutes could have erased institutional memory on either side. "Influx of new blood in the process is inevitable, but this influx…requires very consistent effort from the UN team to keep all participants tuned to the same wave[length], and not lose institutional memory which was built up during the process." (Ruben Mnatsakanian interview). Whatever the reasons, considerable additional time and effort will have been required to bring the many new GEO partners up to speed on integrated environmental assessment in general and their specific roles in the process in particular.

Of the 129 different partner institutes involved in GEO to date, there are 48 that have participated in more than one GEO, including 28 that have played a role in four or more of the GEOs (Table 3.2.2 and Annex II). This continuity has provided a valuable opportunity to retain and hand down institutional memory through the series. At the other end of the spectrum, another 81 institutes have only been involved in one GEO. It is certainly feasible that these fresh eyes may have stimulated alternative approaches, and more experimentation and innovation, in those GEOs.

**Table 3.2.2. Institute participation in multiple/single GEOs**

| Total number of GEOs that partner institutes were involved in | Number of partner institutes involved in multiple/single GEOs |
|---|---|
| All six GEOs | 3 |
| Only five GEOs | 10 |
| Only four GEOs | 15 |
| Only three GEOs | 4 |
| Only two GEOs | 16 |
| Only one GEO | 81 |
| TOTAL | 129 |

| Which GEOs were the one-time partner institutes involved with? | How many one-timers were there in each GEO? |
|---|---|
| *GEO-1* | 4 |
| *GEO-2000* | 4 |
| *GEO-3* | 3 |
| *GEO-4* | 11 |
| *GEO-5* | 27 |
| *GEO-6* | 32 |
| TOTAL | 81 |

## 3.3 Shifting of roles and responsibilities from partner institutes to individuals

*GEO-4* marked a major turning point regarding participation in the GEO process. Much of the impetus for this new way of working stemmed from a Governing Council (GC) initiative on strengthening the science base of UNEP. A consultative process established by GC-22 in 2003 (GC/UNEP,

2003b) resulted in many general recommendations relevant to GEO (IISD, 2004). While commending the bottom-up approach used in GEO, it called for a more effective interaction between science and policy through intergovernmental and multi-stakeholder consultations.

Planning for *GEO-4* began in early 2004. Over the next year, there were two design meetings, six regional consultations and further meetings with other experts and partners. The *GEO-4* preparatory process culminated in February 2005 in a Global Intergovernmental and Multi-stakeholder Consultation on the Scope and Process of the Fourth Global Environment Outlook. This first global consultation during the design phase of a GEO articulated 34 key questions for *GEO-4* and a set of process recommendations to use:

> the best scientific knowledge and expertise in a geographically, disciplinary and gender-balanced way for interacting with policymakers and civil society and analyzing critical environmental issues through an open and transparent, multi-scaled, multi-sectoral and multidisciplinary integrated assessment of high legitimacy, credibility and utility … including by Establishing expert working groups identified through various processes including nominations by governments, relevant international and regional bodies and collaborating centres, chosen on the basis of scientific merit… [and] requests the Executive Director to contact governments and partners inviting them to submit their nominations for experts to participate in *GEO-4* (UNEP, 2005f, para. 10,12(a),13).

Thus while *GEO-4* had the greatest number of CCs to that date, the major design of the chapters was done by expert working groups,[3] and the contents were developed by author teams made up of individuals designated as coordinating lead authors, lead authors and contributing authors. While these teams still included many CC representatives, the CCs played a less conspicuous role, and the majority of authors were involved in their personal capacity, having been nominated by governments based on a track record of particular science or policy expertise. The author teams ranged from 19 to 91 persons across the ten chapters of *GEO-4*, with the largest team responsible for Chapter 6, "Sustaining a Common Future," containing the main regional analysis within the report. This essentially hybrid approach was commended in the subsequent evaluation of the assessment: "The GEO process has over time built a broad constituency of environmental organizations and experts committed to GEO, all engaged

[3] The term 'working group' is also used to name some of the expert and advisory groups established to support GEO (Chapter 7.3).

in co-producing the knowledge. This is a critical strength of GEO and one that should be safeguarded and used to champion GEO after its production" (IUCN and UNEP, 2009, p. 59).

While *GEOs-5* and *-6* adopted a similar approach and process to *GEO-4*, the collaborating centre designation and visibility vanished. The four-page description of 'The *GEO-5* Process' at the end of the report does mention that GEO CCs contributed time and knowledge to the process and that they, along with governments and other major stakeholders, had been asked to nominate experts. But, unlike in earlier GEOs, they are no longer listed specifically as 'collaborating centres,' but they are grouped as 'contributing institutions and organizations' instead (UNEP, 2012a, p. 504). Of the 57 institutions listed in *GEO-5*, 27 had also collaborated in earlier GEOs and 12 had been involved in every GEO so far produced (Annex II). In *GEO-6*, there is no mention of collaborating centres, and only 11 of the 43 partner institutions had been involved in earlier GEOs (Table 3.2.1).

Writing teams have continued to comprise coordinating, lead and contributing authors, with more than 310 individuals involved in the content development of *GEO-5*, around twice the number who prepared the 25 chapters of the even longer *GEO-6*.[4] The main new development for *GEO-6*, as recommended by the Science Advisory Panel, was the appointment of two Co-chairs and two Vice-chairs to oversee the report's entire content and help ensure scientific credibility.

Thus, since 2005 GEO has adopted the authorship practices of the Intergovernmental Panel on Climate Change (IPCC) reports and the Millennium Ecosystem Assessment. This 'IPCC-ization' of GEO also introduced updated process guidelines, a more extensive and rigorous peer-review process and greater government participation in some of the high-level advisory groups and negotiations of the Summary for Policy Makers. Table 3.3.1 summarizes interview responses on the IPCC-ization of GEO.

[4] One of the basic principles established by advisory bodies for *GEO-6* was that author teams should be kept small, since the regional assessments would contain much of the information needed for the global assessment and should form its foundation (UNEP, 2019e, p. 664).

**Table 3.3.1. Opinions from interviewees on the IPCC-ization of GEO**

| **Is the IPCC an appropriate model for GEO?** | |
|---|---|
| • IPCC is focused on one problem from many different dimensions. But you can't do that with GEO... it's a completely different structure, not focused on something single.<br>• It has pulled the report into the scientific ground and away from the policy-science interface.<br>• We have some staff members who would like to behave like IPCC. But GEO is not at all the process of IPCC. Some coordinating lead authors and authors do not understand DPSIR [Driving forces-Pressures-State-Impacts-Response framework], and they come with methodology and primary research, so it's a bit chaotic.<br>• GEO has never been published by a peer-reviewed publisher, so it doesn't count for your citation index. Authors can't even get credit and are not incentivized to engage (unlike being an author for the IPCC).<br>• It was a very big mistake, and to continue the IPCC model is continuing this big mistake.<br>• It could have been done in a hybrid way: keep the CC network strong, widen the base to include other centres from areas not covered by the current CCs and then involve experts to augment the CC network. | |
| **What were the consequences of IPCC-ization on GEO?** | |
| **PROs** | **CONs** |
| • The more people that are involved in creating GEO, the more impact it's going to have.<br>• Bringing more people in has raised awareness.<br>• Especially in the last couple of years, it has been a great capacity-building opportunity by engaging people outside Europe and North America; being part of the process has been enlightening for the hundreds of experts and scientists involved.<br>• This layer of intergovernmental credibility/legitimacy should have given greater acceptance and impact to the findings.<br>• The main intention was to strengthen the science behind it. GEO can now be considered up there with the major assessment processes. | • The process lost a lot of good experts and gained a lot of not-so-good experts.<br>• The learning-by-doing, bringing new participants up to speed, has cost a lot. Formal capacity-building has all but disappeared.<br>• Moving to individuals risks losing institutional memory of the process.<br>• It's much more difficult to maintain the momentum when relying on individual scientists.<br>• GEO has been watered down and lost its independence by becoming overly intergovernmental/too political.<br>• It's risky trying to please all governments. It's the lowest common denominator kind of assessment now.<br>• They became reports saying what governments wanted to say about the environment, no longer independent and science-based. |

| What impact did the IPCC-ization of GEO have on existing CCs? |
|---|
| • Most of the CCs were not happy because it seemed to undermine their role and question their credibility.<br>• When they [UNEP] decided to get the IPCC model of lead, coordinating and contributing authors, the role of CCs was minimized. It really did weaken the process. Some colleagues refused to continue working [on GEO]. "Why should I work? We are not a collaborating centre anymore, and we are not a team."<br>• The CC system provided sustainability and continuity of expertise as a result of learning-by-doing and passing on expertise to new colleagues. For *GEO-6* and West Asia, beginners wrote the regional assessment, producing a poor quality draft.<br>• There was no shift in CC involvement: they were still involved but maybe in a reduced capacity.<br>• Starting from *GEO-4,* we were real authors from the beginning – we participated in all events. |
| This table has drawn from interviews with Asma Ali Abahussain, Adel Farid Abdel-Kader, Joseph Alcamo, Nicolai Dronin, Edgar Guttiérez-Espeleta, Jason R. Jabbour, Peter Noel King, Clever Mafuta, Ruben Mnatsakanian, Nicolas Perritaz, Ashbindu Singh, Leena Srivastava, Anna Stabrawa, David Stanners and Kaveh Zahedi. |

## 3.4 A closer look at author groups

In relation to nominating and selecting individual experts as authors, governments requested ongoing consideration of the need to ensure geographic, disciplinary and gender balance. On a wider level, the *Review of the Initial Impact of GEO-4* (IUCN and UNEP, 2009) stressed that the extent and manner of stakeholder involvement in the design, development and dissemination of the assessment are critical to its salience, legitimacy and credibility. It also stressed that there is a delicate balance to be met when involving both scientists and diverse stakeholders who represent the views of target audiences. An over-involvement of scientists can reduce the political resonance of the process, whereas tipping the balance in the other direction can decrease its scientific credibility.

Focusing on author groups and the lists of contributors acknowledged in the various GEO reports, the stipulations on broad participation appear to have been met. However, the evaluations carried out after the completion of *GEO-4* (IUCN and UNEP, 2009) and *GEO-5* (Rowe et al., 2014) both expressed reservations about the broad composition of author groups. For *GEO-4,* it was noted that "Working Group members (that is, author teams) recommended a better balance of policy, sciences (social and natural),

academic and development expertise" and that "the absence of private sector participation in the GEO process means that the Report lacks the private sector perspective" (IUCN and UNEP, 2009, p. 30). The *GEO-5* evaluation stated that "the assessment process did not include the diversity of interests and stakeholders that was implied by the GC Decision and requested by the Global Intergovernmental and Multi-stakeholder Consultation, and the majority of contributors was drawn from countries with a high level of development" (Rowe et al., 2014, p. 2). However, on a more positive note, it did consider that there was a "favourable gender balance in *GEO-5* contributors" (Rowe et al., 2014, p. 37). About 40 per cent of *GEO-5* authors and reviewers were women. The highest representation was among the *GEO-5* Fellows at 64 per cent, while lead authors were at the low end with 34 per cent.

Interviewees who had been closely associated with author groups also made some interesting observations about their composition and effectiveness. One considered that people from West and Central Africa were clearly under-represented because GEO is by default such an English language-based process. Another stated that the independent consultants in the groups presented their own views and not the regional views. There was also an opinion that bringing government staff who are not academics into the writing teams caused a certain amount of tension around scientific credibility and legitimacy, but that it also resulted in compromises on relevant issues. Other points emphasized significant insights. For example, in developing countries, there are only a handful of scientists, they are used in all processes, and they are always stretched. Also, some bias is likely because most authors are based or trained in the North. As well, a lot of information written in less widely spoken languages such as Japanese and Korean probably never found its way into GEO.

The other main issue mentioned was the lack of participant continuity from one GEO to the next. One interviewee made the point that individuals change. They volunteer while they are young and enthusiastic about contributing to GEO to build their career. But once their career is built, they are not keen to put their effort and time into it for free, so they don't participate. With reference to *GEO-6*, they added that everyone was new in the GEO process, they didn't know what to do, and they had little or no experience. Having received no capacity-building or training, these participants were unable to deliver. West Asia and North Africa were two subregions that suffered tremendously from this discontinuity.

Despite the IPCC-ization of the GEO process, the need to build capacity related to integrated environmental assessment and environmental data

has continued to feature in GC and United Nations Environment Assembly (UNEA) decisions relating to GEO. Thus capacity-building is still clearly viewed by member states as a valuable attribute of the global GEO process and one that should continue. However, with the change of methodology and process design, and reduction of available funding, the formal capacity-building dimensions disappeared from the global process to a large extent. Shifting the emphasis to individual scientists was expected to increase scientific credibility, as only those who already had capacity were expected to be selected. While this presented an opportunity to individuals, it resulted in weakening GEO's ability to contribute to institutionalizing capacity that would be available for alternative integrated environmental assessment processes based on the GEO template but conducted independently, as seen during earlier GEOs. However, to ensure some continuity of capacity-building in the global process, the UNEP Secretariat introduced a GEO Fellowship initiative in August 2005 that engaged young and qualified professionals in *GEO-4*. This alternative capacity-building component linked to author groups is summarized in Chapter 7.4 and has continued through *GEO*s-*5* and -*6*.

## 3.5 Other GEO Participants: A Medley of Roles

This chapter has focused on the role of independent partner institutions and individual experts in researching and developing the content of the GEO reports. However, preparing and delivering a global assessment is a multi-task process, and there have been many other groups and individuals who have also participated, either by strengthening the legitimacy and credibility of the report or by performing other vital functions in the process. Their roles are summarized in the subsections below.

### *UN Member States*

Member states of the UN form the governing body of UNEP and, through sessions of the GC and UNEA, have made every decision requesting the Secretariat to deliver a GEO (Annex I). A subset of member states, comprising the Committee of Permanent Representatives, regularly meets at UNEP Headquarters in Nairobi and considers various documents, including progress reports and draft decisions, before they reach the GC/UNEA. Over the years, the Committee of Permanent Representatives has played a significant role in steering some GEO-related decisions. A UNEP staff member observed that "Our 'board of directors' [UNEA] is made up of

193 countries, and they are not a ubiquitous bunch. They all need GEO for different things. And they all have slightly different positions about what GEO is and ought to be and could be and should be."

As principal stakeholders, member states have collectively played several more direct roles in the GEO process over the years. "The UN is intergovernmental, so involving governments more makes sense" (Ashbindu Singh interview). From *GEO-1* onwards, all governments have been invited to review draft chapters of the reports and participate in regional consultations that promote GEO-related interaction between scientists and policymakers. The regional consultations for the first three GEOs took place as a stage in the draft review process.

For the first time, UNEP held regional meetings during the planning phase of the *GEO-4* process to come up with a preliminary design and select key regional issues. Then, like the earlier GEOs, the process proceeded to a set of regional consultations once the first draft was ready for review. For both *GEO-5* and *GEO-6,* regional consultations were held early on, before drafting began. For *GEO-5,* they identified priority challenges and relevant internationally agreed goals and targets. For *GEO-6,* they were part of the process to prepare the regional reports (Chapter 5.4); no regional consultations were held specifically for the global report. From the national perspective, the choice of representatives who participate in consultations is seen as significant by interviewees. "[Some] are very strong when it comes to governmental review; they get their government position well, and the messaging they want carries the day. Whereas those from my part of the world [Africa] are maybe not getting and pushing forward...what we want" (Clever Mafuta interview). "Regarding Government review, we are not sure that the nominated guys from the Government have the requested ability to tackle this issue. And do they have enough time to read a whole chapter?" (Jacques-André Ndione interview).

As part of the IPCC-ization of the global process, a Global Intergovernmental and Multi-stakeholder Consultation was introduced during the planning phase of *GEO-4*, and these have continued to take place at the beginning and end of every GEO since then. Those held in the initial stage of preparation have decided the objectives, scope and process for the report; those held once the report is finalized have negotiated the Summary for Decision or Policy Makers (SDM or SPM).

Other channels through which some member states have participated in GEO include the designation of government ministries or departments as partner institutes so they will provide inputs to the drafts. As noted in

Table 3.2.1, 19 government ministries were listed as partner institutes in the acknowledgements of *GEO-6*. In addition, some government representatives have been members of high-level advisory groups (Chapter 7.3) or part of author teams:

> Having government officers – directors and senior technical people – participating actively in the GEO process, even as a writer or reviewer, had a major benefit to the content of GEO, but also allowed them to take back some of the state of the environment information to their own government and reflect on that (Kakuko Yoshida interview).

So even draft material could act as an early conduit for conveying policy-relevant messages to decision makers.

There is, of course, often a downside to change, and the increased IPCC-ization of the GEO process since *GEO-4* has received its share of criticisms. Opinions have been voiced that there is now too much government interference in the entire process. This interference could limit GEO's flexibility to respond to new challenges and unforeseen developments. As well, it could compromise the scientific integrity of the reports and weaken the messages relayed to decision makers due to compromises that are inevitably made when agreeing texts through a consensual process (Box 3.5.1).

### Box 3.5.1: Negotiating the SDM/SPM

The SDM for *GEO-4* (UNEP, 2007c) was the first summary submitted to negotiation by member states. It was considered and endorsed by 69 governments and a number of other stakeholders in Nairobi in September 2007. The process proved to be a real eye-opener for all. Although a few countries sent delegates to the negotiation, most of the representatives were "generic diplomats who just happened to be there [embassy staff based in Nairobi] and were very much confronted by something they had never seen before because the GEO process was not happening every day. Many thought, 'What is happening here? Why are we fighting?' I think it was mostly the USA competing with Europe." (Martijn Dadema interview)
The *GEO-4* evaluation (IUCN and UNEP, 2009) concluded:

> Of particular concern is the general perception across user groups that the Summary for Decision Makers production process did not meet standards of independence. The Summary for Decision Makers is therefore generally perceived to be less reliable and authoritative than the main assessment report. This is primarily in response to what some see as a compromise during a negotiated process that sacrificed 'scientific rigour' for 'political expediency'

> during the final stages of the intergovernmental consultation…The Summary for Decision Makers is widely regarded as a negotiated text in which some government representatives had a much stronger voice than others. Qualitative information confirmed…that the SDM content, in particular, was modified due to pressure from certain government delegations and questioned the role and effectiveness of UNEP as a neutral broker in this process.

Interviewees added their perspectives:

- "I think that it is good that countries meet and discuss what is important to highlight for the summary for the stakeholders. I think that is a wonderful process, although it is very difficult." (Ninni Lundblad interview)
- "The real attention comes at the Summary for Policy Makers point of formulation …[when] governments try to ensure that there is no deviation from what [they] have already agreed to." (Peter Noel King interview)
- "When you have to negotiate anything line-by-line, that's not necessarily reflecting buy-in because that's not what you need, that's reflecting people being difficult…. It's not actually reflecting 'we've come along this journey, we agree with this.' It's more reflecting, 'oh no, my government's not going to be happy if it says this, so I'm going to change it.'" (Helen Mountford interview)
- "Allowing the technical team, the writers, to be present during the presentation to the member countries of the Executive Summary…for *GEO-4*…caused quite a furore among the team…It certainly made us feel that our scientific expertise was being glossed over in favour of political expediencies. And in the face of…bullying…we could really see how that was happening. I remember…other people including myself being really shocked and some withdrawing their names even from the list of authors…of the Executive Summary." (Jane Barr interview)

## *Other UN Organizations*

The first decision on GEO (18/27C) requested that the report be prepared in close cooperation with other UN agencies and bodies, and this has always been the intention. While this was nothing new for UNEP as far as cooperating with such relevant bodies as United Nations Food and Agriculture Organization, United Nations Development Programme, United Nations Educational, Scientific and Cultural Organization, World Health Organization and World Meteorological Organization was concerned, GEO has, over time, almost certainly widened UNEP's engagement across the UN.

The participation of other UN entities in *GEO-1* was organized through the cooperative mechanism named UN System-wide Earthwatch, which was coordinated by UNEP from its Geneva office (Chapter 1). For this first GEO, UNEP established the closest links with the United Nations Department for Policy Coordination and Sustainable Development. In connection with this, there was a workshop attended by ten additional UN body representatives, with several contributing to activities of the first GEO Data Working Group.

The range and number of other UN entities that contributed to *GEO-2000* rose steeply and included staff from many environmental convention secretariats. More than 70 individuals from other UN bodies are named as contributors in the back of the report. In return for providing substantive data and information on issues within their individual mandates and helping to review drafts, they had the opportunity to highlight and gain visibility for some aspects of their own work that were relevant to topics covered in GEO. In *GEO-2000*, examples of this include sections summarizing the human development work of the United Nations Development Programme and the efforts of the United Nations Commission on Sustainable Development to develop indicators of sustainable development (UNEP, 1999g, pp. 15–16), the work of the World Health Organization on environment-human health linkages (UNEP, 1999g, pp. 34–36), and the projections of the United Nations Food and Agriculture Organization for cultivated land and deforestation (UNEP, 1999g, pp. 37–39). It also has a section focusing on ten major multilateral environmental agreements (UNEP, 1999g, pp. 199–205).

Despite these inclusions, the Evaluation and Oversight Unit of the United Nation's Office in Nairobi concluded that involvement of other UN agencies in *GEO-2000* had been weak and recommended that in the future, "The GEO Unit should develop strong linkages with other UN agencies" and "ensure their full involvement in the process at an early stage" (Attere, 2000, p. 34). Klaus Töpfer, who was the UNEP Executive Director at the time of *GEO-2000* and *GEO-3,* remarked that other UN organizations were often more focused on selling themselves than in realizing that others could be very helpful partners (Klaus Töpfer interview).

This collaboration has continued through subsequent GEO processes. In *GEO-4*, 18 UN agencies were represented by 37 individuals, while 21 individuals from 11 agencies participated in *GEO-5*, and around 40 from 14 agencies in *GEO-6*. In addition, since *GEO-3*, the reports have included a foreword by the UN Secretary-General.

Going beyond GEO and UN organizations, there have been two initiatives to encourage greater interaction between those engaged in a wider range of global environmental assessments. In 2007-2008, for the first time, there was limited coordination between GEO and four other global environment-related assessments (Box 3.5.2).

### Box 3.5.2: Coordination among global environment-related assessments: the cohort of 2008

The 2007-2008 coordination was triggered by comments from members of analytical teams who found themselves in demand by no less than five global assessments almost simultaneously. It was dubbed 'lightweight' to reflect that it was meant to be pragmatic and only at the level of project managers; in other words, not formalized or controlled by the respective oversight bodies. This cohort of assessments consisted of:

1. The fourth Climate Assessment report of the IPCC (IPCC, 2007b) and its Summary for Policy Makers (IPCC, 2007c)
2. The first International Assessment of Agricultural Knowledge, Science and Technology for Development, initiated by the World Bank and co-sponsored by the United Nations Food and Agriculture Organization, UNEP, the United Nations Development Programme, the World Health Organization, the United Nations Educational, Scientific and Cultural Organization and the Global Environmental Facility (IAASTD, 2009)
3. The fourth GEO led by UNEP (UNEP, 2007b)
4. Environmental Outlook to 2030 by the Organisation for Economic Co-operation and Development (OECD, 2008)
5. The Comprehensive Assessment of Water Management in Agriculture by the Consultative Group for International Agricultural Research, with the International Water Management Institute as lead institute (IWMI, 2007)

While all of these assessments had worldwide coverage, each had a specific focus or entry point and a different methodological approach. By coincidence, their planned publication dates were all in 2007–2008. The coordination served the following purposes:

- Mutual awareness of important moments in each other's calendar, such as the release of drafts;
- Identification of potentially contradictory signals, with the purpose of being able to answer any questions quickly and adequately; and

- Common alerts to key audience members, including reviewers, government contacts and the media. This was useful as each of the assessments typically had its primary contacts in different branches of government, and the contacts would not necessarily be aware of other upcoming reports with related coverage.

The coordination was found useful by the participants and required a minimum of resources, such as staff time. A contradiction between the draft assessments was only identified on one topic, namely energetic use of biomass. The Environmental Outlook of the Organisation for Economic Co-operation and Development expressed more reservations on this than the other assessments. A joint note was issued for the press, describing the upcoming assessments, their lead questions and approaches and alerting recipients to their mutual independence and coordination (UNEP et al., 2007). On the collaboration between different assessments, one interviewee noted, "I think it was both very useful and something that actually should have been continued and enhanced over time. This was a way of basically banding together and saying 'actually we have thoroughly looked at it across different institutions with different angles and we conclude this.'" (Helen Mountford interview)

A decade later, there has been a new initiative. The Adhoc [sic] Global Assessments Dialogue was first convened by UNEP's Chief Scientist in October 2018. The effort was reinforced by UNEA Resolution 4/23, which requested the Executive Director "to continue to promote greater coherence and coordination of global assessments undertaken within the United Nations system and in cooperation with relevant international bodies and the secretariats of the multilateral environmental agreements" (UNEP, 2019j, para. 10). Representatives of ten major global environmental assessments, including GEO, have continued their interaction to enhance synergy and explore further collaboration and opportunities for joint communication and outreach. Coordinated by the UNEP GEO Team, the process has recently prepared a UNEP Global Assessment Synthesis Report *Making Peace with Nature: a scientific blueprint to tackle the climate, biodiversity and pollution emergencies.* The report was launched in February 2021 by the UN Secretary-General and UNEP's Executive Director (UNEP, 2021f).

## *Peer Reviewers*

In addition to the large number of experts engaged in global GEOs as authors, even larger numbers have individually or collectively undertaken other vital tasks. The most obvious of these is the peer review of chapter drafts. While numbers are not recorded in the early GEOs, *GEO-4* reportedly invited about 1000 experts to peer review the first draft and received more than 13,000 comments (UNEP, 2007b, p. 500). The *GEO-5* assessment underwent three rounds of review involving more than 300 experts (UNEP, 2012a, p. 491), and *GEO-6* underwent five rounds of review involving over 1000 experts and received more than 14,000 comments (UNEP, 2019e, p. 665).

*GEOs-4* and *6* also appointed Review Editors to assess whether authors had adequately addressed the comments received, which was considered a positive addition. "It was very useful to have the [*GEO-6*] review editors who can make the bridge between the authors and the scientific communities... I think we are trying to fill the gap between GEO and IPCC ... because now we have the review editors" (Jacques-André Ndione interview). *GEO-5* set up a final independent review process facilitated by the Earth System Science Partnership whereby each chapter had three or four scientific reviewers with extensive experience in the subject area of that particular chapter (UNEP, 2012a, p. 491). In the three most recent GEOs, many of the reviewers were chosen from nominations received from governments and other stakeholders. These various measures were in line with the IPCC-ization of GEO to include a more rigorous peer-review process.

## *Advisory Groups*

Expert and Advisory Groups have supported the global GEO process since *GEO-1*, with different arrangements evolving through the six processes (Chapter 7.3). For the first three GEOs, group members were identified, selected and invited to participate by the UNEP Secretariat. For *GEO-4,* as part of the IPCC-ization of the process, a high-level group was established for the first time and procedures were put in place for governments to nominate experts for this and other roles. Out of the 157 individuals nominated by 48 governments, some were selected to participate in the expert working groups, along with others chosen by the Secretariat. For *GEOs-5* and *-6*, it became standard practice for members of the advisory and expert groups to be initially nominated by governments and other stakeholders. Self-nominations were not accepted. Nominees were subsequently assigned to different roles by UNEP, with selection lists then sent to governments for final review.

*GEO-6* had the most complex nomination process to date. It aimed "to identify the best available expertise representing a range of disciplines, and geographical and gender balance, with particular emphasis on ensuring full representation from developing-country experts" (UNEP, 2020b). For the High-Level Group, the Global Intergovernmental and Multi-stakeholder Consultation on the Sixth Global Environment Outlook held in Berlin in October 2014 made clear that governmental representatives must be nominated by their respective governments and would act in this capacity. The overall selection procedure for the High-Level Group was determined within the UN member state regional groups (UNEP, 2014c, p. 4). The selection process for the stakeholder representatives was overseen by UNEP's Major Groups and Stakeholders Branch (UNEP, 2019e, p. 669). Members of the other two *GEO-6* advisory groups were likewise selected through a nomination process of regional and global experts. Once established, the Scientific Advisory Panel was supported by UNEP's Chief Scientist's Office (UNEP, 2020e), while the Assessment Methodologies, Data and Information Working Group was supported by the UNEP Live team (UNEP, 2020a).

## *Production and Publication Teams*

Significant publications going to a broad user community require professional editors, skilled production teams and highly competent translators – especially when the publication is the organization's flagship report. The teams selected by UNEP to prepare the GEOs for publication have often been involved in the process well in advance of the final production stages. As a result, the editing and publication contractors have been able to provide useful guidance as drafts were prepared and were already familiar with much of the content before it was handed over to them.

*GEO-1* had the smallest production team, with the responsibility being taken on by two collaborating centres – the World Resources Institute in the USA and the National Institute of Public Health and the Environment in The Netherlands, along with an independent editor who provided editorial assistance. After *GEO-1,* the production teams became more diversified. In addition to a professional editor or a small editorial team, specialists in design and layout, maps and photos, and graphics and data compilation have been co-opted from within the UNEP Secretariat or hired.

As its flagship report, UNEP intends to publish GEO in all six official UN languages (Chapter 4.2). However, translating the global GEOs has always been a challenge. In addition to the time and costs involved (Chapter 7.9), it can be quite difficult to find translators who are familiar enough with

the environmental jargon that unavoidably appears in the reports. Fortunately, being a multinational organization, UNEP has established a good network of competent translators over the years; when funds have been available other language versions of GEO have been published (Table 4.2.1).

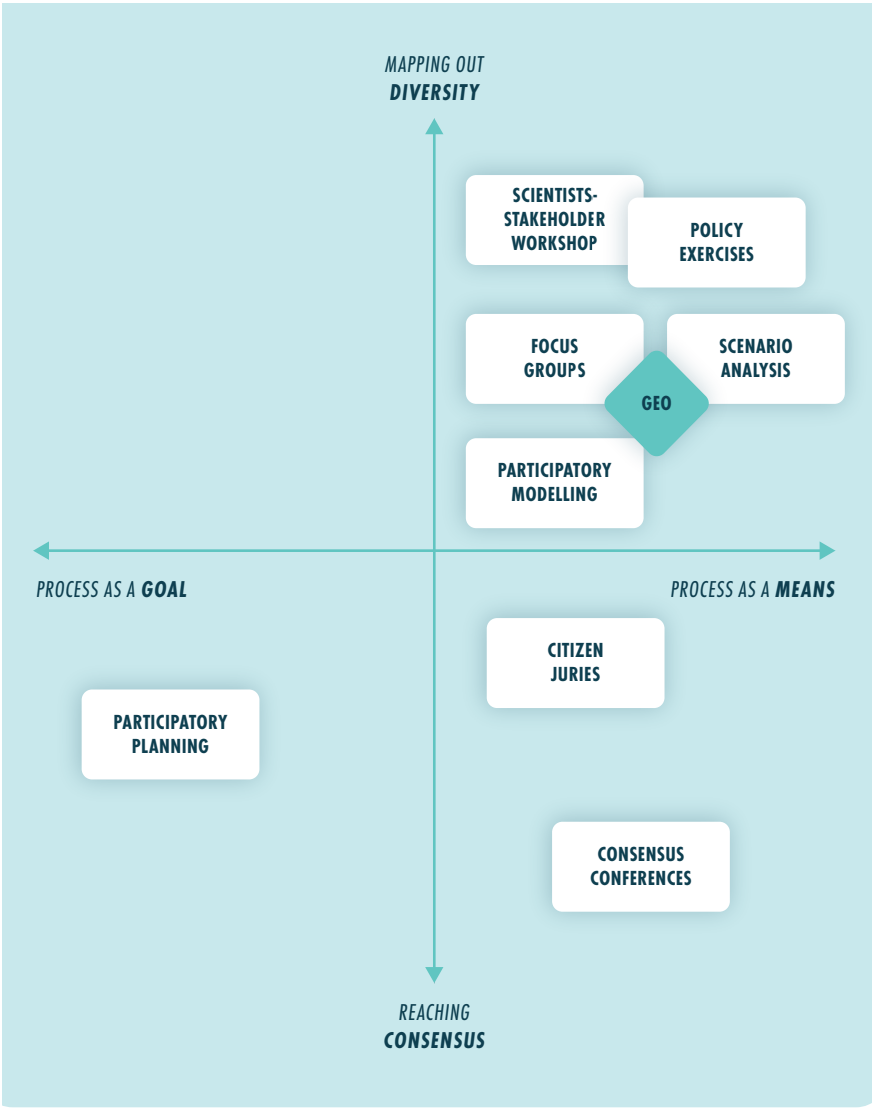
## 3.6 Conclusion

Addressing the complexity and diversity of issues and interests in integrated environmental assessments often goes beyond the capacity of an individual organization, and that has certainly been true for UNEP and its GEO process. The challenge increases with the spatial scale and reaches its maximum at the global but regionally differentiated assessments, with GEO close to the top. Using the classification approach developed by van Asselt and Rijkens-Klomp (2002), GEO falls in a category of integrated assessments that use the participatory process more as a means to enrich assessment and decision-making, as opposed to using it as a goal to organize the decision-making process. Along the other axis, GEO mainly aims at mapping out diversity and trying to reach consensus only in the Summary for Policy Makers (Figure 3.6.1).

This chapter has explored the wide range of roles and responsibilities undertaken by a large mix of participants – governing bodies; international organizations; national and specialized institutions; and hundreds of individual scientists, policy specialists, and other experts – in global GEO reports since the mid-1990s. The general trend towards involving more persons and institutions over time is unmistakable. Collaboration among the various entities has occasionally been fractious, but it has proved to be essential for delivering the outputs requested.

The evolution of GEO politics, particularly in response to the IPCC-ization of the process, has had significant implications for the composition and involvement of the respective participant groups since 1995. Different individuals and entities have moved in and out of the limelight as the process has evolved. Some of the process changes, such as the introduction of GEO Fellows, have been straightforward and very positive. Others have been difficult to manage, such as the introduction of the negotiated SDM process, and the jury is still out on whether these were a good idea in the first place. Taken as a whole, the changes that have occurred provide a broad range of lessons to be learned for any future GEOs.

**Figure 3.6.1. Situating GEO among integrated assessments based on the goal of participation**




*GEO uses the assessment process as a means and mainly for mapping out diversity. Consensus writing only applies to the SPM.*

Source: modified after van Asselt and Rijkens-Klomp, 2002

Chapter

4

# Evolution of the Global Environment Outlook Reports 1-6, Including Their Use of the Integrated Environment Assessment Approach

## 4.1 Introduction

When examining the evolution of the Global Environment Outlook (GEO) reports through their six cycles to date, it is important to consider the overall timeline of their conception, development and delivery. This time period covers nearly 30 years if one includes the pre-GEO preparatory phase of the early 1990s.

GEO's continuity over such a lengthy period argues the necessity of a certain evolution taking place, the impetus for which came from a variety of sources.

First, the governing body of the United Nations Environment Programme (UNEP) – the Governing Council (GC) initially and the United Nations Environment Assembly from 2012 – and its decisions often charted the path towards modified and new elements in the report series. Second, UNEP's GEO Secretariat often had novel ideas to improve the pertinence and user-friendliness of the GEO reports. Third, given the information and communication technology revolution, one can argue that the GEO report series was inevitably under pressure to evolve to maintain or expand its user base and position itself within the wide range of environmental assessment products over the last three decades. Finally, contributing authors/entities, such as those from the collaborating centres network, certainly had their own influence on how the contents and structure of the GEO reports evolved through time. All four of these reasons reflected the evolving needs of policymakers, the public, scientists and assessment practitioners, gradually leading to more detail in policy analysis, more emphasis on root causes, and more attention to synergies and trade-offs.

Table 4.1.1 below, in addition to Figure 1.2.3, provides a calendar of key environment-related events that occurred at the international level, so readers can consider how the global GEO report series interwove with those.

**Table 4.1.1. Global GEO report publication years, related events and their outcomes**

| | EVENT | OUTCOMES | GEO REPORTS & DATES |
|---|---|---|---|
| 1972 | United Nations (UN) Conference on the Human Environment, Stockholm | Stockholm Declaration on the Human Environment; the United Nations Environment Programme (United Nations, 1972) | |
| 1982 | 10-year anniversary of UNEP | The World Environment 1972-1982 (a pre-GEO report by UNEP) (Holdgate et al., 1982) | |
| 1983 | UN General Assembly | Resolution 38/161 led to establishment of the UN World Commission on Environment and Development / the Brundtland Commission (UNGA, 1983). | |
| 1987 | | Our Common Future (Brundtland Report) (WCED, 1987) | |

| | | | |
|---|---|---|---|
| 1992 | UN Conference on Environment and Development (UNCED/Rio Conference/Earth Summit), Rio de Janeiro; 20 year anniversary of UNEP | The Rio Declaration on Environment and Development (UNGA, 1992); the UN Commission for Sustainable Development (UNCSD); Agenda 21 (UNCED, 1992);The World Environment, 1972–1992: Two Decades of Challenge (a second pre-GEO report by UNEP) (Tolba et al., 1992) | |
| 1997 | UN General Assembly Special Session on the Environment | | ***GEO-1*** **-** Stockholm+25/ UNEP+25/ UNCED+5 (UNEP, 1997c) |
| 1999 | | | ***GEO-2000*** "millennium/ centennial GEO" (UNEP, 1999g) |
| 2000 | UN Millennium Summit, New York | UN Millennium Declaration; Millennium Development Goals (MDGs) 2000–2015 (UNGA, 2000) | |
| 2002 | World Summit on Sustainable Development (WSSD/Earth Summit 2002/ Rio+10), Johannesburg | Johannesburg Declaration & Plan of Implementation | ***GEO-3*** - Stockholm+30/ UNEP+30/ UNCED+10 (UNEP, 2002e) |
| 2007 | | | ***GEO-4*** - Brundtland+20/ UNCED+15/ WSSD+5 Halfway to the MDGs (UNEP, 2007b) |
| 2012 | UN Conference on Sustainable Development, Rio de Janeiro | *The Future We Want* (United Nations, 2012); agreement to strengthen UNEP on several fronts | ***GEO-5*** **-** UNCED+20/ UNCSD/ WSSD+10 (UNEP, 2012a) |
| 2015 | UN Sustainable Development Summit, New York | Sustainable Development Goals (SDGs) 2015–2030 (UNGA, 2015) | |

| | | | |
|---|---|---|---|
| 2016 | | | ***GEO-6* regional reports** (UNEP, 2016a, 2016b, 2016c, 2016d, 2016e; UNEP and UNECE, 2016) |
| 2019 | United Nations Environment Assembly-4 (March) | | ***GEO-6* global report** (UNEP, 2019e) |

Over more than 25 years of producing six global GEO reports, much has changed, and much has remained the same in terms of their format, length and contents. For example, both the printed and online versions of the reports have varied the look and feel of their presentation while remaining true to the original concept of being serious, cutting-edge overviews of the state and trends of the global environment. Section 4.2 of this chapter summarizes how the contents of each of the six global reports have been organized and presented to its end users. Sections 4.3 to 4.6 focus on the components of the analytical framework, from driving forces and pressures through state of the environment and impacts to policy responses, as they have evolved across the six global GEO assessments. Using a comparative and sequential approach, it traces how each of these five components evolved from one GEO to the next, including what motivation might explain this continual development. In terms of quality and quantity, the varying contents are considered within the context of the broader environment assessment scene, given that UNEP and its close partners in the GEO process were not the only entities engaged in documenting environmental state and trends (Chapter 1).

## 4.2 GEO delivery formats and length

The main changes that occurred over the lifetime of the global GEO series have much to do with an increasing number of formats and products, particularly those that aimed to synthesize the main report contents and make them more relevant and easily digestible to a diverse range of audiences. Over time, an increasing number of individuals and institutions participated in the conception, drafting and review of the reports, with the transparently stated intention – from governments' perspective – of making them more credible, legitimate and relevant. Chapter 3 covered the evolution of both participation and process in detail; this section

presents highlights of these changes and provides some overall metrics on the products.

Each of the global GEO reports has been available in printed editions. However, the emphasis through time has been to print fewer copies and make the report more easily available online, including downloadable chapter files. All six reports are online, although *GEO-1* and *GEO-2000* reports are only available in HTML. The overall length of the GEO has increased from one edition to the next, other than a slight reduction with *GEO-5* (Table 4.2.1). Despite the 2016 publication of six extensive regional reports, *GEO-6* exceeded 700 pages.

A number of interesting related products were developed for many of the global GEOs, particularly *GEOs-3, 5* and *6* (Figure 4.2.1). For instance, *GEO-3* included a GEO Data Compendium that published the database underlying the report, and *GEO-5* had fact sheets on the regional findings and a video. *GEOs-1, 2000* and *3* were accompanied by technical reports providing comprehensive regional details on projected environmental changes and methodology discussions for the Outlook and other sections (a list of the latter can be found in Annex IV). These accompanying products tended to vary depending on expressed stakeholder needs and ideas from UNEP and the GEO Secretariat itself, as well as on the availability of the financial resources. For example, the main reason that *GEO-5* was not translated into all six official UN languages for the first time since *GEO-1* was the lack of adequate funding for this costly task. It remains to be seen whether resources will be found to translate *GEO-6* from English into all other official UN languages. By early 2022, Chinese, Russian and Arabic translations had become available (Table 4.2.1).

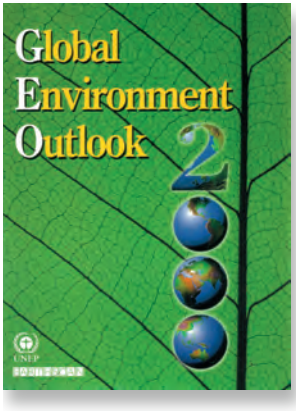
Annex III provides an overview of the structure and contents of all six global GEO reports.

## Figure 4.2.1. GEO report delivery formats and companion products


**PRINTED BOOK** available in hard cover and paperback.

**ONLINE VERSION** of full report on Internet (hyper text markup language; html format).

**GLOBAL ENVIRONMENT OUTLOOK – AN OVERVIEW**, 16-page booklet summarizing the process and findings.




**PRINTED BOOK** in hard cover and paperback versions.

**ONLINE VERSION (HTML)** of report on six websites (Japan, Kenya, Mexico, Norway, Switzerland and USA).

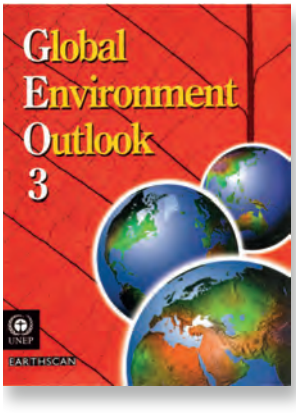
**OVERVIEW GEO-2000** – a 16-page booklet, available in all UN languages and Japanese.

**PRESS RELEASE** (for 15/09/1999).

**SHORT PRESS BRIEFINGS** on key issues and findings, indicators, and profiles on the ED and UNEP.

**GEO-2000 BOOKMARK.**

**GLOBAL ENVIRONMENT OUTLOOK PROSPECTUS** (2000); in preparation for GEO-3.




**PRINTED BOOK** in hard cover and paperback versions.

**ONLINE VERSION** of full report on Internet.

**SYNTHESIS GEO-3** – a 16-page booklet (similar but not identical to the synthesis in the book version).

**CD ROM** included in the printed book with the complete report (PDF), the GEO-3 Electronic Reference System, and the GEO-3 Data Compendium.

**MEDIA KIT** – press release (for 22/05/2002) and video.

**NEWS RELEASE AND FACT SHEETS** on human vulnerability and on regional GEO-3 findings.

**PUBLICITY ITEMS** – GEO-3 posters; postcards with cartoons of the four GEO-3 scenarios; pens.


**PRINTED BOOK** in hard cover and paperback versions.

**ONLINE VERSION** of full report on Internet.

**GEO-4 SUMMARY FOR DECISION MAKERS** – 32-page booklet available in all UN languages).

**VITAL GEO GRAPHICS** (online).

**PUBLICITY ITEMS** – mousepad.

**MEDIA PACKS.**


**PRINTED BOOK** paperback.

**ONLINE VERSIONS** of full report on Internet.

**GEO-5 SUMMARY FOR POLICY MAKERS** – 18-page booklet, available in all UN languages.

**PRESS RELEASE** (for 06/06/2012).

**FACT SHEETS** on regional GEO-5 findings.

**USB** containing all the above items and more, including e-versions of the SPM, and video.


**PRINTED BOOK** paperback.

**ONLINE VERSIONS** of full report on Internet and USB.

**SUMMARY FOR POLICY MAKERS** – 24-page booklet (online in all UN languages + Czech, German & Japanese).

**KEY MESSAGES** – a two-pager listing 31 key messages from GEO-6 (available in all UN languages).

**PRESS RELEASE** (for 13/03/2019).

**INTERACTIVE, ON-LINE STORY** – "What is the outlook for humanity?"

**TECHNICAL SUMMARY** – 106-page report in English, primarily for 'academics and their students'.

**Table 4.2.1. Selected characteristics of the six global GEO reports**

| | Publication year | Length* (main text) | Length* (front & end matter) | Length* (total) | Number of chapters & parts/sections (if any) | Language versions+ |
|---|---|---|---|---|---|---|
| ***GEO-1*** | 1997 | 238 | 34 | 272 | four chapters | C-E |
| ***GEO-2000*** | 1999 | 373 | 59 | 432 | five chapters | A-C-E-F-R-S-Portugese |
| ***GEO-3*** | 2002 | 410 | 70 | 480 | five chapters | A-C-E-F-R-S |
| ***GEO-4*** | 2007 | 496 | 76 | 572 | 10 chapters in six sections | A-C-E-F-R-S |
| ***GEO-5*** | 2012 | 486 | 64 | 550 | 17 chapters in three major parts | C-E-R-S |
| ***GEO-6*** | 2019ç | 630 | 78 | 708 | 25 chapters in five major parts | A-C-E-R (as of early 2022) |

* for an English version of the printed report in each case

\+ A=Arabic; C=Chinese; E=English; F=French; R=Russian; S=Spanish

ç The six *GEO-6* regional reports were published in 2016

## 4.3 Evolution of the Driving forces and Pressures components

### *Introduction*

In general, the use of the integrated environmental assessment approach and the Drivers – Pressures – State – Impacts – Responses (DPSIR) analytical framework was increasingly described and more explicitly applied over the lifetime of the global GEO series of reports. Chapter 2 provides an overall description of the integrated environmental assessment or the GEO framework and the five individual components of the DPSIR approach. The Outlook chapters of all GEOs also explicitly address the full span of DPSIR components. In the background, if not explicitly, the DPSIR framework (Swart and Bakkes, 1995) was always used to organize GEO information, following a tradition that stems from environmental statistics and modelling.

## *Analysis*

The *GEO-1* report did not explicitly apply the integrated environmental assessment approach and DPSIR framework as such, but most of the DPSIR's different components were included in Chapters 2 and 3 on "Regional Perspectives" and "Policy Responses and Directions," respectively. Also, many drivers are referred to in the "Executive Summary", without calling them drivers, and in Chapter 1. Pressures are mainly covered in Chapter 2, in the beginning as part of the global summary of "Major Issues,"[1] and in the individual regional subsections of the chapter. The terms drivers and pressures are used almost interchangeably therein.

By *GEO-2000*, while use of the DPSIR model was not yet fully explicit, it had certainly become more evident. Chapter 1 on "Global Perspectives" included sections on "Social and economic background" and "Areas of danger and opportunity" that, taken together, serve to describe five main drivers of environmental change and a number of strong pressures such as consumer culture and the transport sector (Table 4.3.1). While many pressures are mentioned under key drivers in Chapter 1, they are also described at some length in the "Global issues" section at the beginning of Chapter 2, "State of the Environment."[2]

In *GEO-3*, for the first time, the DPSIR model is explicitly mentioned and, in practice, clearly applied. The introduction to Chapter 2, "State of the Environment and Policy Retrospective: 1972–2002," advocates an integrated approach when using the DPSIR causality chain in the integrated environmental assessment framework. This leads to the "Socio-economic background" section of the Chapter that includes a "Global overview" and establishes separate regional surveys. In the "Global overview", five drivers are described, and many pressures are mentioned here and in the regional surveys. But even greater details on pressures are apparent within the eight well-integrated thematic sections of Chapter 2, which span the pressures-state-impact components of the DPSIR. Thus in *GEO-3*, both the drivers and pressures components of the DPSIR are not only highlighted but fully and clearly presented for the first time.

In *GEO-4*, the conceptual framework and drivers are characterized and illustrated in the "Reader's Guide" at the beginning of the report. In Chap-

[1] The Major Issues covered are: Land, Forests, Biodiversity, Water, Marine and Coastal Environments, Atmosphere, Urban and Industrial Environments, and Polar.

[2] At the beginning of Chapter 2, for example, issues such as climate change (+ El Nino), stratospheric ozone depletion, nitrogen loading, toxic chemicals and hazardous waste, natural disasters, and forest fires and biomass burning are considered.

ter 1, "Environment for Development" of Section A's "Overview", there are nine pages on the "Drivers of Change and Pressures" covering the seven drivers. There are more specific descriptions of "Drivers of Change and Pressures" in each of the four chapters on "Atmosphere", "Land", "Water" and "Biodiversity" contained in *GEO-4*'s Section B "State-and-Trends of the Environment." In Section C, "Regional Perspectives: 1987-2007," each of the seven individual regional sections begins with an approximately two-page treatment of regional driving forces. Under the key/priority issues selected for analysis by each of the seven regions, the pressures related to these environmental problems are also covered.

In *GEO-5,* for the first time, the drivers component of DPSIR is accorded a chapter of its own, Chapter 1, which runs to a full 30 pages. Five broad drivers are explored in detail, in both qualitative and quantitative terms. In addition, the chapter is well illustrated with graphs, maps and photographs that convey, among other factors, the "Great Acceleration" (Figure 4.3.1) in the production and consumption of basic resources and related emissions to the environment after the Second World War. This chapter on drivers is a penetrating exploration that could potentially stand as a primer on its own. Pressures are also extensively addressed in the five major thematic chapters that follow, as in *GEO-4*.

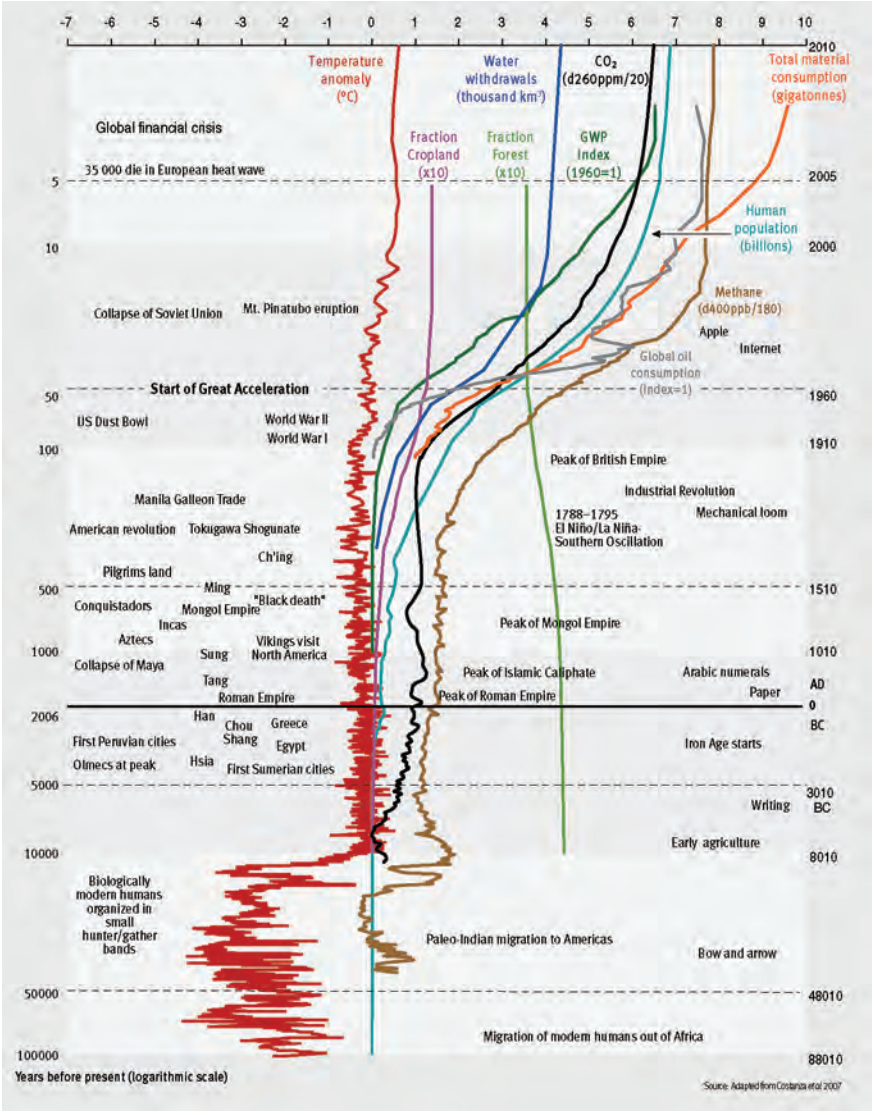
In *GEO-6*, the more detailed and explicit treatment of drivers continued, with an entire chapter devoted to this component of the DPSIR. This Chapter 2 defines drivers as "anthropogenic *inertial* forces … social, economic, ecological, technological and political … they have their own rules of motion and reversing them will require time and effort" (UNEP, 2019e, p. 24). It concludes with a brief analysis of the interaction among the five examined drivers – population growth, economic growth, technological change, climate change and urbanization – and reminds readers that the effects are not the same in different regions. As in *GEO-5*, one needs to look into the separate thematic chapters in Part A, 'State of the Global Environment,' to find a more detailed elaboration of drivers and pressures, although the space devoted per theme varies from one to eight pages. To take only one thematic chapter example, "Biodiversity" includes land-use change/habitat loss, invasive alien species, pollution and overexploitation.

## *Summary*

The drivers and pressures components of the DPSIR model only became fully explicit in global GEO reports with *GEO-3* and reached full maturity in

their treatment in the *GEO-5* and *6* reports. This may represent the evolution of GEO's role towards highlighting root causes of environmental degradation and pathways to systemic change, rather than their effects, as well as improved attempts to deal with environmental problems at their entry point rather than at their impact end. Table 4.3.1 summarizes how the drivers and pressures components have been addressed in the six global GEOs.

**Figure 4.3.1. The Great Acceleration after the Second World War**




Source: adapted for *GEO-5* from Costanza et al. (2007)

**Table 4.3.1. Major variables related to Drivers and Pressures in global GEOs**

| | *GEO-1* | *GEO-2* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Drivers and Pressures explicitly treated? | Only in the Outlook and referred to as 'underlying causes' | **Yes**, to some extent in Chapter 1 and outlook | **Yes**, in several chapters | **Yes**, in several places | **Yes**, in its own Chapter 1, also in Outlook | **Yes**, in its own full Chapter 2 and in Part C Outlooks & Pathways |
| Numbers of Drivers cited | 4 (underlying causes) | 5 | 5 | 7 | 5 | 5 |
| Named Drivers | Social; economic; institutional; environmental | economy; population growth; political organization; conflict, peace & security; regionalization | human development; changing population; economic development; science & technology; governance | population; economic growth; globalization; trade; energy; technological innovation; governance | population; economic development; energy; urbanization; globalization | population; economic development w/ energy; technology; urbanization and climate change |
| Drivers number of pages (not including Outlook) | **16.5** (at regional level) | **22** | **33** | **36** (22 global + 14 regional) | **32** | **58** plus more in X-cutting and Outlook chapters |
| List of Pressures cited (not exhaustive) | *GEO-1*: agricultural expansion; land conversion; human-made fires; land/water pollution/contamination; increased energy e.g. fuelwood use; rising demand for food; hunting; excessive fertilizer use; sewage discharge; oil spills; tourism; infrastructure development; acidification; air pollution; climate change/global warming; unplanned urban growth; rural-to-urban migration; poor waste management; chemical & radioactive pollution; unsustainable fishing, forestry and mining practices.<br><br>*GEO-2000*: most of the above plus rapid urbanization and industrialization; carbon dioxide, sulphur dioxide and heavy metal emissions; transport and distribution networks; nitrate pollution; increased pressures on ecosystems; refugee flows and warfare; toxic contamination (of land/water); air transport; plus those listed in footnote 2 above.<br><br>*GEO-3*: most of the above plus international migration/displaced persons; private vehicular use; high external debt of countries; export of primary materials (cash crops, minerals etc.); civil conflict; over-consumption in general; human and income poverty; persistent organic pollutants, toxic metals, radionuclides and ultraviolet radiation; exploitation of minerals/petroleum in the Arctic. | | | | | |

| | |
|---|---|
| List of Pressures cited (not exhaustive) | *GEO-4*: most of the above plus increasing numbers of refugees, internally displaced and stateless persons; urban sprawl; offshore water pollution; excessive nutrient inputs; spread of exotic species; production subsidies; natural disasters; biofuel production.<br><br>*GEO-5*: most of the above plus increasing migration to coastal areas/small islands; rising number of smaller households; international remittances; changes in food consumption patterns (more meat, dairy & processed foods); hydraulic fracturing and resultant pollution; countries leasing land abroad; containerization/container trade; air freighting; air-/seaport infrastructure; growing emissions from exports and outsourcing of goods production; concentrated animal feeding operations and their wastes; polychlorinated biphenyls and (micro-) plastic wastes; e-wastes; etc.<br><br>*GEO-6*: most of the above plus heightened income inequality; conspicuous consumption; exacerbation of conflicts; extreme climate events. |

## 4.4 Evolution of the State and Trends component

### *Introduction*

From its creation in 1972, UNEP's overall function and mandate included "keep[ing] under review the world environmental situation" (UN General Assembly resolution 2997; 15 December 1972 (UNGA, 1972)).[3] In fact, by the 18th GC session in May 1995, this role had evolved into a far more specific task. In Decision 18/27C (Chapter 1, Box 1.2, p. 7), the GC requested UNEP's Executive Director to "prepare a new, comprehensive report on the state of the world environment, (consisting) of the following three parts: (a) The present state of the global environment; (b) The state of the global environment in the year 2015; and (c) The response: findings, conclusions and recommendations." Item (b), by implication, requested GEO's outlook component.

The decision went on to also request that the report include "the environmental status of the main components of the global ecosystem (waters, forests, soils and farming lands, ozone layer, etc.), (and) basic trends in environmental change (for example, climate change, coastal and marine degradation, desertification, deforestation and habitat loss, pollution, soil degradation, ozone depletion, etc.)."

Thus not only from its earliest days but to an even greater degree after GC Decision 18/27C in 1995, conducting state of the environment (SoE) and

[3] See https://research.un.org/en/docs/environment/unep

trends analyses was inscribed in UNEP's ongoing mission, to the extent of being one of its major raisons d'être. In the earlier global GEO reports, regional analyses of state and trends predominated, while global analyses are more prominent in later editions. In some ways, this was just a question of reconfiguring the global/regional balance in the global GEOs and serving the expectations of different end users.

## *Analysis*

The path-breaking *GEO-1* utilized a mainly regionally based approach to state and trends analysis. In its lengthy Chapter 2, "Regional Perspectives," *GEO-1* dealt with environmental state and trends in seven regions[4] in considerable detail and also included a global overview, which is a synopsis of the main regional issues. This bottom-up approach was not retained in the processes for global GEO reports after *GEO-2000* but re-appeared in *GEO-6*, which included six complete individual regional assessments, prepared prior to and separate from the global report.

*GEO-1* included seven environmental themes in its state and trends analyses. In addition to the classic four of atmosphere, biodiversity, land and water, the various regional sections also focused on forests, marine and coastal environments, and urban and industrial environments. These latter themes are treated differently in subsequent GEOs, sometimes within other themes and sometimes as separate ones. Finally, as noted earlier, drivers of environmental change were dealt with as underlying causes at the end of each regional section, rather than providing an introductory context.

The analysis of state and trends in *GEO-2000* (the "Millennium Report") was similar to *GEO-1*'s coverage of this component and treated the same seven environmental themes, with an entire Chapter 2 covering "The State of the Environment," mostly at the regional level. The latter began with a "Global and Regional Synthesis" and continued with analyses of the environmental situation in each of the seven regions. In terms of geographic treatment, the seven analysed regions were virtually the same as in *GEO-1*, with one exception.[5,6]

[4] Africa, Asia and the Pacific, Europe and CIS countries, Latin America and the Caribbean, North America, West Asia, and the Polar Regions.

[5] The Polar regions section actually split the Arctic and Antarctic (21 pages total).

[6] This geographic treatment in the global GEOs is related to UN(EP)'s official breakdown of regions, that has varied over the years. For example, what in *GEO-1* was

The *GEO-3* report, published in February 2002, not only demonstrated the ongoing success of the global series but in many ways showed brand maturity and a new-found balance. This was also the first GEO in which the analysis of global state and trends – and related content volume – showed a greater prominence in relation to the regional analyses. In addition, *GEO-3* started the trend of combining the analyses of state and policy response components in the same chapter. It also explicitly provided an integrated and retrospective analysis of global and regional environmental trends over the 30 years since the 1972 Stockholm Conference on the Human Environment had taken place. The major Chapter 2, "State of the Environment and Policy Retrospective: 1972–2002," used eight environmental themes[7] as entry points for analysing the state, trends and policy responses globally and in each region. The chapter's global sections precede and are longer than the individual regional sections. This same trend is seen elsewhere: global chapters and sections were now longer than individual regional analyses in many chapters, as in Chapter 1 that traced environmental governance purely at a global level.

The *GEO-4* report confirmed this trend of moving to a more clearly global approach while reducing the in-depth regional analyses. Section B, titled "State-and-Trends of the Environment: 1987–2007," contained four chapters on the traditional environmental themes of "Atmosphere", "Land", "Water" and "Biodiversity"; and, while these do provide some regional variation and examples, they remained primarily global analyses.

The main region-specific state and trends analyses for *GEO-4* were compiled in Section C "Regional Perspectives: 1987–2007," within a single Chapter 6 "Sustaining a Common Future." For the first time, instead of the same environmental themes being covered by all regions, a unique group of three to five key priority issues was analysed for each region that reflected their particular concerns. In many cases, the ongoing or potential responses to address these concerns were also described. While the regions still received significant coverage in *GEO-4*, chiefly through examples and graphics, global analyses had clearly gained dominance in terms of print space.

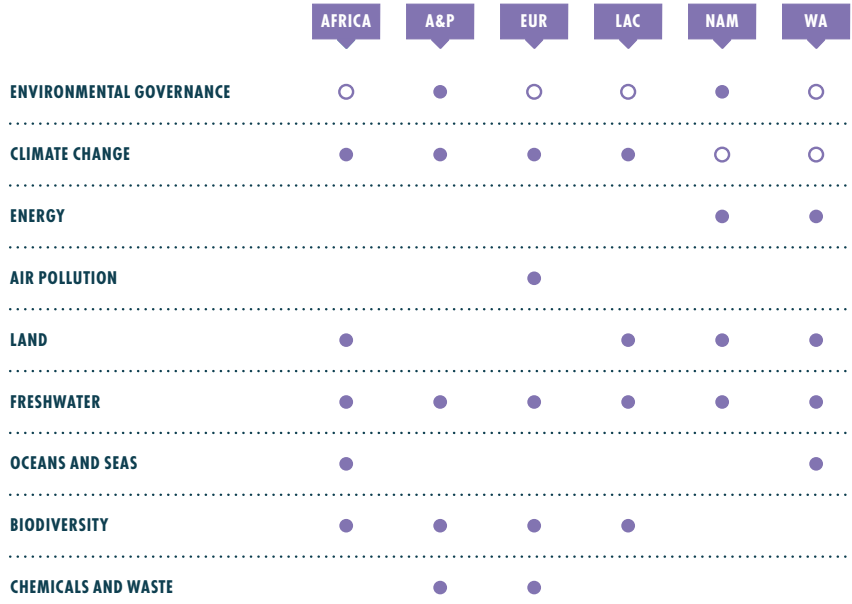
In *GEO-5*, a new emphasis on policy analysis dictated a new format in terms of content and structure. Chapters 2 to 6 – five of the eight chapters included in Part 1, "State and Trends of the Environment"– covered

labeled as "Europe and CIS Countries" was now "Europe and Central Asia." Later in *GEOs-3-5*, the subregion of Central Asia was considered part of the Asia & Pacific region; not until *GEO-6* did Central Asia again revert to the pan-European region.

[7] Land, forests, biodiversity, freshwater, coastal and marine areas, atmosphere, urban areas and environmental disasters.

the traditional environmental themes at the global level: "Atmosphere", "Land", "Water" and "Biodiversity". As well, "Chemicals and Waste" were included for the first time within this component, having been considered as a pressure in earlier GEOs. The content of Chapters 2–6 also provided in-depth analysis on progress, or lack of progress, resulting from international policy measures related to each of the five themes. This analytical approach was even more pronounced in the regional chapters of Part 2, "Policy Options." To a certain extent, these contained brief updates on the status of goals for relevant environmental themes since *GEO-4*'s publication five years earlier, but the main emphasis had indeed shifted to policy appraisal for a series of "key challenges and priority issues" that varied from region to region (Figure 4.4.1).[8] Section 4.6 below explains why this major change occurred in the content of *GEO-5* due to a decision of UNEP's GC in 2009.

**Figure 4.4.1. Priority themes by region in *GEO-5***




*Freshwater was a GEO-5 priority theme for all regions*

Source: (UNEP, 2012a).

[8] For this reason, the page metrics shown in Table 4.4.1 do not include the regional policy analyses (i.e., Part 2 of *GEO-5*) under the State-and-Trends calculations.

The *GEO-6* report contains five chapters (5–9) focusing on the environmental themes of "Air", "Biodiversity", "Oceans and Coasts", "Land and Soil", and "Freshwater". These chapters all employ a common comprehensive structure, covering most DPSIR components to varying degrees. The preceding Chapter 4, "Cross-cutting Issues," also follows this structure under three broad themes: people and livelihoods, changing environments, and resources and materials. Under these, 12 cross-cutting issues are elaborated, including climate change, food systems, chemicals, waste and wastewater, environ- mental disasters, urbanization, and polar regions and mountains.[9] *The GEO-6* introduction describes this comprehensive structure as using "...a matrix approach reflecting the growing need to more effectively synthesize knowledge on the environment's multidimensional functionality and how it already affects human systems" (UNEP, 2019e, p. 15).

The treatment of environmental state and trends in *GEO-5* and *GEO-6* runs to just over 160 pages, the shortest coverage since GEO-*1* (Table 4.4.1 below). When proportions of the six reports devoted to state and trends are compared, they have declined from a high of 57 per cent in *GEO-3* to less than 25 per cent in *GEO-6*. This decline, particularly in the last two reports, can undoubtedly be attributed to the greater emphasis on policy responses. In addition, the *GEO-6* process released its six separate regional reports in 2016, three years before publication of the delayed global *GEO-6* report.

**Table 4.4.1. Some major variables/metrics for the State and trends component in the global GEO reports**

| | *GEO-1* | *GEO-2* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Global & regional SoE explicitly treated? | **Yes**; in one SoE chapter | **Yes**; in one SoE chapter | **Yes**; in one chapter that combines SoE with policy retrospective | **Yes**; in two sections combining SoE/policy responses: separately, four global + one regional chapter | Partially; in the SoE chapter, which includes some 'R' and integrates global with regional examples | Primarily global in the five SoE chapters that also have 'I' & 'R' sections; also, some regional examples are given |

[9] Some of *GEO-6*'s cross-cutting issues also appeared as separate SoE themes or even received treatment as a region (i.e., Polar) in earlier GEOs.

| | *GEO-1* | *GEO-2* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Number of pages devoted | **110** (six global and 104 for regions or 15/region) - plus a brief global overview | **173** (28 global and 145 for regions or 21/region) - global section is longer than any of seven regional ones | **240** (62 global and 178 for regions or 25/region) - global sections more than double any one regional section | **262** (156 global and 106 for regions or 15/region); four global chapters total 1.5 x length of the regional chapter | **162** global with regional examples; global chapters average 32 pages per theme | **163** + a few pages under cross-cutting issues; global chapters average 33 pages per theme |
| part of report | 42% | 44% | 57% | 49% | 31% | 23% |

## *Summary*

The analysis of environmental state and trends has always been at the core of the global GEO report series, but, like most other features, it underwent many mutations over the various global editions. Certain clear lines of progression can be seen over the nearly 25 years of the GEO series. In summary, these include four major shifts:

a) an increasing trend to more global than regional analysis from GEO-1, which was intentionally mostly regional in its state and trends component, to GEO-6, which became all global with only regional examples[10] provided;

b) the number of environmental themes covered at length at the global level diminished from the first three GEOs to the last three GEOs;

c) the relative portion of global GEOs devoted to state and trends analysis was highest in GEO-3 (57 per cent) and reached its lowest level in GEO-6 (23 per cent); and

[10] However, it should be noted again in the case of *GEO-6* that six full regional assessments preceded the global report by approximately three years and were published separately. Thus, an uncharacteristic shortage of regional perspective resulted, particularly in the SoE part of *GEO-6*.

d) the more integrated analysis and presentation, particularly of the state/trends and response components of the DPSIR framework, became apparent from GEO-3 onwards.

One factor that has undoubtedly influenced change after the publication of several GEO reports is the need to shift the focus to policy measures that address the environmental issues frequently identified in previous reports. Perhaps such an evolution can be understood as logical in a world subjected to a constant flow of mostly discouraging information on environmental issues. It is also the result of UNEP Governing Council requests that the GEO process and reports be made more policy-relevant and offer solutions to decision makers at all levels.

## 4.5 Evolution of the Impacts component, including Human Well-being

### *Introduction*

There are thus two major variants of impacts explored throughout the GEO series: on the one hand, impacts on the provision of environmental goods and services resulting from changes in the physical environment (air, biodiversity/ecosystems, land/soil, fresh and marine waters); and, on the other, impacts on human well-being, including specific issues such as human health. Naturally, there is a complex interplay of factors between these two broad types of impacts, in that deterioration of the physical environment can adversely affect humans, and impacts on people and society more generally can lead to further environmental exploitation. A wide variety of negative impacts in the human and physical domains can engender a downward spiral for the environment. This has been a major theme in the GEO reports, the *Millennium Ecosystem Assessment* (Corvalán et al., 2005), the *Global Land Outlook* (UNCCD, 2017)[11] and the *Assessment Report on Land Degradation and Restoration* by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019).

While more traditional state of the environment reporting tends to examine impacts on the physical environment, the DPSIR analytical framework (Chapter 2) was meant to do far more than that and look beyond the study

[11] The "United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa," to give UNCCD's full name.

of environmental problems for the (physical) environment's sake alone. Thus the emergence of human well-being (HWB)[12] as a key focus for the GEO reports not only helped the series to have a more people- and societal-oriented approach but also provided another lens into the increasingly prominent issue of the relationship between environment and development and the need for a healthy physical environment as one of the key prerequisites for sustainable development.

The concept of HWB encompasses many aspects of the human condition such as material well-being, personal security, relationships with family and friends, emotional and physical health, work and recreation, and how individuals relate to their local community and surroundings (Plummer and Schneidler, 2011).[13] In addition, there are numerous terms – quality of life, welfare, living standards, utility, life satisfaction, prosperity, needs fulfilment, development, empowerment, capability expansion, human development, poverty, human poverty, land and even happiness – that are often used interchangeably with HWB (McGillivray and Clarke, 2006).

## *Analysis*

Impacts on the physical environment throughout the six global GEO reports are fully and in nearly all cases interwoven with the state and trends analysis, theme-by-theme (air, land, water, et al.). This was natural due to the integrated nature of the assessment, but it means that unlike other components of the DPSIR chain, impacts lack explicit sections of their own in five of the six GEOs.[14] An alert reader of multiple reports may come to the realization that the wide variety of impacts brought to light is less evolutionary than repetitive; a similar litany of environmental woes being reported from one GEO to the next. In this sense, impacts affecting the physical environment are far more static than the evolving treatment of human health-related issues and HWB more broadly.

Table 4.5.1 lists a series of typical impacts on the physical environment across multiple global GEO reports, without distinguishing these from report to report.

[12] The *Millennium Ecosystem Assessment* defines human well-being as "the extent to which individuals have the ability and the opportunity to live the kinds of lives they have reason to value" (UNEP, 2007b, p. 13 Box 1.2)

[13] See the *Encyclopedia of Puget Sound* at: https://www.eopugetsound.org/science-review/section-3-nature-human-well-being. Accessed 19 May 2020.

[14] Only *GEO-6* has separate sections in its thematic chapters for each of the DPSIR components.

**Table 4.5.1. Examples of impacts on the physical environment appearing in the GEO reports (listed by several major environmental themes)**

| | General Impacts | Specific Impacts |
|---|---|---|
| Air/atmosphere | pollution causing reduced visibility and poor air quality; diminished ozone layer; climate change effects | haze/smog events; stunted crops and plant life; forest die-off; degraded urban infrastructure; faster glacier melting; more extreme weather events; coral bleaching |
| Biodiversity | loss of species; reduced species diversity; increased extinction rates | impoverished ecosystems and their reduced integrity and functionality; degraded quality of forests, grasslands, wetlands, coral reefs et al.; more invasive species; higher carbon dioxide emissions |
| Land/soil | land degraded (physically and chemically) and desertified; erosion of soils (by water & wind) | lowered soil fertility, productivity and plant growth; acidification, compaction and water-logging of soils; diminished plant cover; polluted runoff; impacts of sand and dust storms; higher soil temperatures and increased albedo |
| Water (including fresh, ground and marine waters) | chemically and materially polluted surface waterways, groundwater, lakes, coastal waters, seas and oceans | reduced water quality; eutrophication; damage to, and die-off of, aquatic life including from accumulation of plastics and microplastics in marine & fresh waters; reduced/collapsed fish and animal stocks in polluted waters |

As well as the purely environmental impacts elucidated in the global GEOs, human well-being, including resilience and vulnerability to environmental change, undergirds the GEO series from the beginning, even in the volumes where it was not treated as a stand-alone issue. Early mentions of HWB occur in the "Executive Summary" and also in the outlook section of *GEO-1* (UNEP, 1997c, pp. 245–248), mostly in relation to environmental and human health. These were coupled with the growing recognition "that the wealth of nations and the well-being of individuals lie not just in economic capital, but in social and natural capital as well." Also, in Chapter 1 on the GEO process, the dimension of human well-being is said to be "not only important but essential" to the perception of sustainable development as being more than purely economic (UNEP, 1997c, p. 14).

While *GEO-2000* did not explicitly cover HWB, the concept underlies most of the analysis therein. Much of the discussion concerns the increasing disparities between rich and poor nations and peoples; there are references to living standards, impacts of air, soil and water pollution, and environmental degradation more generally, that "fall most heavily...on the [world's] poorer developing regions." The HWB phrase may not appear directly, but it certainly is considered in these and other contexts.

In addition, human health impacts related to environmental factors (such as polluted air, food and water) are explicitly covered, including a matrix to illustrate these (UNEP, 1999g, pp. 34–36). The impacts of toxic chemicals, hazardous wastes and natural disasters on human health are also covered in an earlier part of the global synthesis section of the same Chapter 2.

With *GEO-3* began a more detailed treatment of impacts and HWB in particular. While changes in the physical environment and their broad-ranging impacts continued to be documented in the eight thematic chapters, *GEO-3* included a separate chapter (3) on "Human Vulnerability to Environmental Change." Since the vulnerability of humankind to environmental problems can lead to a degradation of human well-being, this ground-breaking chapter explored HWB from the other side of the mirror.

Vulnerability is defined as representing "the interface between exposure to the physical threats to human well-being and the capacity of people and communities to cope with those threats" (UNEP, 2002e, p. 302). It also states that "places...which were once safe have been so altered that they no longer safeguard human health and well-being adequately" (UNEP, 2002e, p. 302).

Chapter 3 refers to the multi-dimensionality of the problem while explaining that the environment provides two basic functions "essential for human health and well-being," as both 'source' and 'sink' (pollution absorption/cleansing), but that "these two functions... are being increasingly impaired and degraded by human impacts" (UNEP, 2002e, p. 306).

Health, food security and economic effects are discussed as three major areas affected by environmental change, potentially making humanity more vulnerable or better off; it makes clear that HWB can be both a driver of environmental change – as well as an impact – within the DPSIR framework.

Chapter 3 also explored several ways of reducing human vulnerability through responses (UNEP, 2002e, pp. 309–313). The Chapter's summary concluded that "...the continuing loss of environmental defences and

accelerating global change are increasing threats to human well-being... (thus) putting sustainable development at risk" (UNEP, 2002e, p. 315).

In *GEO-4*, environmental and human-related impacts continue to be given expanded coverage, mostly within the global and regional chapters that dealt with environmental state and trends (essentially, broad Sections B and C; section 4.3 above). Human health aspects were explicitly addressed in many of these global and regional chapters, including, for example, the impacts of air pollution, particulate matter and ultraviolet radiation, biodiversity change, climate change and water quality issues.

The greatly expanded focus on HWB is linked to its being one of the threads running through the entire volume of *GEO-4*. As is evident from even a casual reading of the "Reader's guide," HWB is a core issue in *GEO-4* (UNEP, 2007b, pp. xx–xxiii). The first paragraph, for example, refers to the "role of (ecosystem) services in enhancing development and human well-being, and minimizing human vulnerability to environmental change." Also, the description of the *GEO-4* conceptual framework and related Figure 1 make repeated references to human vulnerability to environmental change and well-being as 'Impacts,' and the 'Responses' are said to offer "opportunities for reducing human vulnerability and enhancing human well-being" (UNEP, 2007b, pp. xxi–xxiii).

The initial treatment of HWB occurs in Chapter 1, "Environment for Development." Two of the up-front main messages focus on HWB, and within the chapter itself an entire section is devoted to defining and exploring HWB in all its aspects (UNEP, 2007b, pp. 13–21). These include poverty and inequality, mobility, vulnerability, gender inequality, health, material needs, security and social relations. HWB is considered as the ultimate aim (end point) of development (UNEP, 2007b, p. 13), and the section declares that "establishing how environmental changes have impacts on human well-being, and showing the importance of the environment for human well-being, are among the core objectives of this report." Chapter 1 concludes with an ideal world (or best-case scenario), asking the reader to "imagine a world in which human well-being for all is secure."

But the discussion of HWB is by no means confined to a single chapter in *GEO-4*. The global thematic chapters (2–5) on "Atmosphere", "Land", "Water" and "Biodiversity" each contain an extensive table detailing linkages between environmental changes in that compartment and impacts on HWB.[15]

[15] See Tables 2.2, 3.3, 4.1, 4.4, 5.1 and 5.3 on pages 50–51, 86–88, 123–4, 138–40, 169 and 179 respectively.

The "Biodiversity" chapter is the most explicit in stating, "the relationships among biodiversity and the five main themes assessed in this chapter clearly demonstrate the importance of biodiversity to … human well-being" (UNEP, 2007b, p. 161).

In Chapter 7, "Vulnerability of People and the Environment: Challenges and Opportunities," *GEO-4* devotes 60 pages to analysing challenges and opportunities to reduce vulnerability and increase HWB while protecting the environment.[16] This comprehensive chapter explores multiple dimensions of environment-related vulnerability and HWB and, without a doubt, provides the most detailed treatment of the very broad subject that is HWB in the entire GEO series of reports. There are also many references to HWB in Chapter 8 as it looks at "Interlinkages" between the Earth's biophysical system, human development challenges and environmental change. In Section E Chapter 9, "The Future Today," the four scenarios all include a "focus on the implications of various actions, approaches and societal choices at regional and global levels for the future of the environment and human well-being" (UNEP, 2007b, p. 400).

With *GEO-5*, the main focus of analysis shifted to assessing progress towards meeting internationally agreed environmental goals, identifying gaps in their achievement and evaluating promising policy response options. Thus, after having been used as an essential framing concept in *GEO-4*, HWB became more of an underlying theme in *GEO-5,* less frequently cited and not as explicitly elucidated.

In Chapter 1, "Drivers," HWB is only explicitly treated within Box 1.5, "Conclusions on driver-centred thinking," where a paragraph covers the relationship between HWB and environmental sustainability, calling this 'synergistic' (UNEP, 2012a, p. 26). There are also brief sections on critical thresholds, driver combinations and their feedback on human health. In *GEO-4,* these were used as entry points to HWB, but here there is no such follow-up.[17]

Environmental impacts are, as before, extensively covered throughout the main thematic state and trends Chapters 2 to 6 in Part 1 of *GEO-5*. Human health issues and impacts on the physical environment are well-elaborated as in previous GEOs; the former are mostly linked to air quality problems (UNEP, 2012a e.g. particulate matter on pp. 46–48), chemical/metals

[16] See also the background report for this Chapter 7 of *GEO-4* (Kok and Jäger, 2009).

[17] Perhaps most surprising is that another opportunity to reflect on HWB that is Box 1.2 – "Expressing prosperity beyond GDP" – looks at purely economic indicators and ignores such indices as the Yale Environmental Performance Index (Wendling et al., 2020) and the UN-commissioned Happiness and Well-being index (Helliwell et al., 2017).

toxicity and access to clean water (UNEP, 2012a, pp. 114–117). Separate tables look at progress towards achieving international environmental goals. For example, "Biodiversity" (Chapter 5) takes up the HWB banner, both in its main messages and the text itself. Several pages (UNEP, 2012a, pp. 146–149) on the topic of biodiversity and HWB highlight that "biodiversity and ecosystem services provide...[what] people need for their livelihoods and well-being" (UNEP, 2012a, p. 146).

"Chemicals and Waste" (Chapter 6) appeared as an explicit chapter for the first time in *GEO-5*; herein, the linkages with and impacts of such substances on human health could not be more clear. Among the main messages of this chapter is one stating that "global chemical pollution is a serious threat to sustainable development and livelihoods...[with] impacts on both humanity and ecosystems" (UNEP, 2012a, p. 168). Chapter 7, "An Earth System Perspective,"[18] includes an extensive section that examines the implications for HWB of Earth system changes (UNEP, 2012a, pp. 199–208). It also considers the consequences for HWB of "exceeding the planet's carrying capacity or entering periods of abrupt ... change."

Chapter 16, "Scenarios and the Sustainability Transformation," is based on the vision of a sustainable world in the future, including the achievement of universal HWB. This chapter concludes with the observation that "policy measures that help achieve environmental goals and targets also have the potential to deliver benefits to human well-being" (UNEP, 2012a, p. 451). Finally, Chapter 17, "Global Responses," articulates a "systematic and comprehensive results-based global approach...anchored in six response options...for addressing global environmental challenges and advancing human well-being" (UNEP, 2012a, p. 461).

*GEO-5* thus provides a tour-de-force on HWB, as this broad theme is clearly one of, if not the principal leitmotif for most of the volume. While it is less extensively covered than in *GEO-4*, many of the same relationships (e.g., between ecosystem services and HWB, environmental degradation and HWB, etc.) are reiterated, and it may have been somewhat superfluous to repeat details from *GEO-4*.

In *GEO-6*, the introductory chapter lists constituents of human well-being (UNEP, 2019e Box 1.1 on p. 8), conforming to the definition of the Millennium

[18] In *GEO-5* Chapter 7, the Earth system is defined as "a collection of component parts that interact with one another within a defined boundary (and is) a complex social-environmental system, including the vast collection of interacting physical, chemical, biological and social components and processes that determine the state and evolution of the planet and life" (UNEP, 2012a, p. 195).

Ecosystem Assessment (Corvalán et al., 2005). Environmental and human health impacts are covered in the major thematic chapters 4–9. Health impacts are explicitly dealt with in a subsection of the "Cross-cutting issues" Chapter 4, as one of several topics under "People and livelihoods" (UNEP, 2019, p. 78).

However, as for HWB, *GEO-6* leaves the impression that this former thread no longer merits much explicit treatment in its own right. While there are hundreds of references to human or social well-being scattered throughout *GEO-6*'s 25 chapters, there is no analysis of how this issue has evolved in the various sectors since the publication of *GEO-5*, even if *GEO-6* was meant to focus on people-centred development and its overall title (*Healthy Planet, Healthy People*) flags the importance of human health.

## *Summary*

The treatment of the broad HWB subject in the global GEO series of reports appears to have had a trajectory that began from a very low baseline, swelled substantially with the *GEO-3* report, and reached its culmination in the detailed analyses of HWB conducted in *GEO-4*, followed closely by *GEO-5* (Table 4.5.2). Thereafter, while it is frequently mentioned in *GEO-6*, it appears more as a key motive to pursue environmental improvement rather than a subject for direct or in-depth analysis.

To some extent, this trajectory of HWB may be related to the 'coming into fashion' of this concept and a greater orientation of environmental studies beyond the purely physical world to examining the human dimensions of environmental change. But one might also link it to the need to take a more holistic and integrated view of the Earth's environment, along with political considerations of UNEP's member states and GC and later United Nations Environment Assembly to make the environment more immediately relevant to decision makers by, for example, providing explicit information of impacts on vulnerable groups or the varying effects of policies on environment and natural resources.

**Table 4.5.2. Summary of human well-being in global GEO reports**

| | *GEO-1* | *GEO-2* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Explicitly discussed? | **Yes**; limited mentions in Executive Summary and Outlook chapter | **No**, but human health issues are in Chapter 2 | **Yes**, but not with its own explicit section | **Yes**; with explicit sections | **Yes**; with explicit sections | **Yes**; with over 200 mentions of human health or well-being, but no standalone part |

## 4.6 Evolution of the Policy Responses component in the global GEOs

### *Introduction*

From the beginning, the GEO report series sought to improve understanding of global (and regional) environmental state and trends through the various themes mentioned. However, assuming that society seeks a cleaner, healthier environment and to reverse the negative trends, this greater understanding of environmental problems could not remain an end in itself, particularly in a world where the science-policy interface was rapidly evolving. With this objective in mind from the start, a key element of the global and most other GEO reports has been a summary of existing and nascent policy measures, how they were being used, under which conditions they might be effective and at what cost. Use of the DPSIR concept as the analytical framework for GEO reporting also assured that the response component would play an integral role in the overall GEO analysis. With the passage of time, analysis of policy measures and their relative effectiveness in dealing with perceived state and trends problems would become a key objective for the series. Government stakeholders seeking options for positive action, and at least one UNEP Executive Director keen to demonstrate that GEO should be more than just a litany of ongoing environmental woes, supported the evolution of this objective.

The following section seeks to document the evolution of the policy element in the global GEO reports, from mere suggestions of relevant policies vis-a-vis perceived problems to a highly analytical approach wherein diverse policy measures were put under a spotlight and examined in terms of their apparent effectiveness (or lack of same) and costs. At the end of this section, Table 4.6.1 provides a numerical look at the policy analyses.

## *Analysis*

In *GEO-1*, Chapter 3 on "Policy Responses and Directions" was particularly prescient in addressing the three pillars of sustainable development from the outset: "Effective policy setting for sustainable development requires a blend of policy instruments that addresses the social fabric of life, ensures effective institutional arrangements, improves the economy and protects the environment" (UNEP, 1997c, p. 129 side note). While it began at a general level, the chapter explored changing approaches to environmental management and highlighted examples of policy approaches and relevant tools. These include current international negotiation processes, changing perceptions of environmental policy, and relatively new concepts such as economic instruments for environmental protection and natural resources management, cleaner production, resource efficiency and material intensity and flow accounts. What is significant is that most of these concepts would not become common discussion points among environmental policy-makers until well into the first decade of the 2000s.

However, the bulk of *GEO-1*'s policy chapter was devoted to environmental policy initiatives in each of the seven regions, including Polar. After a summary of regional policy responses, individual sections looked at both notable national initiatives and (sub) regional ones as well. At this stage, these were offered as examples of good and possibly successful policies to deal with environmental issues but were not listed as policy options, leave alone recommendations. Instead, they were described rather than analysed in terms of effectiveness and practicability.

Notably, one key approach explored, next to promoting renewable energy sources, is changing the human diet to include less meat. By the time of *GEO-6*, over 20 years later, this was again one of the key synergistic approaches identified. This may indicate that GEO often suggested viable approaches to dealing with environmental issues or problems long before such approaches gained broader traction or popular currency.

In *GEO-2000*, policy analysis was taken up energetically and immediately after *GEO-1*. Two complete chapters were drafted: one on national environment-related policies and the other on multilateral environmental agreements (UNEP, 1999g). But eventually, the draft material was deemed unsatisfactory, and these two chapters were collapsed into one.

The resulting Chapter 3 on "Policy Responses" used a similar approach and format to *GEO-1*, but at a somewhat greater length (Table 4.6.1). Beginning with a global and regional synthesis section, it then continued with seven

regional policy sections where the same structure was followed as in the global synthesis. Each of these sections addressed eight policy clusters[19] that provided a coherent appearance and content to all of the sections while allowing to some extent for inter-regional and global comparison. While the introduction to the Chapter states that it attempts to go beyond describing policy responses to "...assess[ing] their success or failure" (UNEP, 1997c, p. 198), it readily admits that "quantitative assessment of success or failure of policy initiatives and developments is not an easy task" (UNEP, 1997c, p. 198).

On balance, policy analysis in *GEO-2000* remained at a rather general level throughout. The global synthesis section contains a half-page on "Implementation, compliance and effectiveness" (UNEP, 1997c, p. 204) but remains highly descriptive. Reasons for the lack of success of new environmental laws and institutions are briefly discussed under that heading, but otherwise, there is little that approaches actual policy analysis. At the regional level under the eight policy clusters, there is somewhat greater specificity in the policy discussion, but this remains qualitative and non-systematic.

One potentially significant finding was that numerous multilateral environmental agreements – such as the Convention on Long-range Transboundary Air Pollution, the Montreal Protocol on Substances that Deplete the Ozone Layer and the Convention on the Protection of the Rhine – only came into being after serious environmental pressures relaxed. In conclusion, while the intent to conduct policy analysis existed with GEO-2000, execution of the same was mostly lacking until the later GEOs.

With *GEO-3*, a major change occurred in format, if not in the depth of policy analysis. The former state and trends and policy chapters of previous GEOs were fully integrated into a single lengthy chapter of 270+ pages. However, the seven regional analyses were subsumed under a socioeconomic backgrounder, eight thematic headings and conclusions, which constituted the subchapters of "State of the Environment and Policy Retrospective: 1972–2002." Thus for the first time in one of the global GEOs, a more visibly integrated assessment approach was conducted by environmental theme and region.

The eight global and 56 regional and environmental thematic sections of this chapter differ in their treatment of state and trends and relevant policies due to varying subject matter and the nature of regional authors' teams. The global state and trends sections as well as the policy overviews by environmental theme typically remain mostly descriptive, as similar

[19] Laws and institutions, economic instruments, industry and new technologies, financing, multilateral environmental agreements, public participation, environmental information and education, and social policies.

policy sections were in the previous GEOs. They generally mention the most relevant international policy measures that exist or had recently been developed, but judgments on the effectiveness of international policies are the exception rather than the rule in the global sections.

More common are conclusions such as those found in the "Biodiversity" section, which states that among other impediments, "Assessment of the impact of policy responses to pressures on biodiversity is limited by lack of a comprehensive system for monitoring, for collating relevant data and for presenting information in a consistent manner" (UNEP, 2002e, p. 126). Such limits for conducting policy assessment vary, with some environmental themes such as "Atmosphere" being more amenable to analysis at an international level, given existing policy measures. At the regional level, under most subchapters, somewhat greater detail about policies and occasionally their effectiveness are provided, in particular for the Asia and the Pacific and the Latin America and the Caribbean regions. However, the text remains largely descriptive rather than analytical.

In the brief "Conclusions" section of the Chapter, a 'policy divide' is identified and defined as "characterized by two distinct dimensions involving policy development and implementation with some regions having strength in both and others still struggling in both areas" (UNEP, 2002e, p. 297). In summary, while the overall depth of policy analysis in *GEO-3* remained on the whole rather superficial and often merely descriptive, using a more integrated approach with the state and trends content was a clear improvement and offered greater coherence to the volume. In addition, numerous issues were treated in greater depth at the regional level. Thus overall, the evaluation of policy measures and their effectiveness – to the extent this was possible – had become more promising.

*GEO-4* followed the style of *GEO-3* in terms of the regional analyses and global treatment of policy responses. Chapters 2 to 5 on "Atmosphere, "Land", "Water", and "Biodiversity" covered state and trends, impacts and responses in an integrated fashion. A single Chapter 6, "Sustaining a Common Future," dealt with state and trends and related policy measures at the regional level. Unlike in *GEO-3*, in Chapter 6, each of the seven regions selected only three to five priority issues for their integrated analyses. And at slightly over 100 pages, this integrated chapter was much shorter than what *GEO-3* allocated for global plus regional coverage.

In addition, a separate Chapter 10, "Options for Action," presented potential policies for the future. However, despite the many policies cited throughout that Chapter, one does not find any systematic or in-depth analysis.

Instead, the rich mix of traditional and more up-to-date approaches constitutes an ideal scenario of how the world could try to proceed in dealing with known and emerging environmental problems, along with a panoply of relevant options. Any actual analysis of environmental policies' effectiveness would have to await the approach to be attempted in *GEO-5*.

*GEO-5*, in contrast with the first four GEO reports, took the challenge of policy analysis to an entirely new level, with a clear and deliberate attempt throughout to conduct an in-depth and substantiated evaluation of existing environmental and related policies. This did not occur by chance: an overview of the assessment landscape commissioned by UNEP highlighted the shift from agenda-setting to identifying options for action. Its conclusion identified key aspects of such policies to be analysed by future assessments while warning that "A shift in future assessments towards exploring policy options and governance issues would mean putting the spotlight on questions that...have remained only vaguely illuminated because they are controversial" (Kok et al., 2009, p. 27).

In February of 2009, GC Decision 25/2 adopted this advice by requiring a new focus for *GEO-5* (UNEP, 2009). Specifically, in paragraph 12, it had requested UNEP's Executive Director to "...strengthen the policy relevance of *GEO-5* by including an analysis of appropriate policy options and their indicative costs and benefits to speed up realization of internationally agreed goals and targets." In short, while policy options were already a vital part of previous global GEO reports, the UNEP Secretariat was now asked to also cost those options and cite their potential benefits (Annex 1).

To accomplish this, the structure of *GEO-5* reverted to the separate treatment of state and trends and policies, rather than the fully integrated approach used in *GEO-4*. *GEO-5*'s policy analysis was conducted in two main parts under the titles of Part 2, "Policy Options," at the regional level and Part 3, "Global Responses." In Part 2, six regional chapters of up to 30 pages each evaluated the effectiveness of policy measures by chosen environmental priority areas or themes (air, land, marine). Like *GEO-4*, each of the six regions selected up to five priority themes and one cross-cutting theme as broad clusters for the policy analytic work. Table 15.1 (UNEP, 2012a, p. 401) shows all priority themes by region and illustrates that climate change, environmental governance and freshwater were selected by all regions (Figure 4.4.1).

Within Part 2, Chapter 15, "Policy Options: Regional Summary," provided an overview and identified commonalities among regional policy successes

for potential adoption and adaptation elsewhere. It also highlighted those that best addressed the international goals, provided co-benefits and could be leveraged to do so in other geographic settings.

The bottom line shows that *GEO-5* made a major investment in terms of in-depth policy analysis that was lacking in previous global GEOs and, in doing so, largely responded to the new directive stemming from UNEP GC-25's Decision 25/2 (UNEP, 2009). While the exact nature and execution of the policy analysis work proved to be a great challenge to both UNEP's GEO team and the wide cast of expert authors, the final *GEO-5* achieved the goal to include "... an analysis of appropriate policy options and their indicative costs and benefits to speed up the realization of...internationally agreed goals and targets." It also established a new high-water mark in terms of policy-related content, based on the percentage of response-related material (Table 4.6.1).

In *GEO-6*, the entire Part B of the report – nine chapters out of 25 – is devoted to examining policies according to the environmental themes of air, biodiversity, oceans and coasts, land and soil and freshwater, with an average of 25 pages per chapter. In addition to these five policy-oriented chapters, additional chapters address the overall approach taken, the details of policy theory and practice, various approaches to deal with policies for cross-cutting issues, and overall conclusions on policy effectiveness.

But aside from Part B of *GEO-6*, there is also brief identification and some general discussion of policy responses along the thematic lines in Part A, "State of the Global Environment," in chapters 5 to 9. Each of the five environmental themes covers major existing policies for the range of issues identified, but without going into the analysis of effectiveness found in Part B.

It is clear that Part B of *GEO-6* represents a heightened interest in attempting to analyse policy effectiveness, on the part of both governments and the UNEP Secretariat, and to provide answers for policymakers worldwide on which types of policies seem to work best in confronting a host of environmental issues, including cross-cutting ones. As well, each of the six *GEO-6* regional reports included policy response chapters or placed such analysis within individual sections.

## *Summary*

For many reasons that are cited in the policy chapters of the global GEO series, conducting policy analysis is a challenging endeavour. The cost and effectiveness of chosen policy measures vary, sometimes greatly, depending on the context in which they are applied. At the same time, collecting data and passing judgment on what is successful policy are also not typically straightforward tasks. For these reasons, conducting policy analyses at the global and regional levels long remained more of a goal than a reality in the GEO series, even with the increased effort being devoted to this activity. While *GEO-6* may have succeeded in policy analysis more than any previous GEO report, in doing so, it may have become more of a handbook of policies than an assessment.

In practice, this means that most of the policy analysis work in the global GEOs has been aspirational rather than in-depth or quantitative. While *GEO-3* and *GEO-4* adopted a more integrated approach at the global and regional levels by blending state and trends and policy responses, *GEO-5* employed more rigorous and structured methods to evaluate the cost and effectiveness of selected policy measures responding to trends in environmental themes. The assessment of policies on a thematic and cross-cutting basis conducted in *GEO-6* appears to represent an even more serious attempt to come to grips with policy analysis and highlight successful policy measures for a broad range of stakeholders.

**Table 4.6.1. Summary of policy response coverage in global GEO reports**

| | *GEO-1* | *GEO-2* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Global Response treatment; number of pages, % of report | 10 pp. - 12% | 20 pp. -15% | Yes, but in the same chapter as regional | Approx. 34 pages in Chaps. 2-5 and 40 pp. in Chap. 10; 13% | Yes, some aspects in Part 1 + Chap. 17; total of ±30 pp.; 14% | Yes, but mixed global & regional; with ±20 pp. in Part A and extensive coverage in Part B (178 pp.); more in Chap. 22 (33 pp.) |
| Regional Response treatment; number of pages, % of report | 76 pp. - 88% | 116 pp. - 85% | Yes, but in same chapter as global | 30 pages (approx.) in Chapter 6 - 29% | 186 pp. in Part 2 Pol Options - 86% | |
| Part of report | 32%<br>86/272 pages | 32%<br>136/432 pages | not calculable | 19%<br>104/572 pages | 39%<br>216+/550 pages | 33%<br>231/708 pages |

* - Because global and regional State and Responses are fully integrated with a single lengthy Chapter 2, it is impractical to try to quantify the global versus regional Response coverage.

## 4.7 Chapter summary

This chapter has provided a context for the six global GEO reports published from 1997 to 2019 and described how these six reports evolved over a nearly 25-year production period, particularly in terms of the five components of the DPSIR analytical framework. The reasons for GEO's evolution are manifold. They include both demand factors, such as governments' preferences as expressed through UNEP's Governing Bodies, and supply factors, such as the many innovations stemming from the UNEP Secretariat and the network of GEO partners.

Some of the main trends include the ever-increasing length of the global report, with the single exception of *GEO-5* being slightly shorter than *GEO-4*, and the increasing complexity of the report in terms of the number of chapters per volume, reflecting greater cross-cutting analysis. At the same time, factors such as the shifting global-regional balance in the reports, with regional content all but disappearing and the popularity of certain topics – the Earth system, Human Well-Being, payment for ecosystem services –and other popular topics from edition to edition are also worth noting.

Chapter

5

# Beyond DPSIR – Outlook and Other Major Aspects

## 5.1 Introduction

Aside from documenting environmental state and trends, the Global Environment Outlook (GEO) reports have consistently featured several other lines of analysis. First, there is the Outlook proper, exploring the future some decades ahead and extracting strategic signals. Second, other key themes such as the Earth system, environmental data and options for action were often singled out for special treatment. Third, the regional content in the GEOs has varied greatly from one edition to another. This chapter tells how these three particular lines of analysis evolved in size and role. In addition, it highlights a fourth important category in GEO's global reporting, being the companion products and technical reports. These helped bridge the six major GEO report processes and made GEO more transparent for a broader audience in terms of data, detailed overviews of regional impacts, methodology and network formation. For this fourth category, the current chapter provides an overview only, whereas related Annex IV offers a complete list.

## 5.2 Evolution of the Outlook component in global GEOs

Embedded in the name "Global Environment Outlook" from the beginning, the forward-looking outlook aspect of GEO reports has always been among the most anticipated and read by a wide variety of readers. This first section of Chapter 5 explores the evolution of the Outlook element in the global GEO series.

Forward-looking analyses developed in a manner that often characterized GEO's style through a learning-by-doing and stepwise fashion. But certain key steps in relation to these future analyses were taken even before the first edition was published. There were many successive battles of opinion between the various teams involved. A prototype global environment outlook was prepared as input for a 1994 meeting in Cali, Colombia, including several entities that later became part of the GEO collaborating centres network run by the United Nations Environment Programme (UNEP). The prototype included thematic projections on climate change and freshwater availability, and these were illustrated via quantified examples for various world regions. However, there was no comprehensive coverage of all regions for all key themes. While this initial Outlook component was praised, it also drew criticism for not providing a full picture of regional challenges whereas, at around the same time, it was becoming clear that the new assessment had a special role to play in illuminating the regional dimensions of global environmental change.

In *GEO-1*, Chapter 4, "Looking to the Future," is a straightforward business-as-usual scenario that essentially shows the magnitude of the world's future environmental challenges if current trends continued (UNEP, 1997c). The model-based analysis clearly demonstrates the integrated nature of the planetary system, along with the need to better study and understand interlinkages between different human aspects such as culture, economy, institutions and society, and environmental themes including biodiversity, climate, land and water.

Already this first report, in all its simplicity, pointed to the potential for action. The last few pages of the *GEO-1* outlook chapter quantify potential environmental impacts of stepped-up policies based on the use of the best available technologies in agriculture and energy, possibly combined with renewable energy sources and changes in the human diet, such as reduced meat consumption. These served as a reminder that positive action is possible and highlighted the risk of growing inequality in a world that is overall

becoming healthier and wealthier. The *GEO-1* outlook was well-received and offered inspiration for its "Executive Summary". At the same time, it was criticized, at least among the GEO team, as being confusingly close to prediction. From this point onward, GEO outlook work evolved, featuring alternative futures and more elaborate options for action.

*GEO-2000* strengthened the outlook element in two ways (UNEP, 1999g). First, the new outlook work saw creative involvement of regional teams from the start. Second, paralleling the introduction in GEO of a full-blown policy chapter, the *GEO-2000* outlook work placed alternative policies centre-stage. These two changes entailed a major expansion relative to *GEO-1*.

While *GEO-1* only offered a limited regional flavour in the outlook chapter, particularly in regard to land and pressure on natural habitats, *GEO-2000* offered regional alternative policy studies (Box 5.1.1). Each regional study focuses on one or two environmental issues of particular relevance to the region, such as air pollution or water resources management, combined with specific categories of moderate policy instruments, such as promotion of new technologies or stepped-up voluntary action by the private sector. For the global edition, each regional summary is encapsulated in two or three pages. The choice to focus the outlook work for *GEO-2000* on moderate alternative policies, not on radical scenarios of transformative change, was a compromise. It reflected the capacity of the various regional teams for scenario work at that point in time.

In itself, the *GEO-2000* regional studies produced clear and significant work; for example, the study on freshwater availability in the West Asia region. Its scenario thoroughly analyses to what extent increasingly ambitious mixes of supply technology and rationalization of water use could achieve in terms of the regional water balance. In fact, neither of the scenarios was deemed to postpone by more than a few years the moment when the annual water balances for these areas would become entirely negative. Thus, its message was that without a drastic change in regional population growth, no solution could be imagined.

Here it already became apparent that the logical next step in the evolution of GEO outlook work would be more encompassing scenarios for deeper change. This also points to the benefits for GEO of its regional teams' antennae for issues that could be usefully put on the table, naturally connecting environment and development.

The way regional involvement in the Outlook grew during the production of *GEO-2000* – out of regionally focused scenarios in the absence of a global

framework – made it hard to synthesize the results. There was not much scope for relating findings of one region to those of another or relating the regional to the global. Eventually, to construct the *GEO-2000* outlook chapter while doing justice to regional specificity and the analyses delivered, a global backdrop scenario was invented. This was done after the regional studies had been finalized, each with its own assumptions on, for example, global trade, migration and technology. The backdrop scenario was based on *Bending the Curve*,[1] for lack of more suitable material at that late stage (Raskin et al., 1998).

### Box 5.2.1: The scenario process for *GEO-2000*

Regional teams for *GEO-2000* were asked to develop their scenarios without the help of a quantified global framework of interregional linkages as in trade, climate change and technology. The scenarios were to explore the impact of moderate alternative policies, roughly translating as better governance and better technology, for a specific issue of regional importance, amenable to regional policies; for example, deforestation in Latin America or water quantity issues in West Asia (UNEP, 1999b, 1999c, 1999d, 1999e, 1999f). One regional study, namely for Europe and Central Asia on the classic issue of acidification and eutrophication, was elaborated in detail and served as an example (van Vuuren and Bakkes, 1999).

Each regional study comprised six steps as follows. (i) Define the scope of the study and the primary policy question to be answered. For example: "what can be achieved by moderate additional measures and will the achievement be enough?." (ii) Define a reference scenario to describe likely social and economic developments up to 2010, including consistent projections of the key driving forces under current policies; the purpose of the reference scenario is to describe what could happen without alternative or additional policies. (iii) Estimate impacts of the reference scenario in terms of selected environmental issues. (iv) Define alternative policy packages, focusing on physical measures, such as fuel switching, the policy instruments needed to achieve them, such as taxation, or both. (v) Estimate changes in the impacts caused by the alternative policies and compare them to those of the reference scenario. (vi) Draw conclusions about the effectiveness of the alternative policy packages.

[1] *Bending the Curve* was about what would now be called transformative change – a concept that would only make its entry in later editions of GEO. Its global business-as-usual scenario was merely an auxiliary construct – the curve that needs bending. In contrast, what inspired *Bending the Curve* was its policy reform scenarios. Nevertheless, its business-as-usual scenario was a convenient stop-gap for *GEO-2000*.

A central team compiled short standardized summaries of regional scenarios; regional scenarios with insufficient substance were propped up with material from pre-existing studies, as with the Africa region, or dropped, as with the Arctic region, when such material was not available.

Globally, the *GEO-2000* outlook work highlighted three insights:

- time is running out, and environment-related policies are generally moving in the right direction, but much too slowly;
- setting up a well-coordinated global provision of trusted data and information is time-consuming and should be energetically pursued without delay; and
- in various regions of the world, existing environmental issues will change in their nature once a threshold is passed, while old unsolved problems will persist and start interacting with or producing new problems; for example, nutrient loading or air pollution or climate change.

In addition to the alternative policy studies and the backdrop scenario, the "Future Perspectives" chapter in this second GEO report also drew on a one-off exploration of emerging issues for the 21st century. The International Council of Scientific Union's[2] Scientific Committee on Problems of the Environment carried out a survey, to which some 200 scientific experts in more than 50 countries responded. At the time of the launch of *GEO-2000*, UNEP Executive Director Klaus Toepfer noted that poor governance came out as number 5 in a prioritized list of 36 issues – a result he did not expect from scientists!

On balance, while the *GEO-2000* outlook was perhaps not the strongest in the GEO series, it confirmed the standard of GEO having a forward-looking element, now explicitly paying attention to alternative policies. It also saw the emergence and engagement of regional outlook teams and became a natural stepping-stone for much more ambitious outlook work in the preparation of *GEO-3*.

In all probability, *GEO-3* represents the pinnacle of scenario development in the global GEO series, with four full-blown and colourful scenarios (UNEP, 2002e). Thirty years after the Stockholm Conference and ten years after Rio, the "Outlook" chapter examines the 30-year period 2002–2032. *GEO-3*'s retrospective chapters covered the time period 1972–2002, and thus *GEO-3* as a whole provided a balanced look backward and forward.

[2] ICSU, now the International Council for Science

The outlook for *GEO-3* combines descriptive narratives and quantitative approaches by examining four scenarios of potential future development at both global and regional levels. The intellectual basis for this was the work of the Global Scenario Group (Gallopín et al., 1997; Raskin et al., 1998).

- The *Markets First* scenario "envisages a world in which market-driven developments converge on the values and expectations that prevail in industrialized countries."
- In a *Policy First* world, "strong actions are undertaken by governments in an attempt to reach specific social and environmental goals."
- The *Security First* scenario "assumes a world of great disparities, where inequality and conflict prevail, brought about by socio-economic and environmental stresses."
- *Sustainability First* "pictures a world in which a new development paradigm emerges in response to the challenge of sustainability, supported by new, more equitable values and institutions."

The scenarios developed for *GEO-3* have an environmental focus, supported by a host of data and quantitative modelling, together with regional or local examples to explain their relevance on the ground. At the same time, they recognize that the environment cannot be discussed without also considering what may be happening in the social and economic spheres. Therefore, they span eventualities in many overlapping areas, including culture, demography, economic development, human development, science and technology, governance and, of course, the environment itself.

While the four *GEO-3* scenarios were meant to differ strongly from each other in terms of physical trends and public mood, the environmental changes projected within each one for the first two decades are not so different. This is a reminder that many changes that will occur in the future have already been set in motion today; for example, through present population dynamics, power infrastructure, the layout of cities and tax rules. By the same token, it was also a reminder of the time lag between the introduction of policy responses now and eventual effects on the environment and society in the future. This was the central message that the journal Nature picked up from *GEO-3* (Gewin, 2002). For many issues, such as climate change or biodiversity loss, the divergence of trends under the different scenarios' policies does not become apparent until observed over a significantly long time.

Perhaps the most important result of the *GEO-3* scenario work is that it convincingly framed the future of the global environment as a social and economic development imperative. Much more than a classic state of the

environment report could do, it enabled UNEP to describe global care for the environment in the context of the sort of society we collectively wish to develop and to maintain. This outlook, while concluded in 2002, offered an early foreshadowing of the 2015 Sustainable Development Goals (SDGs) (UNGA, 2015).

Most long-term participants in the global GEO reporting process and most end users of the reports were probably more enthusiastic about and impressed by the four *GEO-3* scenarios than any of the other GEO outlooks. Regional and global workshops were instrumental in putting *GEO-3*'s scenario analysis on track. They were lively and fed with inputs from various sources, more so than previous GEO editions.

While *GEO-3* outlook work generated considerable enthusiasm and admirable outputs, it also brought ample headaches for the compilers. In particular, issues around the chosen data had to be solved. There was persistent disagreement over whether the numbers that had been discussed earlier in regional scenario workshops should be kept for the global *GEO-3* scenarios. As an alternative, the global environmental impact analysis could use a consistent, modelled basis to consider the effect of global linkages such as trade, technology diffusion and climate change. The eventual outlook chapter of *GEO-3* quotes data from both approaches, but the regional impact analysis is model-based (Box 5.2.2).

### Box 5.2.2: Scenario multi-team set-up in *GEO-3*

Four modelling teams contributed the quantitative analyses of the *GEO-3* scenarios:

- Polestar team at the Stockholm Environment Institute in the USA
- The team at the National Institute for Environmental Studies in Japan
- IMAGE team - Integrated Model to Assess the Global Environment – at the National Institute for Public Health and the Environment (RIVM) in the Netherlands
- The modelling team at the Center for Environmental Systems Research at the University of Kassel in Germany

Each of these covered a specific environmental impact across the four scenarios. For example, the modelling team at the National Institute for Environmental Studies provided all projections for urban air pollution, and the modelling team of the University of Kassel covered water stress for all four scenarios (UNEP, 2002e, pp. 398–400 outlook Technical Annex).

This differed from the arrangement for the Assessment Report of the Intergovernmental Panel for Climate Change at that time, as each of its four scenarios was provided by one analytical team, complete with all the environmental numbers (IPCC, 2000). The GEO arrangement turned out to offer better possibilities to check consistency across the models involved.

Making good use of the arrangements between the analytical teams, a technical background report to the outlook segment of *GEO-3* provided wall-to-wall details of all issues for all regions, in numbers and traffic lights. It also investigated convergence and divergence between the analytical teams and found that for longer-known issues, such as sulphur dioxide emissions, all models agreed. For issues where modelling was relatively new, such as land-use change, larger differences appeared (Potting and Bakkes, 2004).

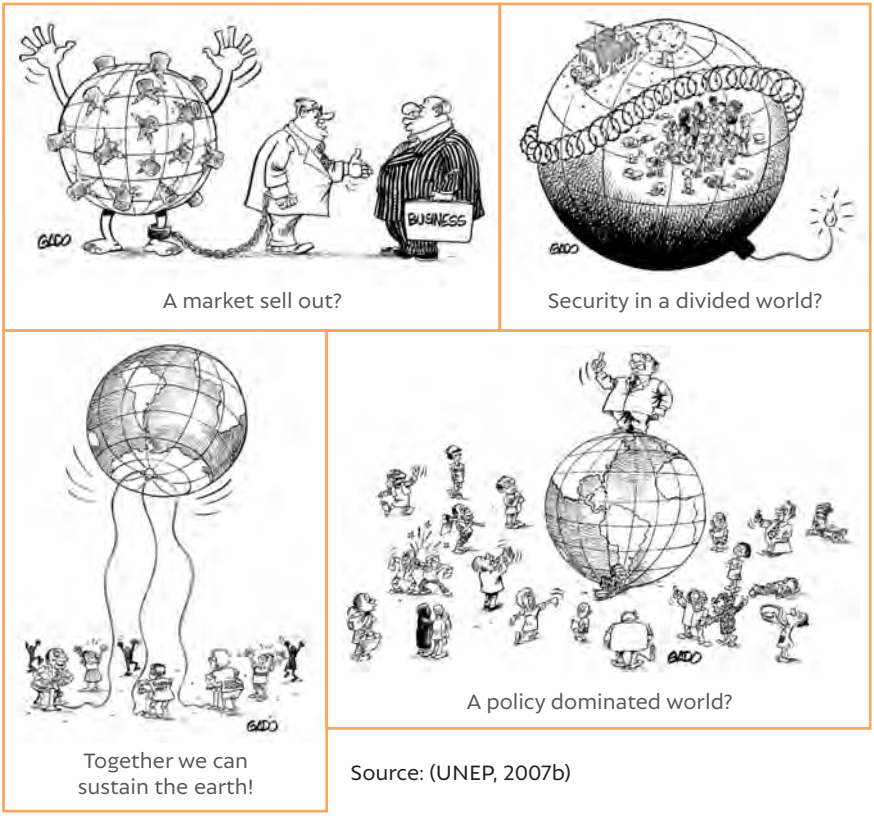
*GEO-3* saw the first full-blown development of regional scenarios, in all four variants that were elaborated at the global level, in terms of "Environmental Implications" that the four scenarios would have for each of UNEP's six regions plus the Polar zones. Indeed, the four global scenarios have a significant regional flavour to them, with a complete and deliberate interweaving of multiple examples from UNEP's six regions under all four and many references made therein to potential developments in these six regions. This made these four scenarios fresh and compelling but required close working relationships between the global and regional contributors. This contrasted with most other GEO outlook chapters where the global and regional analyses were developed and presented separately, making linkages less evident.

Interestingly, different views were expressed on which of the scenarios felt the most like current reality. In the European and North American scenario workshops, the steady economic progress of *Markets First* was often mentioned as closest to reality at the time *GEO-3* was being produced (early 2000s). But participants from Africa often recognized the hostile atmosphere of *Security First* (earlier known as *Fortress World*) as being closer to their current reality (Raskin and Kemp-Benedict, 2004).

In *GEO-4*'s outlook Chapter 9 "The Future Today," the same four scenarios are presented as in *GEO-3*, this time up until 2050 rather than 2032, again using a mix of narrative storylines and quantitative data, "...to explore different policy approaches and societal choices at global and regional levels" (UNEP, 2007b, p. 398). After the main messages, the chapter began by

laying out fundamental assumptions behind the four scenarios in a table of key questions. Cartoons are used as a communications tool, with the four scenarios then being detailed in two-page snapshots, making it easy for readers to grasp the different potential futures envisioned under each.

**Figure 5.2.1. Cartoons by Gado illustrating the *GEO-4* scenarios**
***A view of the future?***




Source: (UNEP, 2007b)

The bulk of the chapter, however, is devoted to demonstrating the implications of the four scenarios on various environmental themes – atmosphere, biodiversity, land, water, as well as human well-being and vulnerability and implications for the Millennium Development Goals (MDGs) – with numerous quantitative graphs at both global and regional levels to illustrate likely paths of future development (UNEP, 2007b, pp. 428–431).

Once again, in *GEO-4*, the narratives and numerical elements complement each other, with several contemporary scenario exercises referenced. The *GEO-4* outlook is arguably the most quantitative of all global GEO outlooks,

at least in appearance, with dozens of trend graphs and maps showing the probable evolution of various indicators from 2000 to 2050 by region and globally. With these, *GEO-4* includes in the main report what had only been extra material in support of *GEO-3* (Potting and Bakkes, 2004).

The outlook in *GEO-5* is titled "Scenarios and Sustainability Transformation" (UNEP, 2012a, pp. 419–456). Rather than re-working all four scenarios used in previous GEOs, it concentrates on two very different storylines until 2050, the two highly contrasting *Conventional World* and *Sustainable World* pathways. This outlook explores the deep-seated changes in human behaviour and mentality that would be required to move the planet as a whole onto a truly sustainable future path, including in the key realms of production and consumption. This is done by contrasting the two scenarios through the lenses of major environmental themes, which are limited this time to atmosphere, land, water and biodiversity. It also provides an analysis of the gaps between the two scenarios and what measures could help to close those gaps, as well as a detailed look at various means of reversing the unsustainable through improved governance and gradual changes in societal attitudes and behaviour.

To achieve a sustainability transformation, the *GEO-5* outlook offers a vision with goals and targets that would need to be met by 2050. It describes the main challenge as "(being able to meet) both human needs and human aspirations within the planet's carrying capacity" (UNEP, 2012a, p. 423). The goals and targets are mostly derived from existing multilateral environmental agreements, many of which have been poorly or at best partially implemented until now.

The resulting outlook chapter in *GEO-5* "Scenarios and Sustainability Transformation", diverges in a major way from the previous GEO reports. While not a true backcasting exercise[3], the chapter focuses on several targets as end points and how they could be achieved, mostly in global terms. In great contrast to *GEOs-3* and *4*, the scenario analysis of *GEO-5* focuses almost exclusively on the global level, with little mention of the regions other than a few examples. In this, the outlook part complements the rest of *GEO-5*, with its extensive coverage of regional detail in environmental trends and policy

[3] Different from forecasting, backcasting is a scenario approach that explores the feasibility of a desirable future; for example, by analyzing the critical path. The central element is a vision of the desirable future. While forecasting seeks answers to questions starting with *what if...*, backcasting tries to answer *how to ....*? In terms of support to policy, backcasting is meant to connect a vision for the future to present-day decision-making. Backcasting can be a powerful tool in interacting with stakeholders, to connect a vision for the future with concrete near-term priorities (van Bers et al., 2016).

options. Ultimately, the concept of moving towards a sustainability transformation distinguishes the outlook chapter of *GEO-5* from all previous treatments of this aspect.

*GEO-6* devotes almost one-fifth of its 700 pages to an outlook, namely six chapters in Part C entitled "Outlooks and Pathways to a Healthy Planet with Healthy People" (UNEP, 2019e, pp. 463–592). The chapters explore pathways for sustainable development, reaching the SDGs by 2030 and continuing to 2050 and beyond on a sustainable, long-term trajectory. The outlook investigates the scale of the challenge as well as synergies and trade-offs between the goals. This line of inquiry is a logical continuation from *GEO-5*. The whole section reflects the broad change from *what-if* scenarios, as considered in the early GEOs, to *how-do-we-get-there* by maintaining a vision of worldwide sustainable development.

The future study of the *GEO-6* outlook features the usual creative mix of narratives and quantitative projections. Three additional elements are striking. First, an extensive introduction has to navigate the full n-dimensional 'thought space' of GEO and the SDGs, plus obligatory concepts such as 'transformative change.' The introduction serves to position the exercise in terms of regions, themes, time horizons, top-down/bottom-up balance, and even sustainability ideology.

Second, the exercise derives its authority not so much from the substantial work by its analytical team but by positioning itself as part of a growing movement of environment-related future studies and acknowledging an array of approaches within this movement. It enabled the GEO team to annotate its conclusions in terms of robustness, using judgments such as 'well-established' or 'well-established but incomplete.' This is similar to a style adopted by the Intergovernmental Panel for Climate Change a few years earlier. In this vein, the outlook part is one of the rare occasions in *GEO-6* where insights from the six *GEO-6* regional reports of 2016 are acknowledged, albeit briefly (UNEP, 2019e table 21.1).

Third, the *GEO-6* outlook draws conclusions not only in terms of challenges, such as economic sectors, rates of technological progress or distributive justice[4] but also in terms of synergies and trade-offs between SDGs, viewed in a long-term perspective. It builds on its conclusions by naming three key areas of intervention with significant synergies across the targets: changing

[4] Distributive justice in relation to environment and development concerns the fairness of the distribution of pluses and minuses of environment practices and related interventions, especially across different segments of the population, for example in terms of age groups, ethnic groups and prosperity classes.

the human diet, improving education and combating air pollution. This latter statement, on key areas of synergy, is one example of author-drafted chapter conclusions in recent GEOs that makes them more thought-provoking than the government-approved Summary for Policy Makers.

**Table 5.2.1. GEO forward-looking analyses**

| | Main scenario set-up | Regional detail of analysis | Focus | Time-horizon | Chapter length pages | Further details |
|---|---|---|---|---|---|---|
| *GEO-1* | Business-as-usual + technology variants | 6 regions | What is likely to happen if current human behaviours go unchanged?<br>For example, trends in consumption as the middle class grows in many regions, human diet, technology and resource use, trade. | 2050 | 42 | Bakkes and van Woerden (1997) |
| *GEO-2000* | Regional baselines and policy variants. Global backdrop added later | 6 regions | What can be achieved with moderate, region-specific policies? For example, water-efficient agriculture, ambitious water recycling, and desalinization | Diverse. Added backdrop is to 2050 | 28 | van Vuuren and Bakkes (1999);<br>UNEP (1999b, 1999c, 1999d, 1999e, 1999f) |
| *GEO-3* | Four richly described scenarios of contrasting development. Policies embedded, not separate | 6 regions, each with subdivision, plus a global total.<br>Systematic overview in tech report | What is the future we want as a society? *Markets First, Policy First, Security First* or *Sustainability First?* | 2032 | 82 | Raskin and Kemp-Benedict (2004);<br>Bakkes et al. (2000a, 2000b); Potting and Bakkes (2004). |

| | | | | | | |
|---|---|---|---|---|---|---|
| *GEO-4* | Same as *GEO-3* | 6 regions, for every scenario and every theme, plus global. Systematic overview included in report body; limited analysis of polar regions. | Interlinkages between environment themes and between environment and development issues.<br>Rates of change required versus historical evidence.<br>Key messages are planet-level. | 2050 | 60 | |
| *GEO-5* | *Conventional World* and *Sustainable World* | None | Visions, goals and targets on the road to 2050 | 2050 | 38 | |
| *GEO-6* | Future developments without targeted policies. Drawing on Shared Socioeconomic Pathways to Sustainable Development | | How can we achieve the environmental dimension of the SDGs and related multilateral agreements?<br>What mid- to long-term strategies are needed to achieve lasting sustainability? | 2050 mostly.<br>2100 for some themes | 132 | O'Neill et al. (2017) |

## *Concluding Observations*

Table 5.2.1 summarizes the evolution of the GEO outlook component from *GEO-1* through *GEO-6*. The middle two GEOs to date, and particularly *GEO-3*, took up the most intellectual space by connecting to broad, powerful and intuitively significant patterns of development. Building on a decade of early work, including *GEO-1* and *GEO-2000*, *GEO-3* contributed greatly to connecting environmental care and human development in the public mind, both globally and for specific regions. This seems to have coincided with a transitional phase of maturity in the GEO scenarios' development process in terms of ambition, participants and paid and in-kind resources for the work.

In step with the whole of GEO, the outlooks of *GEO-5* and in particular *GEO-6* included the established *what-if* type scenarios in a broader, goal-driven analysis of pathways to sustainable development. The *GEO-6* outlook added to the existing framework of the SDGs by considering them against a farther time horizon (2050) and by focusing on synergies and trade-offs between individual targets.

One issue that seems to have resolved itself is the early difficulties, or even distrust, between traditions of scenarios as storytelling and model-based quantification. During the first decade of GEO, while its centre of gravity was still in its network of collaborating centres, this issue gradually dissolved through joint learning-by-doing GEO-style. At the same time, the harsh reputation of normative models, in the style of the International Monetary Fund, wore off. Today, GEO benefits from the strengths of both traditions: the imagination and mobilizing power of storytelling and the evidence of quantification.

*GEO-6,* in particular, made a point of building on existing work from earlier GEOs and studies by other organizations. It sought to explicitly position the GEO outlook work as a member of a diverse family of forward-looking analyses, taking advantage of multiple lines of work, not just one school. Specifically, it recognized inputs to *GEO-6* outlook work based on: top-down as well as bottom-up approaches; an increasing body of 'target-seeking' scenarios in the context of the SDGs; engagement of stakeholders in knowledge production; and communication with decision makers throughout the process, not just at the end (UNEP, 2019e, sec. 19.3).

Throughout the series, outlooks have made the GEO process and products stronger by helping to make connections. Of these, the most important are:

- The connection between the present and challenges and opportunities on the horizon, thus offering policymakers fresh vocabulary in making commitments for the future. As mentioned earlier in this section, many changes that will occur in the future have already been set in motion today. The case for putting the results of scenarios in the hands and minds of decision makers is cogently made in the introduction of *GEO-3*'s "Outlook" Chapter 4, which explained how consideration of a number of possible futures could help today's decision makers understand what these futures could hold for the planet in environmental and societal terms, and thus make decisions that could lead to a more desirable future (UNEP, 2002e, p. 320).
- Acknowledging that contrasting perceptions of what is going on in the world may be equally valid, for example, perceptions on globalization,

use of natural resources, and regional conflicts. In particular, the colourful contrasting storylines of *GEO-3* scenarios allowed many participants to connect their regional realities with global environmental policymaking. Most strikingly, in the early 2000s, contributors in Africa typically identified Security First as their reality on the ground, in contrast to comments from the other regions. Responses from the regions in the early 2020s may well be different.

- Added significance for retrospective information, such as classic state of the environment and descriptive accounts of development in environment policy. As mentioned above, the outlook work of GEO showed that in various regions of the world, existing environmental issues can change in their nature once a threshold is passed and start interacting with or producing new problems. In this and other ways, GEO outlooks helped illuminate where current trends could lead to in the absence of timely intervention. The connection between outlooks and retrospective information works the other way around as well: long-term series of past developments are evidence that changes as significant as those projected in some scenarios (deforestation, collapse of fisheries, air pollution clean-up) have happened in the past and therefore cannot be dismissed as fairy tales that are unlikely to come true.

Through such connections, the outlook element considerably strengthened GEO's saliency and relevance in terms of both its findings and its process. It also took UNEP's role to provide early warning of emerging environmental problems and threats to a new level, expressly in an environment and development context. This ground-breaking element made GEO the true global environment outlook that it is while increasing the number of contributors involved and greatly widening its appeal with readers.

## 5.3 Other main elements found in GEOs 1-6

### *Introduction*

While the main components (Driving forces and Pressures, State of and trends in the environment, Impacts including human well-being and policy Responses to threats and change) are regular threads throughout the global GEOs, they do not occupy centre-stage alone in the reports. Indeed, other elements such as policy options/recommendations, environmental data concerns and the integrated Earth system are topics of occasional analysis in what became an increasingly innovative GEO series over the

years. The following section identifies and describes these other key elements and what roles they played, beginning with *GEO-1* published in 1997.

## *The Issue of Environmental Data for Integrated Environmental Assessments*

The issue of data has always presented a challenge to the GEO process and is one of the reasons that a Data Working Group has advised each report (Chapters 7.3 and 7.5). It is also why it has been flagged as an issue in every global GEO to date, although in greater detail in some than others. *GEO-2000* was the first edition to undertake a brief exploration of the data issue. In little over three pages of its preambular material (UNEP, 1999g, pp. xvi–xix), *GEO-2000* explains the critical role of environmental and other data for conducting science-based environmental assessments. Analysed issues include data quality, data availability, geo-referenced data and space-based observations, along with access to data. A chart also identifies both institutional and technical constraints affecting data issues (UNEP, 1999g, p. xviii).

It was not until *GEO-5*, however, that the data question was explored again in any detail. In this case, it appeared as Chapter 8, "Review of Data Needs," at the end of Part 1, "State and Trends of the Environment." This 16-page chapter is perhaps the only one ever written by the UNEP Secretariat itself and aims to provide "...a snapshot of the data on which *GEO-5* [was] based" (UNEP, 2012a, p. 217), as well as highlighting data limitations and gaps on a thematic basis, such as air, land, water. It also describes international programmes supporting global data collection and official environmental statistics from countries, noting problems of both quality and quantity in the latter.

It is perhaps in *GEO-6* that the broad data issue is taken the most seriously, with two full chapters directly on this subject. The first of these, Chapter 3, is entitled "The Current State of our Data and Knowledge." It includes a history of environmental statistics, the need for improved data and derived indicators for monitoring progress toward the SDGs, major data gaps for *GEO-6,* including gender-related data and existing data systems. The second is *GEO-6*'s final Chapter 25, "Future Data and Knowledge Needs", in the closing Part D of the entire volume. Many issues such as citizen science-generated data, big data and data analytics, and traditional data are dealt with in several cases through case studies, notably one on the Global Learning and Observations to Benefit the Environment programme for citizen science (GLOBE, 2020). Near-future trends and

means of data collection, and the challenges of working with these new data streams, are also examined.

Thus, not only do these *GEO-6* chapters finally give the data problem what it is fully due in the integrated environmental assessment context, but they break new ground exploring various cutting-edge aspects of environmental data and statistics in terms of their implications for GEO-style reporting.

Finally, in terms of the presentation of data in GEO reports, one should not overlook the novel presentation of pairs of Landsat satellite images included in the *GEO-3* report at the end of the nine thematic sections of Chapter 2. These pairs of images from roughly 20 years apart – including the shrinking Aral Sea, the "Black Triangle" of Central Europe, the Mesopotamian Marshlands – are accompanied by brief explanations of the phenomena involved, leading to the often dramatic and undeniable changes that can be observed.

## *Environment and (or for) Development as a Theme*

While the entire GEO series can be said to be about the environment from a development perspective, the first two GEOs made only limited use of sustainable development terminology. For example, *GEO-2000* briefly discusses development on pages 15 and 16, stating that "The environment cannot be separated from the human condition, but it is one essential complement of sustainable human development" (UNEP, 1999g, Chapter 1 p. 20). It also has a table on policy goals for achieving sustainable development at the end of the global synthesis section (UNEP, 1999g, Chapter 3 p. 215), but there is very little discussion around the concept of sustainable development in the text. Nevertheless, the first two GEOs were essential in preparing the ground for the SDGs of the 2010s: by framing environment issues in a development context, in increasingly rich detail and narratives as well as numbers; by recognizing global as well as regional perspectives; and last but not least, by its process of engaging regional expertise through its collaborating centres.

*GEO-3*'s Chapter 1, "Integrating Environment and Development: 1972–2002," traces the development of international governance measures and institutions, along with significant events related to the environment up until the end of the 20th century, in a nearly 30-page chapter. Using a decade-by-decade approach, this unique chapter shows how general environmental concerns evolved from one to the next and how global society reacted

to increasingly obvious environmental issues and threats. According to this timeline, the 1970s saw the foundation of modern environmentalism, the 1980s led to the definition of sustainable development, and the 1990s became the decade of implementing this concept, marked by the United Nations Conference on Environment and Development (or Earth Summit) and *Agenda 21* in 1992 (UNCED, 1992). This chapter ends with a look forward at the environmental agenda for the 2000s, including highlighting numerous emerging issues – climate and energy, and globalization, among others – but curiously, there is no mention of the MDGs that were the main outcome of the year 2000 Millennium Summit (UNGA, 2000).

Along a similar line, *GEO-4*'s Chapter 1 takes a slightly different tack on this theme by rendering the subject as "Environment for Development," thus endorsing and promulgating the sustainable development paradigm. While significant parts of this *GEO-4* chapter are covered in sections 4.3 (Driving forces) and 4.5 (Human Well-being) of this book, there are other parts of "Environment for Development" that bear exploring.

This Chapter drives home the points that the natural environment is the basis of human lives and livelihoods and that economic development cannot be sustainable unless it considers the natural environment. It reviews major steps in international environmental governance that linked the environmental, economic and social spheres, in particular the work of the World Commission on Environment and Development and its report *Our Common Future* (United Nations, 1987), along with *Agenda 21* that stemmed from the 1992 Earth Summit in Rio de Janeiro, Brazil.

This Chapter also describes MDG 7 on environmental sustainability and linkages between the environment and other MDGs. Thus overall, Chapter 1 of *GEO-4* sets the scene for a discussion of progress and setbacks within the various environmental compartments, much in the same way as the first chapter of *GEO-3* had done, but with greater emphasis on key interlinkages.

Section 4.5 has already covered *GEO-4*'s Chapter 7 on "Vulnerability of People and Environment: Challenges and Opportunities," which devoted 60 pages to analysing challenges and opportunities to reduce vulnerability and increase human well-being while protecting the environment. This comprehensive chapter explores multiple dimensions of environment-related vulnerability and human well-being. It remains, without a doubt, the most detailed treatment of this very broad subject in the entire GEO series of reports.[5]

[5] Notwithstanding that *GEO-3* included a briefer chapter entitled "Human Vulnerability to Environmental Change" (UNEP, 2002e, pp. 301–317).

The SDGs that appeared as part of the international environmental agenda in the mid-2010s soon found their echoes in the global GEO series. *GEO-5*, published in 2012, pre-dates the formal negotiations for and eventual launching of the SDGs in August 2015. However, *GEO-5* does show awareness of the nascent thought process of the SDGs, referring to its ambition level and time horizon, in particular in concluding Chapter 17, "Global Responses." This occurs first in a very focused explanation of its conceptual framework (UNEP, 2012a, pp. xix–xxi), then by theme-specific assessments of progress towards goals in each chapter of the "State and Trends of the Environment" part, and finally through examples of promising policy tools in their national context. In addition, the necessary global ambition level is underlined by both the United Nations' Secretary General and UNEP's Executive Director in *GEO-5*'s "Foreword" and "Preface".

*GEO-6,* in contrast, is squarely positioned as a road map to achieving the United Nations' Agenda 2030 (UNEP, 2019e). The SDGs explicitly appear in *GEO-6* in three ways:

- in explaining the purpose and legitimacy of *GEO-6* in both of the forewords and the introductory chapter;
- in measuring progress made and ambition needed by discussing indicators and as a reference in many graphs in, for example, the "Freshwater" chapter; and
- as a basis to synthesize policy messages: in terms of pathways, synergies or trade-offs between separate policies and perspectives to 2030 and 2050 in the outlook part, and the preambular material from the *GEO-6* co-chairs.

Thus, from *GEO-3* onwards, the interlinkages between environment and development and international environmental goals (MDGs, SDGs) have been heavily featured in all GEOs.

## *GEO and UNEP's Early Warning Role*

GEO has arguably contributed much to UNEP's role of early warning of emerging issues. In fulfilling its overall mandate of keeping the world's environment under review, UNEP pays special attention to early warning of emerging issues of environmental concern.[6] This is nominally distinct from

[6] UNEP's mandate on early warning was encapsulated in the original United Nations General Assembly decision 2997 (XXVII) of 15 December 1972 (UNGA, 1972). Section I/2 reads "Decides that the Governing Council shall have the following main functions and responsibilities ... (d) To keep under review the world environmental situation in

producing UNEP's environment outlooks (GEO) but sufficiently related to benefit from shared insights and organizational proximity.

GEO's contribution to early warning of emerging issues has occurred in various ways, one of these being through the GEO process as a whole, in the global and other reports. A second way was through the parts of GEO reports that explicitly look to the future: scenario studies and, occasionally, special surveys or sections. Examples of the latter are in *GEO-2000* (UNEP, 1999g, pp. 339 and 363) and *GEO-5* (UNEP, 2012a, pp. 56 and 183). And finally, a third way has been through the extensive theme-specific information in GEO's state and trends parts. Examples of this are found in *GEO-1* on the prospect of megacities of over 100 million inhabitants (UNEP, 1997c, p. 23) and in *GEO-6* on the opening of the Arctic (UNEP, 2019e, p. 41). Each of these pathways contributed to identifying and raising awareness of emerging issues.

From 2003 to 2014, UNEP's main publication drawing attention to emerging issues was the *GEO/UNEP Year Book* series (UNEP, 2020g), now replaced by the periodic *Frontiers* repors. Each report highlights a limited number of emerging issues, for example, the environmental dimension of antimicrobial resistance or environmental displacement (UNEP, 2017a).

## *The Earth System Perspective and Interlinkages*

Another significant theme is interlinkages between different planetary systems (human and natural) and the broad Earth system as a whole. This recurrent element features in global GEO editions from the start: for example, in the global "Introduction to Regional Perspectives" in *GEO-1* and the 20-page "Global Perspectives" chapter opening *GEO-2000*. Later, interlinkages and planetary systems reappear as more explicit themes, reflecting evolving concerns in policy and science: *GEO-4*'s Chapter 8, "Interlinkages: Governance for Sustainability," *GEO-5*'s Chapter 7, "An Earth System Perspective", and *GEO-6*'s Chapter 4, "Cross-cutting Issues", and Chapter 17, "Systemic Policy Approaches for Cross-cutting Issues".

The *GEO-4* "Interlinkages: Governance for Sustainability" chapter (34 pages) "...pursues the current understanding of human-environment interlinkages." It examines how "...drivers, human activities and environmental changes are interlinked through complex cause-and-effect relationships embedded in both biophysical and social processes" (UNEP, 2007b, p. 365).

order to ensure that emerging environmental problems of wide international significance receive appropriate and adequate consideration by governments."

It also looks at how environmental governance regimes at various levels could be better aligned through what is referred to as adaptive governance measures.

Five years later, *GEO-5*'s Chapter 7, "An Earth System Perspective" (20 pages), looked at changes in the interconnected Earth system of which humans are an integral part. This Chapter discusses some of the unprecedented changes that are taking place within the Earth system, stating "Evidence shows that human activities are now so pervasive and profound in their consequences that they affect the Earth at a planetary scale" (UNEP, 2012a, p. 195).

Most of the Chapter is devoted to discussing these system changes and their implications for human well-being. But the Chapter also covers the concepts of overshoot, crossing of thresholds, and tipping points in terms of Earth systems. In its concluding pages, it describes how transition management needs "...to improve understanding of the dynamics of complex processes of change and try to influence their pace and direction" (UNEP, 2012a, p. 209).

Finally, in regard to interlinkages among Earth systems, *GEO-6* includes the two chapters 4 and 17 mentioned above. Chapter 4, "Cross-cutting Issues," examines 12 such issues grouped under three subheadings[7] and how each of these issues provides an entry point and relates to Earth system topics. The stated purpose is to "demonstrate where intersections and nexus issues will need synergistic solutions with the objective of achieving true transformative change" (UNEP, 2019e, p. 97).

Chapter 17, "Systemic Policy Approaches for Cross-cutting Issues," analyses four of the 12 cross-cutting issues named in Chapter 4 – climate change, the food system, energy and resource use – due to their link to important economic, social and environmental systems (UNEP, 2019e, p. 428). The intent is to identify and evaluate policies that can help achieve systemic transformation in these four sustainable development challenges: resilience to climate change, creating a sustainable food system, decarbonizing energy systems and moving the world towards a more circular economy. The Chapter concludes that such "...systems policy approaches with transformative potential do exist. If key leverage points can be identified in a system and the right policy interventions are made...transformative change leading to innovations will lead to net positive effects" (UNEP, 2019e, p. 446).

[7] People and livelihoods (health, environmental disasters, gender, education, urbanization); Changing environments (climate change, polar regions and mountains, chemicals, waste and wastewater); and Resources and materials (resource use, energy, food systems).

## *Options for Action*

The concluding parts of the global GEO report series have varied greatly through time. For example, in *GEO-1*, the final Chapter 4, "Looking to the Future,"[8] was actually GEO's first attempt to use integrated modelling techniques and scenarios as tools for policy setting and planning (UNEP, 1997c, p. 215). Essentially, this is what in subsequent global GEO reports grew into the outlook component, although that never featured again as the report's concluding chapter. In this sense, *GEO-1* seems to end rather abruptly, with no overall conclusions, but still foreshadowing much for the future. Overall conclusions flowing from the report as a whole had been formulated and, after high-level discussions in UNEP, were moved up front as *GEO-1*'s "Executive Summary" (UNEP, 1997c, pp. 1–12).

*GEO-2000* presents a different case, with the final Chapter 5 entitled "Outlook and Recommendations." This, in fact, was not the outlook proper, which is instead found in the previous Chapter 4 called "Future Perspectives." But Chapter 5 is unique in laying out a series of "Recommendations for Action" after briefly reminding about current unsustainable trends and new problems. These may have only been common-sense suggestions but did respect that governments had recommended the inclusion of "recommended measures and actions" when requesting the first two GEOs (Annex I). However, it turned out that, as the main consumers of the reports, governments did not want to be told what they should do, and so subsequent global GEOs instead offered options for action. This political consideration aside, the recommendations for action in *GEO-2000* can be seen as the forerunner of future GEOs' policy options.

The cases of *GEO-3* and *GEO-4* confirmed the trend of presenting an assortment of broad policy options for governments to consider. However, in the case of *GEO-3*'s Chapter 5, "Options for Action", this was done in a far more succinct fashion (10 pages) than in *GEO-4*'s Chapter 10, which is almost four times as long. In the *GEO-3* chapter, a series of boxes offered "Suggestions for Action," mostly under various policy headings such as "Valuing the environment" and "Making the market work for sustainable development" (UNEP, 2002e, pp. 405–408).

*GEO-4*'s Chapter 10, "From the Periphery to the Core of Decision Making - Options for Action," offers a sophisticated discussion of both existing and newer policy instruments and the relevance of their application in tackling long-standing as well as emerging environmental problems. The entire set

[8] See section 5.2 above on this outlook-related chapter.

of problems is mapped along a continuum in terms of management and possible reversibility to frame the discussion.

Numerous approaches for raising the profile of the environmental agenda are described (UNEP, 2007b, pp. 462–464), and critical gaps and implementation challenges for environmental policymaking are documented (UNEP, 2007b, pp. 464–468), including a chart providing an overview of global policy targets for major environmental problems (UNEP, 2007b, fig. 10.3). A two-track strategic approach towards a future policy framework is elaborated (UNEP, 2007b, pp. 468–479) to expand the reach of proven policies and find new transformative policies. A final section explores the conditions for successful implementation of the proposed new policy framework (UNEP, 2007b, pp. 479–493), including such issues as public awareness, monitoring and evaluation, organizational reform and financing the environmental agenda.

*GEO-5*'s final Part 3 consists of two major chapters. The first is Chapter 16, "Scenarios and Sustainability Transformation," (38 pages), with the latter part bringing a unique approach to the GEO series. Although the need for a major transition in human behaviour was already mentioned in previous volumes, *GEO-5* elevates this concept to full prominence and explores the various aspects of such a transition, from the setting of sustainability targets through transforming production and consumption patterns to fundamental shifts in underlying human motivations and value patterns.

This part of Chapter 16 describes how to advance sustainability through various paths at the subglobal level by applying four strategic elements: compelling visions and social contracts, reversing the unsustainable, leverage points, and adaptive management and governance. Such a transformation needs to be "...without precedent in human history..." and one that would "...effectively transform society's material metabolism..." (UNEP, 2012a, p. 444).

The "Global Responses" Chapter 17 (UNEP, 2012a, pp. 457–486) seeks to take stock of current global responses to environmental issues and then to look at emerging options and policy clusters based on conclusions largely derived from Part 2's "Policy Options". The first of these two sections "...assesses the state of global responses to date and highlights gaps and barriers that have hindered the collective ability to manage environmental change" (UNEP, 2012a, p. 461). The second section of Chapter 17 offers a list of six broad global response options as part of a systemic approach to more sustainable development and towards deeper societal transformation (UNEP, 2012a, pp. 459 and 470–483).

*GEO-6*'s penultimate Chapter 24 is entitled "The Way Forward" and appears as the last chapter of Part C, "Outlooks and Pathways to a Healthy Planet with Healthy People," whose goal-driven scenarios have been more fully analysed in Section 5.2 above. Chapter 24 reprises many of the earlier conclusions found throughout *GEO-6*, at the end of individual chapters, including the call for transformative change and the basic concept of *GEO-6* that a "...healthy planet is the ultimate foundation for supporting all life forms, including the health and well-being of humans..." (UNEP, 2019e, p. 587). With this global GEO reaching a total length of slightly over 700 pages, these chapter summaries and overall conclusions are worth recognizing as an important element on their own.

### *Summary*

This section demonstrates that aside from the many core elements included as standard chapters and analyses in *GEOs 1-6*, there has also been a certain dynamism and willingness to experiment with the proven formula. Occasionally this represented a response to UNEP's governing body; for example, in *GEO-5* to analyse the indicative costs and benefits of policy options. At other times, it was inspired by thinking within the GEO Secretariat and the extended GEO family. The ability to adapt, adjust and innovate in terms of the contents of the subsequent reports has helped to make the volumes relevant to an ever-expanding audience while allowing UNEP to justifiably claim that the series regularly had something new to offer.

## 5.4 Regional aspects, content and treatment in global GEOs

### *Introduction*

One of the major differences found in the global series of *GEO 1-6* is the relative balance of explicitly global versus regional analyses. This is particularly manifest in the state and trends portions of the six reports, and to a lesser extent, in the policy options and outlook chapters. Interestingly, *GEOs-1* and *-2000* undertook a more regionally based approach than *GEOs 3-5*, which begin with explicitly global chapters covering the main themes – air, biodiversity, land and water – followed by some level of regional analyses. In contrast, *GEOs-1* and *-2000* cover seven regions[9] in greater detail

[9] Africa, Asia and the Pacific, Europe and countries belonging to the Commonwealth of the Independent States, Latin America and the Caribbean, North America, West

and length and include a global overview that is a synopsis of the main regional issues. This more bottom-up approach was discarded after *GEO-2000* but reappeared with *GEO-6*, which first published six complete individual regional assessments in 2016, while the global *GEO-6* was published only in 2019. With these six separate regional reports – ostensibly meant to inform and feed into the global *GEO-6* – one can argue that the handling of regional aspects came full circle since *GEO-1* appeared in 1997.

While, to some extent, the global versus regional structuring and content of the six global GEO reports offered different looks and presentations of the material from one GEO to the next, there are real differences in the global-regional balance and the content order among the six global reports. The following section documents the regional content of the six global GEO reports to date and examines some of the potential reasons for the changing global-regional balance. This section does not cover subglobal GEO reports, which are examined in Chapter 6.

## *UNEP's Regional Structure and Breakdown*

As one body of the United Nations Secretariat, UNEP operates on a regional basis, but in doing so, it does not precisely follow the breakdown of countries by region and subregion established by the United Nations Secretariat in New York.[10] UNEP works in six political regions (footnote 9), while the Polar Regions are included for geographic purposes. UNEP maintains regional offices in all six political regions, including at UNEP Headquarters in Nairobi for Africa. In addition, UNEP runs liaison or similar offices in some countries, including Brazil, China and the Russian Federation.

For UNEP, each of the six political regions,[11] other than North America, is made up of two or more subregions, and the countries considered to be

Asia and the Polar Regions. *GEOs-3* and *4* also covered seven regions, but the "Polar Regions" (as a separate, seventh region) were dropped with *GEO-5*.

[10] An official list of countries by region as used by the United Nations Secretariat (United Nations, 2020).

[11] Authors' note on geographic terminology: UNEP uses the term "regional" for GEO reports that cover one of its six regions. Thus, "subregional" reports are those that cover either an explicit UNEP political subregion, or some subset of countries within a UNEP region, or a natural one such as the entire Amazon River Basin. National GEO reports cover a single country, and subnational reports part of a given country, while local reports (GEO-Cities) cover a city or municipal zone. This is to make clear that while in a more general sense, geographic areas within a UNEP 'region' or 'subregion' or within a country can also be called a region, for the purposes of GEO and throughout this book, a "region" or a "regional" report is only applied to what UNEP considers to be one.

part of each of these (sub)regions are fairly fixed lists. However, there have been some variations over the years, as in the shift of Central Asia from Europe to Asia and the Pacific in *GEOs-3* to *5*, and back again for *GEO-6*. An official list of countries by region, with a breakdown by subregions as designated by UNEP, can be found in the UNEP's Environmental Data Explorer website (UNEP, 2020h).

## *Regional Aspects, Content and Treatment in GEOs-1 to 6*

It is important to recall that the first GEO employed a mostly regionally-based approach throughout. In a roughly 260-page report, *GEO-1's* Chapter 2, "Regional Perspectives" (110 pages) deals with environmental state and trends in the seven regions in considerable detail while including a brief global overview that summarizes the main regional issues. In Chapter 3, "Policy Responses and Directions" (85 pages), the seven regions were again the basis for describing existing policies related to the seven environmental themes.[12]

Thus, in *GEO-1*, the regional state and trends and policy response chapters alone make up a full 75 per cent of the volume. Even the bulk of Chapter 4, "Looking to the Future," takes a mostly regionally based approach in analysing likely trends in climate change, land use, human health and pressure on natural habitats, as did much of the "Executive Summary". As a result, *GEO-1* is the most explicitly regionally based of all six global GEO reports. However, in the case of *GEO-6,* as mentioned earlier, six stand-alone regional reports preceded the global one, thus alleviating the need for much regional content.

The structure of the *GEO-2000* report is quite similar to that of *GEO-1*, with a Chapter 1 on "Global Perspectives" and a Chapter 2 on "The State of the Environment." The latter begins with a "Global and Regional Synthesis," opening with a 30-page overview of the various themes, such as stratospheric ozone depletion and natural disasters, and showing regional trends within each theme or regions within themes. But then the chapter continues with 125 pages of analyses of the environmental situation in each of the seven regions treated in *GEO-1*, or themes within regions. Chapter 3 looks at "Policy Responses" under the same geographic headings as Chapter 2, followed by a "Future Perspectives" Chapter 4 and a new

[12] Atmosphere, biodiversity, land, water, forests (typically included in land in other GEOs), marine and coastal environments (typically included under water in others), and urban and industrial environments (typically included under land in others).

"Outlook and Recommendations" Chapter 5. In terms of geographic treatment, the seven regions analysed are the same as those in *GEO-1*.[13]

The *GEO-2000* "Future Perspectives" chapter begins with global sections on "Issues" and "Pointers for the 21st Century", but the following two-thirds of this chapter are devoted to "Alternative Policy Studies" for all regions except the Polar. However, each region only looked at one particular area of future concern and conducted an alternative policy study about that issue in relation to a global backdrop scenario. This chapter can be seen as a prototype for *GEO-3*'s Chapter 4, "Outlook: 2002–2032". The brief Chapter 5, "Outlook and Recommendations," in *GEO-2000* does not deal with the regions at all, offering a preview of the 21st century at the global level only.

Nevertheless, with lengthy individual sections for all seven regions under both "The State of the Environment" and "Policy Responses" chapters, as well as having two-thirds regional treatment in the "Future Perspectives" chapter, the balance of *GEO-2000* remains well on the regional side. Interestingly, it was between the publications of *GEO-1* and *GEO-3* that the first prominent and separately prepared regional reports began to appear: three GEOs for Small Island Developing States in 1999, the first *GEO for Latin America and the Caribbean* in 2000 (UNEP, 2000b), the *Asia-Pacific Environment Outlook-2* in 2001 (UNEP, 2001a) and the first *Africa Environment Outlook* in 2002 (UNEP, 2002a). The implications of this increased regional-level GEO reporting are analysed at the end of this section.

The *GEO-3* report, published in May 2002, is the first GEO in which the global content began to assume equal or greater prominence to regional analyses. However, the regional analyses are still fully present in two of the four major chapters and partially in a fifth minor one.

Environmental state and trends are covered in the massive Chapter 2 entitled "State of the Environment and Policy Retrospective 1972–2002" in over 270 pages. For seven regions and the eight environmental themes[14] now covered, *GEO-3* provides a retrospective analysis of regional environmental trends from 1972, the year UNEP was established, to 2002. This

[13] However, what was formerly labeled as "Europe and the Commonwealth of Independent States" was now "Europe and Central Asia." In *GEOs 3-5*, the subregion of Central Asia was considered part of the Asia and the Pacific region; only in *GEO-6* did Central Asia once again revert to the pan-European region (these changes were aligned to UNEP's official regional breakdown, which has varied).

[14] Land, Forests, Biodiversity, Freshwater, Coastal and marine areas, Atmosphere, Urban areas, and Disasters.

would be the most extensive treatment of regional state and trends until the separate *GEO-6* regional reports, as the balance was shifting more toward global state of the environment coverage, a trend that would be confirmed in *GEO-4*.

Chapter 3 on "Human Vulnerability to Environmental Change" is a rather short chapter (less than 20 pages) that mixes a global narrative with manifold examples of vulnerability at the regional and national levels. Therefore, it can be considered a mixed global and regional chapter, having significant regional content.

Chapter 4, "Outlook", looks ahead to 2032, combining qualitative (descriptive narratives) and quantitative approaches using four distinct scenarios. In doing so, *GEO-3* undertook the development of all four scenarios at the regional level, which required a complete series of regional scenario workshops and extensive interactions between the global scenarios team with the seven regional ones. This effort led to the four global scenarios having a significant regional flavour (Chapter 5.2 above on Outlook).

Despite significant regional content in the main state and trends, policy retrospective and outlook chapters, *GEO-3* saw the emergence of global chapters and sections that were now longer than individual regional analyses. Chapter 1 traces environmental governance purely at a global level, and Chapter 5's "Options for Action" also offers only a global treatment of policy actions, addressing a world of haves and have-nots faced with widening divisions, of which the environmental divide is one. While the other three chapters present a mix of global and regional analyses, the global sections precede and are longer than the individual regional sections. Thus *GEO-3* reversed or at the very least evened out the previous regional dominance apparent in *GEO-1* and *GEO-2000*.

The *GEO-4* report confirmed the trend that had begun with *GEO-3* of moving to a more global approach, to the detriment of in-depth regional analyses. For the first time, what before had been separate regional chapters are reduced to a single one in Section C, Chapter 6, "Regional Perspectives: 1987–2007," totalling 105 pages, or about 14 pages per region, out of a full *GEO-4* of 540 pages. This does not imply that the regions, chiefly through regional examples and graphics, are not covered or mentioned elsewhere in *GEO-4*. However, for the first time, global analyses had gained the upper hand in terms of print space, particularly in the state and trends chapters.

Given the prior dominance of regional analyses or at least equality between regional and global treatment, the new format was bitterly protested by

many in the regional teams, both those from the collaborating centres who worked on the regional analyses and those UNEP staff who supervised the teams. Essentially, as time-consuming and expensive efforts were still undertaken to prepare the remaining brief regional sections, it was felt by some that the end analyses did not reflect the heavy investments.

Thus, while the first five chapters of *GEO-4* include some regional examples, they remain primarily global analyses. Later Chapters 7, 8 and 10 are similar in focusing mostly at the global level, with occasional case studies or examples given at the regional and, in some cases, national level. However, the outlook Chapter 9 did undertake "...to explore different policy approaches and societal choices at global and regional levels" (UNEP, 2007b, p. 398). It includes a section, "Key Messages from the Regions," where line and bar charts dominate the brief explanatory text. One-third of the outlook chapter focuses on the regions, and at least two-thirds of the chapter has detailed regional content in trend graphs.

While in *GEO-5* the eight chapters of Part 1 cover the traditional environmental themes at the global level, Part 2 saw the revival of separate regional chapters, not for the purpose of state and trends but rather for conducting the policy analytic work region-by-region. Thus, Chapters 9 to 14 cover the six regions in 25-30 pages each, while an overall "Regional Summary" Chapter 15 provides an overview of the policy analyses in under 20 pages. The concept was for each of the regions to select up to six priority environmental themes and related international goals to be analysed. Most regions chose five themes, as shown in Table 15.1 (UNEP, 2012a, p. 401). Each of these issues/themes is then evaluated in terms of which policies had shown success in achieving the related goals.

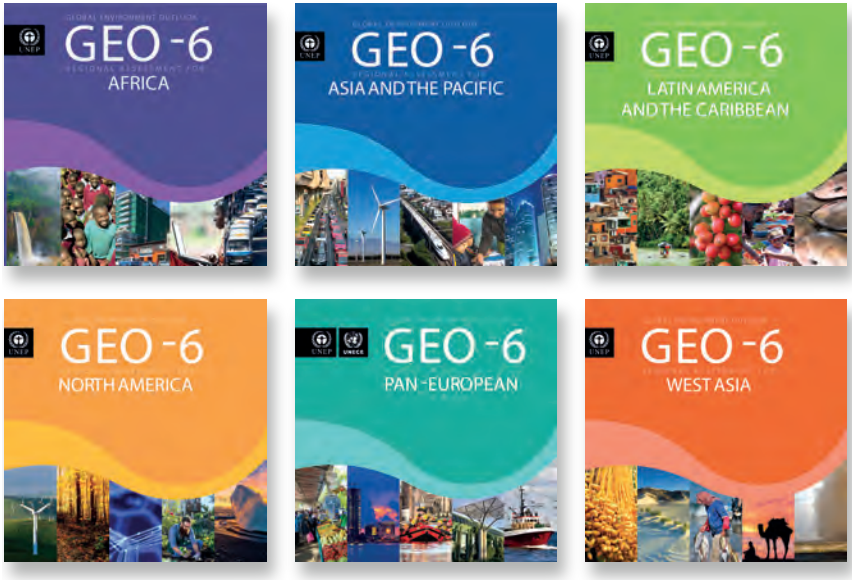
The selection of priority environmental themes and related international goals was accomplished in each case by a Regional Consultation that brought together 50-100 persons from countries of the region. Climate change, freshwater and environmental governance were selected as priorities by all six regions.[15] A fairly rigid policy appraisal methodology was meant to determine which policies offered the most promise in addressing the thematic issues. This, however, proved largely unworkable due to the time required and a lack of expertise among most participants. In the end, a less rigorous approach emerged, with each region completing a chart that documents positive policies.

[15] Four of the six regions treated governance not as a theme as such, but as a background, cross-cutting issue facilitating or restraining progress on a given priority at the regional level.

Finally, there is virtually no regional breakdown in *GEO-5*'s Chapter 16, "Scenarios and Sustainability Transformation," and, therefore, no systematic subglobal futures coverage. This was a striking departure from the scenario work in the four previous editions.

As noted in the Introduction to this section, *GEO-6* took a completely different approach, with six separate regional GEOs developed and published during 2016 (Figure 5.4.1), well before the *GEO-6* global report issued in March 2019 (UNEP, 2016a, 2016b, 2016c, 2016d, 2016e; UNEP and UNECE, 2016). The extent to which the six regional reports were utilized as sources for the global *GEO-6* report appears to have been extremely limited. This would have been a difficult undertaking in any case, given the rather different content and formats of the six individual reports. However, the original intent of the UNEP/GEO management team at the start of the process was to base the global *GEO-6* on the contents of the six regional reports.

**Figure 5.4.1. *GEO-6* Regional Reports**




The six *GEO-6* regional reports were made available in English and other language versions, plus booklets with key findings and policy messages (UNEP, 2016)

The six *GEO-6* regional reports vary in length by a factor of 2.4, the pan-European one being 376 pages in length and the West Asian report only 156 pages. The average length of the six reports is 260 pages, or about one-third the length of the global *GEO-6*.

Where one might expect to find at least some references to the six regional reports in the scene-setting Chapter 1, "Introduction and Context," of the full *GEO-6*, there are none. Only in Chapter 23 "Bottom-up Initiatives and Participatory Approaches for Outlooks", it is evident that content from the six regional reports was taken into consideration. Section 23.8 (UNEP, 2019e, p. 553) explains how "...region-specific environmental challenges and the key interventions for addressing them..." were extracted from the six regional reports and used. Section 23.10 (UNEP, 2019e, pp. 566–570) highlights and synthesizes policy interventions from the outlook chapters in the six regional assessments, including a chart of how these clustered along thematic lines and another showing how many regions prioritized each type of policy intervention. Otherwise, *GEO-6* is conspicuously missing substantive material from the earlier-produced – and costly – six regional *GEO-6* reports. However, the 190-page Part B, "Policies, Goals, Objectives and Environmental Governance," is full of regional, national and subnational policies as examples.

## *Analysis of the Global - Regional Balance in the GEO Global Reports*

It seems probable – if not 'provable' – that the increasing number of periodic and separate GEO-style regional reports[16] and subregional reports by UNEP and partners contributed to the generally declining ratio of regional to global coverage in the global GEO reports 1 to 6, particularly in the state and trends components. While *GEO-1* had the highest proportion of regional compared to global content and *GEO-3* had the greatest amount of regional content, *GEO-4* saw a sharp decline in regional coverage other than in the outlook. And while *GEO-5* had substantial regional content once again, this was almost entirely on policy analysis and neither in the state and trends nor outlook sections.

However, there is no single moment that can be identified where an explicit decision was ever taken by UNEP management affiliated with the global GEO reports to promote global content over regional. Nor was there a decision to de-emphasize the latter due to the steadily increasing proliferation of regional, subregional and other subglobal GEO reports that can

[16] Including the *Africa Environment Outlooks 1-3, Asia and Pacific Environment Outlooks 1 and 2*, the *GEO Latin America and the Caribbean Reports 1-3*, several *pan-European Environment Assessments* by the European Environment Agency and the *Environment Outlook for the Arab Region*.

be seen from the early 2000s onward (Figures 6.2.1 and 6.2.2). What can be said is that regional bodies, individual governments, donors and other stakeholders, perhaps particularly in the Africa and the Latin America and the Caribbean regions, saw the GEO process and reports as a means to popularize and raise the profile of environmental issues. At the same time, GEO efforts helped participants to standardize regional to local environmental reporting, to become part of a much broader reporting process, and to gain scientific credibility and experience for their own institutions.

In conclusion, the overall trend in global versus regional coverage in the six GEO reports evolved as follows. GEO began by focusing on a regional development context of the worldwide environmental situation and its prospects. This resonated strongly, and many regional groups applied, copied and came to own elements of the GEO process. Gradually, over the various editions, global and cross-scale issues could be given their place in GEO. This was not a fixed place, as the organization of GEO reports in terms of geographical scales, themes and policy focus was constantly experimented with and refreshed. By the time of *GEO-4*, the global-regional rebalancing had evolved towards global coverage with regional examples. But a contrary development is true for GEO's policy analysis, which developed greater and more systematic analysis in the regional development context. To some degree, this applies to the outlook element of GEO as well.

The broad capacity-building efforts that accompanied the proliferation of GEO- and GEO-style reports at subglobal levels helped to put regional bodies, countries and localities in a much better position to take ownership of their own assessment processes in the first decades of the 21st century (Chapter 7.4). In Chapter 6, the immense range of regional and other subglobal reports that stemmed from the global GEO process are described, and their origins and underlying motivations are analysed.

## 5.5 Other global GEO products

Over the nearly three decades that the global GEO report series evolved, numerous related products were conceived and developed. Quite a few of these can be considered as GEO companion products since they complemented the global editions. Many fall in the realm of process reports. A third general category can be seen as bridging or thematic spin-off products that adopted the term 'outlook' but not the essence of the GEO methodology. These complementary global products vastly expanded the terrain covered by the GEO series and brought many more people into the GEO orbit, both as authors and ultimately as readers/users. Finally, these spin-offs confirmed the broad appeal of the GEO brand by reflecting the old maxim that imitation is the sincerest form of flattery.

Chapter 7.8 provides more details on these three types of additional products, and Annex IV offers a full list of them.

Chapter

6

# Global Environmental Outlooks from Subglobal to Local: GEO's Multilevel, Multiscale Geographic Success

## 6.1 Introduction

In this chapter, the multiple geographic manifestations of the Global Environment Outlooks (GEO) are explored, along with how they related to the main ongoing global process at their time of publication, and how or if the varying levels of reporting informed each other over the years. For example, calls from regional forums such as the African Ministerial Conference on the Environment (AMCEN) in Africa (UNEP, 2002f) and the Forum of Ministers of Environment in Latin America and the Caribbean (LAC) (UNEP, 2004a) to develop comprehensive regional GEO reports helped to spread the methodology and products throughout those regions. This led to further calls for GEOs at the subregional, national and even municipal levels.

Ultimately, quantity is never a guarantee of quality and is often the opposite. This chapter does not suggest that quantity assures quality in the case of the GEO series. However, the demand to replicate the global GEO process at other geographic levels clearly indicates that something inherently interesting and useful to stakeholders was emanating from these various processes. The end consumers of these subglobal reports ranged from the Governing Body of the United Nations Environment Programme (UNEP) to regional conventions[1] and many national authorities, and as well to local councils in cities as diverse as Buenos Aires, Argentina; Kigali, Rwanda; Shenzhen, China; and Tbilisi, Georgia; and their citizens. This chapter also argues that the amount of effort required to carry out the complex and introspective process of integrated environmental assessment (IEA) means that the local participants saw some value in illuminating their environmental state and trends, perhaps a positive occurrence in its own right for many places on our besieged planet.

Given the vast proliferation of GEO processes implemented in the LAC region, from regional to local scales, this chapter also highlights the outputs of LAC as a regional case study while not ignoring other regions. This includes an analysis of what made the LAC region so successful in applying GEO processes and producing valuable outputs.

Table 6.1.1 below lists some of the major GEO regional and subregional reporting processes and dates of their publication, along with those of the six global GEO reports. These are also illustrated by two timelines (Figures 6.2.1 and 6.2.2) on the following pages of this chapter. A full catalogue of subglobal GEOs is included in Annex IV.

**Table 6.1.1. A sample of major GEO reports – global, regional and subregional**

| Mandating session of UNEP Governing Council (GC) or United Nations Environment Assembly (UNEA) | Year of launch | Examples of reports published |
|---|---|---|
| GC-19 | 1997 | *GEO-1* (UNEP, 1997c); Asia and the Pacific Environment Outlook (UNEP, 1997a) |

[1] To give but two examples, the United Nations Framework Convention on the Protection and Sustainable Development of the Carpathians, in the case of the *Carpathians Environment Outlook* (UNEP, 2007a) and MERCOSUR in the case of the *GEO MERCOSUR: Integracion, Comercio y Ambiente en el MERCOSUR* (UNEP et al., 2008).

| | | |
|---|---|---|
| GC-20 | 1999 | *GEO-2000* (UNEP, 1999g); three regional Small Island Developing States (SIDS) Outlooks (United Nations, 1999) |
| | 2000 | *GEO Latin America and the Caribbean -1* (UNEP, 2000b) |
| GC-21 | 2001 | *Asia-Pacific Environment Outlook -2* (UNEP, 2001a) |
| | 2002 | *GEO-3* (UNEP, 2002e); *Africa Environment Outlook -1* (UNEP and AMCEN, 2002); *North America's Environment: A Thirty-Year State of the Environment and Policy Retrospective* (UNEP, 2002g); *Caucasus Environment Outlook* (UNEP, 2002c) |
| GC-22 | 2003 | *GEO Latin America and the Caribbean 2003* (UNEP and DEWA, 2003); *GEO Andes* (UNEP and Andean Community, 2003) |
| | 2004 | |
| GC-23 | 2005 | |
| | 2006 | *Africa Environment Outlook -2* (UNEP, 2006a) |
| GC-24 | 2007 | *GEO-4* (UNEP, 2007b); *Carpathians Environment Outlook* (UNEP, 2007a) |
| | 2008 | |
| GC-25 | 2009 | *South Asia Environment Outlook 2009* (UNEP, SAARC, et al., 2009); *GEO Amazonia* (UNEP and ACTO, 2009) |
| | 2010 | *GEO LAC-3* (UNEP, 2010a); *Environment Outlook for the Arab Region* (UNEP et al., 2010); *North American Environmental Outlook to 2030* (CEC, 2010) |
| GC-26 | 2011 | |
| | 2012 | *GEO-5* (UNEP, 2012a) |
| GC-27 | 2013 | *Africa Environment Outlook -3* (UNEP, 2013a) |
| UNEA-1 | 2014 | *GEO Small Island Developing States Outlook* (global) (UNEP, 2014a) |
| | 2015 | |
| UNEA-2 | 2016 | *Global Gender and Environment Outlook* (UNEP, 2016f);<br>*Six GEO-6* regional reports (UNEP, 2016a, 2016b, 2016c, 2016d, 2016e; UNEP and UNECE, 2016) |
| UNEA-3 | 2017 | |
| UNEA-4 | 2019 | *GEO-6* (global) (UNEP, 2019e) |

## *The Regionalization of GEO*

Before the year 2000, there were only limited signs of the regionalization of the GEO reporting process to come, despite a few notable exceptions,[2] such as the first – although very brief – *Asia and the Pacific Environment Outlook* in 1997 (UNEP, 1997a) and three GEOs for Small Island Developing States (SIDS) in 1999 (United Nations, 1999). By contrast, the first GEO for the LAC region appeared in 2000 (UNEP, 2000b) and the first *Africa Environment Outlook (AEO-1)* report came in 2002 (UNEP and AMCEN, 2002).

The roots of GEO's increasing regionalization and subglobal reporting stem from a particular UNEP Governing Council (GC) decision (UNEP GC, 2003). UNEP's GC-22 took place in February 2003; its Decision 22/1 had much to say about GEO reporting at the global level (Annex I). But Decision 22/1 included another request that was to have a significant impact on the future series of reports, which was that UNEP should support "subglobal integrated environmental assessment processes, including the production of regional, subregional and national environment outlook reports, in partnership with relevant authorities and institutions." This mandate to take the GEO process to subglobal levels reflected GEO's success at the global level. It led to dozens of reporting processes and products at other geographic levels (Figures 6.2.1 and 6.2.2 below).[3] However, over the following years, the request would also have major implications for the global GEO process and the contents of those reports.

Among other impacts, this mandate eventually led to diminishing regional content in the global GEOs, a trend that persisted through the *GEO-5* edition until the separate *GEO-6* regional reports appeared in 2016 (Chapter 5.4 for details).

[2] The earliest in fact may have been a 1994 SoE report for Southern Africa, which included an outlook chapter and thus appears to be a proto-GEO subregional report (Booth et al., 1994).

[3] In fact, in addition to the regional environment outlooks and GEO SIDS reports mentioned above, several Latin American countries had forged ahead with GEO reports prior to 2003: Barbados, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Panama and Peru, among others.

## 6.2 Regional and subregional GEO reports and their origins

Despite the imprimatur of UNEP's GC Decision 22/1, most of the regional GEO reporting processes would not have gotten underway without a strong regional push in one form or another. Regional support for such processes came most notably through resolutions from prominent regional bodies, particularly the AMCEN and the LAC Forum of Ministers, and regional convention secretariats that expressed admiration for and saw value in the global process and wanted to replicate GEO within their regions.

### *Africa*

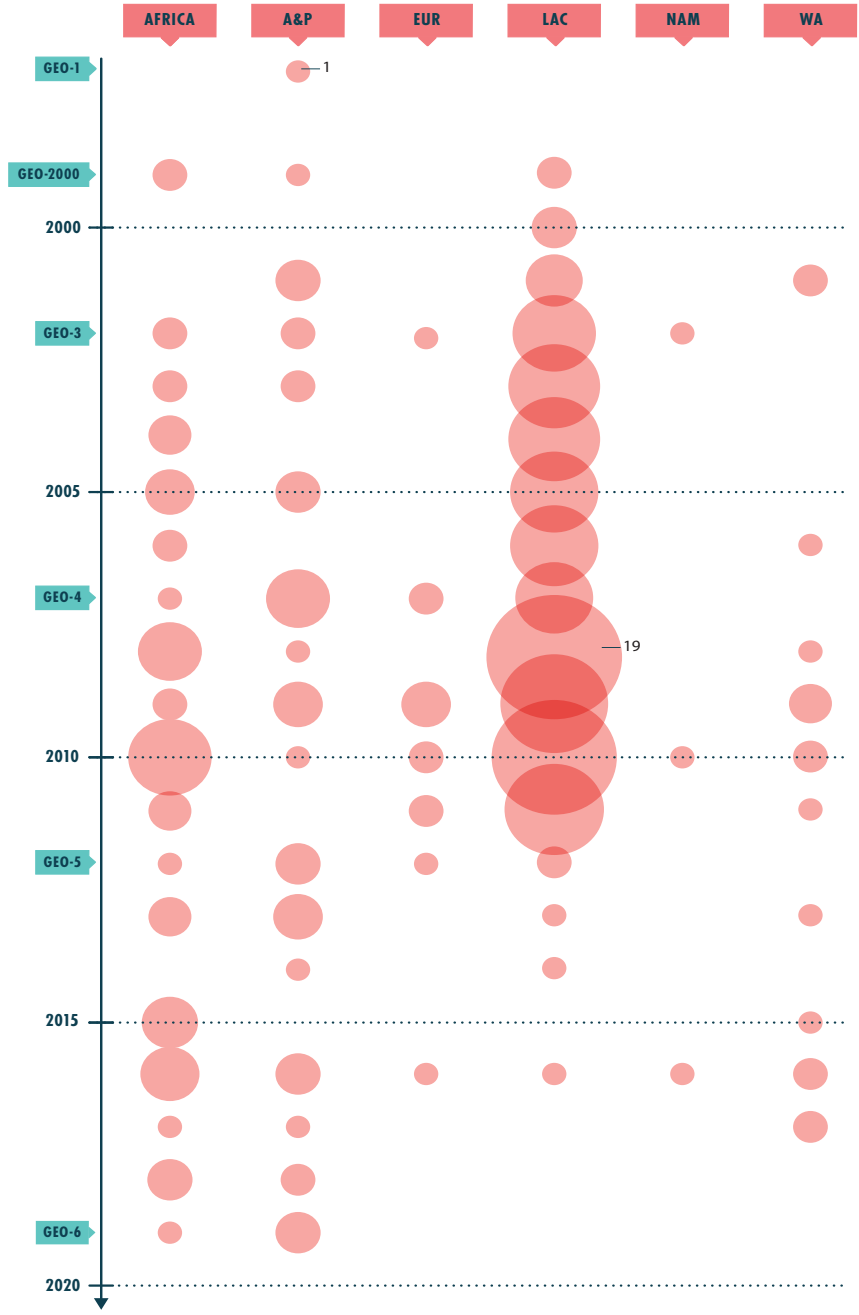
A former head of the GEO team at UNEP Headquarters states that:

> ...certainly there was always in AMCEN a decision on GEO-related processes and the need to build capacity in African countries...for AMCEN, there were numerous decisions of ministers related to GEO and to the Africa Environment Outlook. And the first GEO was used to develop the environmental policy...which was adopted by the African Union in 2002.

The Eighth Session of AMCEN, held in Abuja, Nigeria, in April 2000, approved AMCEN's medium-term programme, a key element of which was the production of the first AEO report (UNEP and AMCEN, 2002). This decision was affirmed at the AMCEN Inter-sessional Committee, which met in Malmö, Sweden, in May 2000. In response, the AMCEN Secretariat and UNEP Regional Office for Africa, in collaboration with the Division of Early Warning and Assessment (DEWA), embarked on producing the first AEO report to be published in 2002. As recalled by one of the collaborating centre participants involved in the GEO process from its early days,

> it [was] a ministerial request...to have this kind of assessment because they wanted to have a regional view of the environment...in Africa. The *AEO-3*, for example, [was requested] by the Ministers of Environment and Health in their joint meeting...they asked for an AEO assessment for environment and health...an important issue at the regional level.

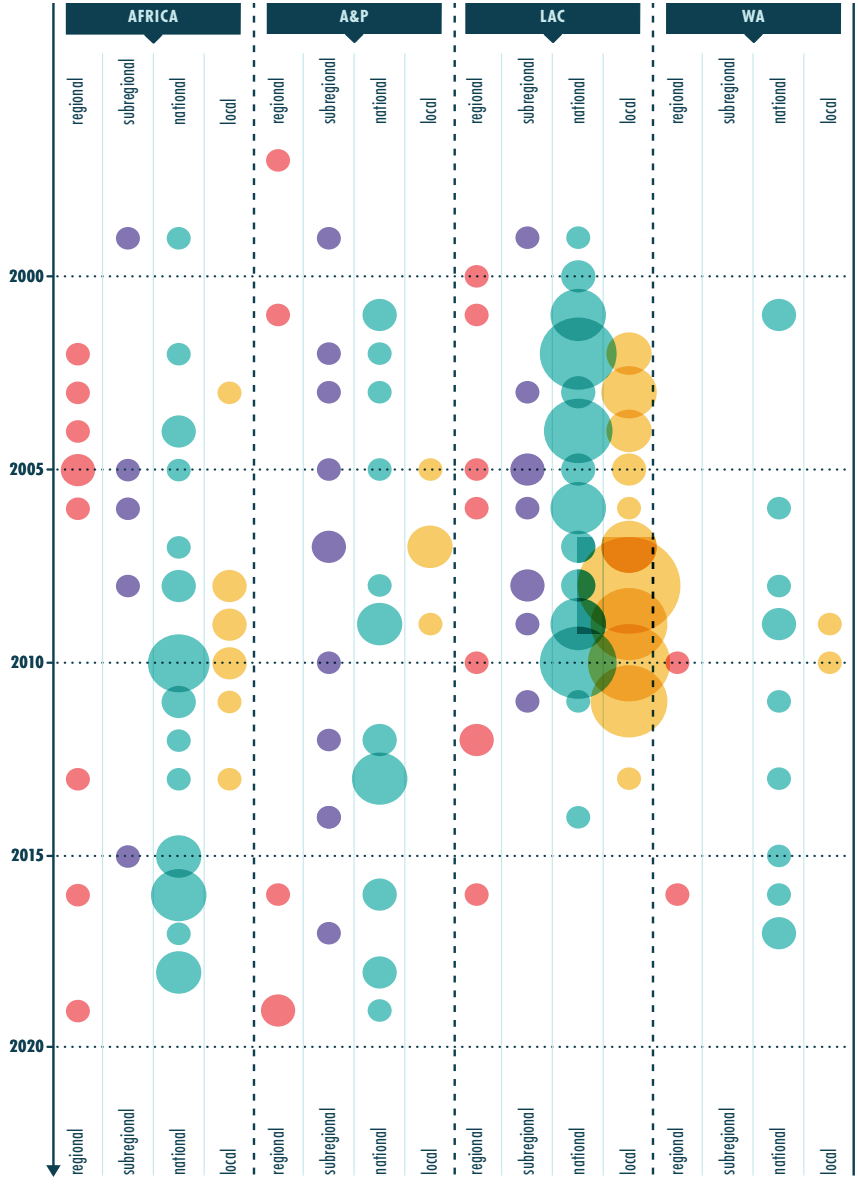
**Figure 6.2.1. Number of GEO reports by region through time**




*The greatest number of GEO-style assessments was produced in the Latin America and Caribbean region, until the early 2010s.*

Note to Figure 6.2.1: Excluding language versions, summaries and assessment reports with an unknown year of publication. National reports have been counted in the UNEP region to which the country was grouped at the time of publication

**Figure 6.2.2. Number of subglobal GEO reports by region and geographic level**




*National-level reports make up the vast majority of all GEO-style reports for the four regions shown here*

Note to Figure 6.2.2: Excluding language versions, summaries and assessment reports with an unknown year of publication. National reports have been counted in the UNEP region to which the country was grouped at the time of publication. Europe and North America are not included. For totals per scale level see Figure 1.5.1 or A.IV.1.

In October 2001, a special session of AMCEN held at UNEP Headquarters in Nairobi adopted the AEO process as an ongoing umbrella programme for regional IEA and reporting. The Ministers also endorsed the IEA methodologies and tools as the most effective approach for assessing and reporting on the state of the environment at regional, subregional and national levels. These commitments were reaffirmed by the AMCEN Inter-sessional Committee meeting held at UNEP Headquarters in January 2002. Then, in May 2002, the AMCEN Inter-Agency Technical Committee reviewed and approved the contents of the draft *AEO-1* report for publication. The same body also assumed ownership of the *AEO-1* report as an output of the AMCEN Medium-Term Programme.

The production of the *AEO-1* report was the first attempt to generate a comprehensive analytical assessment of the state of the environment covering the African continent. Therefore, it was a major milestone in harmonizing and disseminating integrated environmental and socioeconomic data and information. Launched at the 9th AMCEN Session held in Kampala, Uganda, on 4-5 July 2002, the *AEO-1* received a broad series of endorsements from the assembled ministers of environment.

In terms of process, the production of the first AEO report relied heavily on a coordinated network of regional collaborating centres that UNEP worked with to develop the GEO report series. The substantive content of the *AEO-1* report was generated using the analytical framework that is the cornerstone of the GEO reports. The collaborating centres, representing the six subregions of Africa, helped ensure a broad participatory and consultative process that also built consensus around the major environmental issues of concern to the Africa region. Inputs for the *AEO-1* report and ancillary products came from over 250 individuals, experts and representatives of government institutions, United Nations (UN) agencies, regional and international organizations and subregional intergovernmental groupings. Subregional consultations were held in the six subregions at various stages of the production process to ensure that the contents of the draft report received the widest critical review, refinement and endorsement. Capacity-building for the collaborating centres and their respective national institutions and thematic experts was a central component of the AEO process. Over 150 experts were trained in IEA, scenario development, policy analysis and other subjects.

The *AEO-1* process also generated an ancillary report (UNEP and AMCEN, 2002, pp. 265–302) containing 12 case studies on environmental change, human vulnerability and security. The case studies focus on many of the issues highlighted in the *AEO-1* report by providing concrete examples of the impact of environmental change on human vulnerability and the ways people respond to these impacts. The case studies illustrate the particular nature of vulnerability in the African context and the specificity of lessons and recommendations that they provide.

The second *Africa Environment Outlook (AEO-2)* (UNEP, 2006a) report was launched in Brazzaville, Republic of the Congo, in May 2006 under the theme "Our environment, our wealth," The *AEO-2* report highlighted:

- A synthesis of the opportunities provided by Africa's natural resource base for sustainable development and improving livelihoods;
- Emerging challenges that require specific policy attention; and
- Forward-looking strategic management of existing environmental assets for development that would also signal a departure from preoccupation with recounting losses arising from environmental degradation.

In 2008, a joint meeting of the African Ministers of Health and Environment was held in Libreville, Gabon. During this meeting, the role of the AEO as a decision support tool was reaffirmed. A follow-up joint meeting of the ministers further decided that an *AEO-3* report should focus on health and environment issues in Africa. Once published in 2013, the *AEO-3* report discussed the linkages between these two themes and the impacts on peoples' livelihoods in the region (UNEP, 2013a).

## *Latin America and the Caribbean*

According to a former UNEP LAC Regional Coordinator, in its role as the Secretariat to the LAC Forum of Ministers for many decades, UNEP had the credibility to promulgate the IEA/GEO methodology at the regional, subregional and country levels. Due to the region's high interest in integrated environmental assessments, the 12th Meeting of the LAC Forum of Ministers, held in Barbados in 2000 (UNEP, 2000a), decided to:

> Express appreciation for the UNEP environmental assessment (GEO) process which has been implemented at the global, regional and national levels, resulting in assessments and the development of a regional environmental vision;

> Request UNEP to continue providing leadership in LAC for the preparation of IEAs at the regional level, and providing support to countries of the region in preparing national assessments within the framework of the GEO process and methodology;
>
> Request UNEP to continue development of sectoral and targeted assessments within the GEO methodology, especially in the assessment of urban areas (GEO-Cities) and the other areas of importance for the Forum of Ministers and the Strategic Action Plan 2002-2005;
>
> Strengthen the GEO process for youth and provide support to countries wishing to implement the methodology at the national level; and
>
> Urge regional organizations and partners to provide support, data and information so as to enable UNEP to continue and strengthen the GEO process and provide associated data and information products at the global, regional and national levels.

The report of the 16th Meeting of the LAC Forum of Ministers of Environment, held in 2008 in Santo Domingo, Dominican Republic, describes typical ways in which the GEO reports were being used as trusted references for regional and subregional analyses on the state of the environment and priority issues for sustainable development.

The LAC region was not only prolific in terms of the series of regional reports produced – *GEO LAC-1* or *GEO-LAC 2000* (UNEP, 2000b), in line with the global *GEO-2000* (UNEP, 1999g); *GEO LAC-2* in 2003 (UNEP and DEWA, 2003), and *GEO LAC-3* in 2010 (UNEP, 2010a) – but also managed to stimulate and produce several subregional reports. These included the *GEO Amazonia* in 2009 (UNEP and ACTO, 2009), the *GEO Andes* in 2003 (UNEP and Andean Community, 2003), two *Caribbean Environment Outlooks* for 1999 and 2005 (UNEP, 1999a, 2005b), the *GEO for Central America* in 2005 (UNEP and CCAD, 2005), and the *GEO Mercosur* countries[4] of 2008 (UNEP et al., 2008). This prolific report production and the associated political statements point to a sweeping endorsement of the GEO process in LAC (section 6.5 offers more detailed information).

The resulting processes and products were less uniform for the other UNEP regions, if still substantial. Each of UNEP's other four regions – Asia and the Pacific, Europe, North America and West Asia – can be seen as unique cases where regional reporting is concerned and thus worthy of being examined individually.

[4] MERCOSUR is the Southern Common Market, composed of five full members (Argentina, Brazil, Paraguay, Uruguay and Venezuela (the latter suspended as of 2020)), five associate members (Bolivia, Chile, Colombia, Ecuador and Peru) and two observers (Mexico and New Zealand).

## *Asia and the Pacific*

For Asia and the Pacific, the largest region and one of the most diverse in terms of countries, cultures and languages, region-wide GEO reports were published in 1997 and 2001 (UNEP, 1997a, 2001a). UNEP prepared the first of these with several prominent regional partners and, though it only ran to 62 pages, it represents the first regional GEO report to be developed. Just four years later, the second *Asia-Pacific Environment Outlook* was issued and went to significantly greater depth in examining regional environmental challenges.[5] For the latter, the same regional partners were involved, plus a growing list of collaborating centres[6] whose experts provided greater scientific weight to the document. Both of these Asia-Pacific reports followed the framework used in the global GEOs.

Aside from these two regional reports, a number of subregional ones were published. The first of these, in 2007, covered the five countries of Central Asia[7] and was entitled *A Sub-regional Integrated Environment Assessment* (IFAS et al., 2007). It was executed by the Scientific Information Center based in Ashgabat, Turkmenistan,[8] named as UNEP's GEO collaborating centre for the subregion in 2000. While this IEA for Central Asia does contain a foreword by UNEP's Executive Director at the time, Achim Steiner, it exhibits few elements of a GEO report and scant use of the DPSIR (Drivers-Pressures-State-Impacts-Responses) approach. But it is clearly intended as a GEO report and remains the only one done for this subregion.

The *Greater Mekong Environment Outlook*, the other 2007 subregional report, covers the five countries of the Greater Mekong River basin plus one province of China[9] (UNEP, 2007d). The institutional circumstances of its development are not clear, but it appears to have had the support of UNEP and at least loosely follows the GEO methodology. Certain environmental themes – land, water and biodiversity – are assessed through the DPSIR approach, and there is a Part V on "Outlook and Recommendations."

[5] Interestingly, in initiating the GEO process at the regional level, UNEP was to some extent supplanting the role of the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP), which had a mandate to produce SoE reports for the region on a five-yearly basis. While cooperation did occur on a joint Asian Development Bank/ UN ESCAP/UNEP *Green Growth, Resources and Resilience* report in 2012 (UN ESCAP et al., 2012), this proved to be an exception, rather than the rule.

[6] See Acknowledgements in page 5 of the report for the full list of partners and centers.

[7] Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

[8] The Scientific Information Center operated under the aegis of the Interstate Sustainable Development Commission, a Central Asian regional body of post-Soviet cooperation for the Aral Sea.

[9] Cambodia, Laos, Myanmar, Thailand and Vietnam, and Yunnan Province of China.

Two editions of a *South Asia Environment Outlook*, in 2009 and 2014 (UNEP et al., 2014; UNEP, SAARC, et al., 2009), were also produced under UNEP's leadership and the auspices of the South Asia Association for Regional Cooperation[10] with Development Alternatives, an Indian-based environmental non-governmental organization, playing a major role.

The *Pacific Islands Environment Outlook* of 1999 was a forerunner in subregional reporting that covered 22 countries and territories of the South Pacific (UNEP, 1999h). This report was part of a broader UNEP project to produce GEO-style assessment reports for three oceanic subregions of small islands (SIDS), with financial assistance from the European Community.[11] The *Pacific Islands Environment Outlook* reporting process was coordinated by the South Pacific Regional Environment Programme (SPREP),[12] UNEP's GEO collaborating centre for the subregion, in parallel with the *GEO-2000* report.

The *Western Indian Ocean Environment Outlook* of 1999 (UNEP, 1999j) was conducted as part of the same project and under similar conditions, with the Indian Ocean Commission playing a role similar to SPREP's for the *Pacific Islands Environment Outlook* report. In this case, only four countries (Comoros Islands, Madagascar, Mauritius and Seychelles) were covered.[13] The 1999 *Caribbean Environment Outlook* was the third one of this project[14] (UNEP, 1999a).

It is clear that the three subregional SIDS reports were intended both to complement and feed into the global *GEO-2000* report. The preface of the *Western Indian Ocean Environment Outlook* states (UNEP, 1999j, p. 6):

> This participatory process is crucial in ensuring that the assessment involves stakeholders and experts from all over the world and from every discipline that relates to environment and development. As with [the global] GEO, the Caribbean, Western Indian Ocean and Pacific Islands environment outlooks aim to incorporate regional views and perspectives and to build consensus on priority issues and actions through dialogue among policymakers and scientists at the regional and global levels.

[10] The South Asia Association for Regional Cooperation includes Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka.

[11] Through the European Commission Directorate General for Development (DG VIII).

[12] Later, the Secretariat for the Pacific Regional Environment Programme.

[13] Given that these countries are included in Africa by UNEP under its regional breakdown, this report has to be considered as an African (not Asia and the Pacific) subregional product.

[14] These three SIDS reports were launched during a side event at the United Nations General Assembly Special Session on Small Island Developing States on 28 September 1999.

Also, as is made clear in the preface of the *Pacific Islands Environment Outlook*, these reports were each meant to be the first in a series, and there was follow-up in the form of later SIDS reports. These covered the Atlantic and Indian Oceans, the Pacific Ocean, and the Caribbean in 2005. The initiative then took the form of a *Pacific Environment and Climate Change Outlook* (ECCO), again prepared by SPREP, in 2012 (SPREP et al., 2012). Most recently, the comprehensive global report *GEO for Small Island Developing States* was completed in 2014 (UNEP, 2014a).

## *Europe*

GEO-related work in the pan-European region took place in a very different – indeed unique – institutional setting, compared with all other regions. Many western European governments were strong advocates of the GEO process and products from the beginning and invested significant resources from the mid-1990s in the reports and other process elements. These elements included capacity-building activities in developing and transitional countries (the formerly socialist countries of the Caucasus, Central Asia and Eastern Europe). Also, the environmental governance entities of the European Commission, particularly the Directorate-General Environment and the European Environment Agency (EEA) established in 1994, held a mandate similar to UNEP's in terms of reporting on the state and trends of the regional environment. The EEA's regular reporting, through the series *Europe's environment* (EEA, 1995b, 1998, 2003, 2007, 2011b, 2015a) obviated any real need for UNEP to be engaged in regional reporting in Europe. In fact, UNEP's European office staff worked closely with the EEA on their related processes. Another pan-European player was the United Nations Economic Commission for Europe's Working Group on Environmental Monitoring and Assessment, which brings together the more than 50 countries of the pan-European region to address issues such as environmental reporting, data and indicators. The Working Group also helped countries of Central and Eastern Europe and the former Soviet Union improve their related environmental monitoring and assessment activities over the years. The EEA and UNEP were strong participants in the Working Group on Environmental Monitoring and Assessment, which became a common forum to discuss mutual assessment activities and develop synergies.

Nevertheless, UNEP and its partners did produce two subregional GEO reports within Europe, which stemmed from government requests to develop GEO-style reports for particular subregions, these being the Caucasus

and later, the Carpathians. The *Caucasus Environment Outlook* of 2002 originated from a proposal of the Georgian Minister of Environment and Natural Resources Protection at the time, Dr. Nino Chkhobadze (UNEP, 2002c). This led to conducting a GEO-like process covering the four Caucasus countries: Armenia, Azerbaijan and Georgia of the South Caucasus, and a small portion of the Russian Federation in the North Caucasus. In the case of the Carpathians region, a request for an integrative GEO report came from the Slovak Environment Minister at the time, Dr. László Miklós, in October 2004. This ultimately led to a complex process involving the seven countries of the Carpathians subregion[15] over a three-year period and the eventual launch of the *Carpathians Environment Outlook* at the sixth Environment for Europe Ministerial Conference in Belgrade, Serbia, in October 2007 (UNEP, 2007a).

Both of these subregional processes proved to be arduous undertakings due to a number of reasons. First, in both the Carpathians and Caucasus countries, geopolitical and historical factors colour any discussion of transboundary issues that remain quite sensitive in certain cases, including environmental issues. Second, the nature of these reporting processes was such that each government needed to accept the concept of a neutral, transboundary report on the environment and designate appropriate national experts to participate and assist in preparing the document, implying extensive correspondence and numerous face-to-face meetings. Third, collecting and, to the extent possible, harmonizing data sets from multiple countries, merging these into a seamless database, and sharing observations on the state and trends of the environment created enormous challenges, particularly for countries where open sharing of data – even internally – was not a tradition.

Nevertheless, these various challenges were met and more or less successfully overcome, but with certain disputes occasionally arising in meetings of authors and government representatives to the processes. The fact that UNEP was seen as a neutral coordinator of the processes probably helped them along. In both cases, a UNEP-designated Global Resource Information Database (GRID) centre – Tbilisi in the Caucasus and Warsaw in the Carpathians – was engaged to collect and integrate a wide range of national data sets, allowing for the analyses to have factual/statistical underpinnings.

The concept of the two European subregional reports was to provide a geographically integrated picture of environmental state and trends across

[15] The Czech Republic, Hungary, Poland, Romania, Serbia, the Slovak Republic and Ukraine.

the entire area in question. This required filtering out national boundaries and blending as much as possible environmental data and other observations across such boundaries to emerge with a more holistic view of the Carpathians and Caucasus subregions. These two reports ran to over 230 pages for the Carpathians and 100 pages for the Caucasus. They applied the classic GEO format of covering the various elements of DPSIR in successive chapters, followed by an outlook chapter and policy options. Both were envisioned as the first in a potential series, but neither has yet been replicated, although there were discussions on preparing a Carpathians Environment Outlook-2 report.

But the recounting of subregional GEO reporting in Europe would not be complete without one story of failure, which was UNEP's overreach in trying to develop a similar report to the two above for the Western Balkans region in 2008-9. Tentatively titled *Dinaric Arc and Balkans Environment Outlook*, this reporting process never went beyond the exploratory stage with countries of that subregion[16] due to a low level of interest from the countries and a lack of potential financing from UNEP. Also, the EEA itself was investing significant resources in environmental reporting by the Western Balkan countries, raising fears of a parallel process in UNEP's initiative. This non-success story serves to underline the vital role played by those countries themselves in petitioning for or at least making a commitment to the concept of GEO reporting.

## *North America*

For UNEP, the North American region[17] consists of two developed countries, Canada and the USA, and as such was one that saw little need or reason to produce integrative regional or separate national GEO reports. Nevertheless, two regional reports were completed, *North America's Environment: A Thirty-year State of the Environment and Policy Retrospective* in 2002 (UNEP, 2002g) and *North American Environmental Outlook to 2030* in 2010 (CEC, 2010). A third regional report was also published as part of the *GEO-6* process in 2016 (Chapter 4.7), but this was a UNEP Headquarters-led effort in which all regions participated, as opposed to a bottom-up initiative from within North America or decision of a regional body. Their years

[16] Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Former Yugoslav Republic of Macedonia (FYROM; now the Republic of North Macedonia), Greece, Montenegro and Serbia.

[17] In *GEO-2000* (UNEP, 1999g), Mexico was also treated under North America for selected sections.

of publication – 2002, 2010 and 2016 – offer a fairly regular examination of regional conditions and trends, given these reports cover the same environmental issues over time and use the DPSIR approach.

The story of how the initial regional report came to be published in 2002 is illustrative of the special nature of the North American region. The main substance of *North America's Environment: A Thirty-year State of the Environment and Policy Retrospective* stemmed from an earlier regional report[18] prepared by the Commission on Environmental Cooperation of the North American Agreement on Environmental Cooperation (CEC, 2001). Material from this report not only formed the basis of UNEP's 2002 regional one but was also used directly in the global *GEO-3* report (UNEP, 2002e). This offered an explicit linkage between a regional product and the global one. Two other major contributors to the 2002 North American regional report were the International Institute for Sustainable Development in Canada and the World Resources Institute in the USA, which functioned as collaborating centres for GEO at the global level.

The 2010 *North American Environmental Outlook to 2030* report was purely a product of the Commission on Environmental Cooperation of the North American Agreement on Environmental Cooperation. However, UNEP's *GEO-4* report is mentioned (UNEP, 2007b, p. 8)[19] as one source reviewed for information in the document, along with other global assessment reports (*IPCC-4, the Millennium Ecosystem Assessment,* et al.), and thus offers an interesting example of reverse linkage from a global GEO to a regional one. And while neither the 2002 nor the 2010 North American reports include a GEO-style outlook section with scenarios of future development, they both employed the IEA DPSIR methodology.

## *West Asia*

For West Asia, the GEO process contributed greatly to the region's capacity development in environmental assessment and state of the environment (SoE) reporting, and it also had a clear bearing on environmental decision-making processes in the region. However, the regional process has always been complex and is challenged by the geographic breakdown of UNEP's GEO subregions there, compared with the geography of policy-

[18] *The North American Mosaic: a State of the Environment Report*. It should be noted that all environmental work of the Commission on Environmental Cooperation also includes Mexico.

[19] In the Executive Summary / Reader's Guide, p. 8.

setting in the region. UNEP's West Asia, with 12 countries, can be seen as a subset of the wider Arab region, which encompasses 22 countries, 10 of which are in Africa. While there is no ministerial policy forum for West Asia, there is a forum for the broader Arab region. Therefore, the regional policy dialogue takes place, and decision-making is always made at the Arab regional level, rather than for West Asia alone. The challenge of UNEP's GEO subregions is compounded because the 10 Arab countries in Africa are split among four GEO subregions.[20] This breakdown has had major implications for GEO work, as regional reports are normally prepared in relation to the wider Arab region rather than one or more GEO subregions. It is also the case in terms of related network development, capacity building and data and indicators work related to the reporting.

The GEO process began in the West Asian/Arab region in 1995–1996 through missions of international consultants funded by UNEP to visit the region. The first visit was in 1995 to the Centre for Environment and Development for the Arab Region and Europe (CEDARE) in Cairo, Egypt, which in its own right has a regional mandate covering the Arab region. UNEP then commissioned two consultants, one to cover Yemen and the five Mashriq countries (as defined by UNEP; these are Iraq, Jordan, Lebanon, Palestine and Syria) and one for the six Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates). The consultants' assignment was to map and assess existing institutions as candidates to become GEO collaborating centres. The processes concluded with the selection of two centres from West Asia – the Arabian Gulf University in Bahrain and the Arab Center for the Studies of Arid Zones and Dry Lands in Syria – and CEDARE in North Africa.

The GEO process influenced the preparation of regional reports for the Arab region to the Earth Summits, particularly in 2002 when UNEP supported the League of Arab States in preparing their report in collaboration with the United Nations Economic and Social Commission for Western Asia (UN ESCWA) and the subsequent Earth Summit report in 2012 (Rio+20) (UNGA, 2012). The GEO process also affected the preparation of the regional Millennium Development Goals' reports led by UN ESCWA for the League of Arab States (UN ESCWA and LAS, 2013), with some staff from UNEP's Regional Office for West Asia contributing to these reports.

[20] Algeria, Egypt, Libya, Morocco, Sudan (plus South Sudan since 2011) and Tunisia constitute the UNEP GEO subregion of North Africa; Djibouti and Somalia are part of East Africa; while Mauritania belongs to West Africa. Comoros is in the West Indian Ocean subregion.

The GEO process also led to the preparation of key regional policy documents, the best known being the *Environment Outlook for the Arab Region* (UNEP et al., 2010). Based on a ministerial request, the report was published in 2010. It is still used for its policy options and as a key reference on the state of the environment in the region. It covered all 22 countries of the Arab region. Ministerial decisions in 2013 and 2014 called for preparing a second environment outlook for the Arab Region, but this has not yet materialized.

The GEO process in the West Asian/Arab region led to other related activities, such as a regional data working group under the aegis of the League of Arab States and technical lead of UNEP and UN ESCWA. Two subgroups on environmental information networking and indicators helped to support the GEO process. UNEP also developed a regional data portal for West Asia, populated with some regional data sets mostly from international organizations, but also with some regional and national data coming from the region.

## *The special case of the GEO-6 regional assessments*

As noted in Chapter 5.4, *GEO-6* took a completely different approach, with six stand-alone regional GEOs developed and published in 2016 (UNEP, 2016a, 2016b, 2016c, 2016d, 2016e; UNEP and UNECE, 2016), well before the *GEO-6* global report issued in 2019. Taking the single case of the pan-European assessment, the state and trends Chapter 2 is by far the dominant component (102 pages out of a total of 180, not including supplementary material and other annexes), in which eight environmental themes were analysed, similar to the number dealt with in the *GEO-3* report. Not only were state and trends covered in Chapter 2, but policy responses under each of the eight themes as well.

It should be noted that while there was no separate regional report for the Polar areas, the North American regional report included as one of its nine state and trends sections "A rapidly changing Arctic" (UNEP, 2016d, p. 15), that looked at issues such as sea ice loss, thawing permafrost and the effects of opening up Arctic seaways. The pan-European regional assessment mentions Europe's Arctic regions (UNEP and UNECE, 2016, pp. 88, 125–127), particularly in the context of climate change. It is not clear why the Polar regions, which had near-equivalent coverage to the other six regions in GEOs-1 to 4, were given no explicit profile in *GEO-5* (UNEP, 2012a) and limited coverage, mostly under North America, in *GEO-6* (UNEP, 2019e).

The extent to which the six regional reports were utilized as sources for the global *GEO-6* report seems to be very limited. According to the *GEO-6* mid-term evaluation report, "there was a perception that the [six regional reports] should have been capitalized upon to a greater extent, given the time and money allocated" (UNEP, 2018b, p. 38 para. 88) and that "...their contribution to the global assessment had been minimal" (UNEP, 2018b, p. 46 para. 130). Part of the reason for this may have been due to the "...general agreement that the regional assessments [were] very different, and that there [was] no consistency across the six." The evaluators considered the usefulness of the six regional assessments as uncertain, with "...concern expressed that the scientific content of the regional assessments was not as well reviewed as [had] been the case for the global exercise." This seems to indicate that the original project design where the six costly regional assessments were meant to feed into and support the global *GEO-6* report was either consciously shelved or tacitly recognized by the GEO core team as not doable.

## 6.3 National GEO-style reports

All across the globe, between 1999 and 2020, a total of approximately 100 national GEO or similar reports were produced using all or part of the methodology developed for global GEOs (Annex IV). While this chapter does not have space to go into a detailed analysis of all or even many of these reports, certain overall trends can be perceived.

Several GEO-like reports were done by African countries, mostly in the last decade, including Zambia (ECZ, 2008b), Zimbabwe (MOENRM, 2010), Kenya (NEMA and UNDP, 2011) and most recently Rwanda (REMA, 2015). Typically, these reports used the DPSIR methodology and included an outlook chapter, so even where they do not reference UNEP directly, the GEO influence is clear because they are titled "Environment Outlook" or "SoE and Outlook." In several cases, UNEP appears as a co-publisher, and often UNEP staff are credited with having supported or backstopped related processes. Two national SoE reports for Uganda, from 2014 and 2016/17 (NEMA and UNDP, 2016, 2017), appear to have been inspired by GEO, since they cite and apply the DPSIR methodology. Curiously, only the second of these mentions UNEP support, while the first refers to the United Nations Development Programme.

For the mainland countries of the Asia and the Pacific region, nearly 20 national environment-related reports were prepared, most with direct support from

UNEP, from 2001 to 2020. About half of these were published in 2001 or soon after – seven with support from the Norwegian Agency for Development Cooperation – and followed the more traditional SoE approach. In contrast, most of those prepared from the mid-2000s onward used the 'Environment Outlook' label instead of SoE. Many in the early 2000s series made limited use of the DPSIR approach in their analyses of selected key issues, and the application of this signature GEO methodology is clearer in the later reports. But none – with or without 'Outlook' in their title – seem to have conducted the future scenarios exercise, which is one sign of a fully authentic GEO report.

The countries that undertook these varying processes were quite diverse, scattered across the Asia and the Pacific region, and appear to have either been inspired by or at least included key elements of a GEO process. Three of these were in the new series labelled as Environment and Climate Change Outlooks (ECCOs)[21] (MoEF, 2013; MoLEP, 2012; UNEP, 2001b, 2013e), which surely assisted in raising funds from donor countries concerned about national impacts of climate change, Belgium in particular. A DEWA Regional Coordinator for the region recalled that "the ECCO approach made things very difficult. [We] had to move from traditional national SoE reports to IEAs and then to ECCOs within the space of a few years, which countries found challenging" (Anna Stabrawa, personal communication, 17 June 2017). In the end, not all of the funding promised from UNEP Headquarters was made available, so concluding even these three ECCOs proved to be a challenge.

Finally, several other countries in the region – Afghanistan, China, Mongolia and Vietnam – also issued SoE reports, some with initial assistance from UNEP (Anna Stabrawa, personal communication, 17 June 2017), but few of these used the GEO approach. For example, UNEP funded the first SoE report for Vietnam in the late 1990s, whose government then passed legislation to produce such reports every two years.

Even though many of the national reports done by Asia and the Pacific countries were not GEO reports, many of them were linked to UNEP's GEO process at the global or regional level. Most of these reports were either advised or technically supported by UNEP's Regional Resource Center for Asia and Pacific. In terms of closeness to GEO, the picture of environmental reporting across mainland Asia is as varied as the region. For example, the national reports of Bhutan (2001, 2008, 2016) can be characterized as SoE, GEO and GEO, respectively (UNEP, 2001c; NEC, 2008, 2016). Those of Laos

[21] A fourth national ECCO report for Papua New Guinea was never completed.

were hybrid (2001) and GEO (2012) (UNEP, 2001e; MONREoL, 2012). Afghanistan (2008) and China (from 1996 on) produced conventional SoE reports (UNEP and NEPAoA, 2008; MoEEoPRC, 2022). There was also a clear intention of linking the 2001 series of seven national SoE reports with broader regional and even global reporting, as the foreword in each of those seven reports makes clear: "This global assessment [*GEO-3* issued in 2002] will be enriched by producing SoE reports at the national, subregional and regional levels...thus linking national to regional and global initiatives" (quoting Dr. Klaus Töpfer, Executive Director of UNEP).

For Europe, not a single national GEO report has ever been done, mainly because most European countries had been involved in more mainstream SoE reporting since the 1990s. Western and later Central European countries were involved in environmental reporting processes with the EEA and thus were not inclined to conduct separate ones using UNEP's methodology. However, the UNEP-affiliated centre GRID-Arendal in Norway, which pioneered SoE reporting in an electronic format, assisted numerous countries of Central and Eastern Europe and Central Asia in developing online SoE reports. Thirteen countries were covered by these capacity-building efforts between the early 1990s and mid-2000s.

For the Latin America and Caribbean (LAC) region, which is discussed as an exceptional case in section 6.5, over 40 national reports were produced from 1999 to 2014, with most of these prepared in the early 2000s (Annex IV). A few of these – Chile, Panama and Peru – were repeated after three to five years, showing strong national interest in periodic reporting and the viability of these processes. National GEO reports from LAC outnumber those from any other region, particularly if one includes the roughly 10 GEO for Youth reports produced at the national level between 2002 and 2011.

These many national applications of the DPSIR framework in the LAC region allowed the GEO methodology to be tested and fine-tuned, ultimately streamlining while making it more robust and able to withstand scrutiny by national stakeholders from a range of disciplines and backgrounds. More focused applications such as GEO-Cities and GEOs for Youth required the preparation of modified methodologies to ensure that these assessments were done to cater for geographic and group needs while allowing for cross-fertilization and remaining scientifically rigorous.

In North America, there were no national GEO reports produced by Canada and the USA, mainly for reasons cited earlier. SoE reporting was established in Canada in 1986, and at least three reports were produced at five-year intervals: 1986, 1991 and 1996. And while the USA pioneered environmental

reporting in the 1970s and its Council on Environmental Quality produced *Environmental Quality Reports* every year from 1970 to 1997, the practice was dropped by an act of Congress in 1995, leaving further reporting in the hands of civil society and the private sector (GC/UNEP, 2008).

The GEO process was the spark leading many West Asian countries to prepare national SoE reports. While countries in West Asia have been moving towards a more integrated assessment format, they still title their reports *State of the Environment*, as they have a legal mandate to produce an SoE report. One of the regional challenges in producing a national GEO or SoE is that most countries do not have a fully adequate institutional set-up to undertake the preparation of those reports, even if the legal mandate exists.

Some countries, such as Jordan and Kuwait, created an institutional unit to be responsible for the preparation of the report, which made a major difference. Another challenge is that many of the West Asian countries lack technical expertise and financial resources: capacity-building and mobilizing resources are critical for the preparation of those reports. Few countries invest in impact, communication and outreach strategies, and thus the outcomes of reports may not be used to their full potential.

Many countries – Bahrain in 2009 (PCPMREW, 2009), Iraq in 2016 and 2017 (IMoE, 2016, 2017), Jordan in 2009 and 2016 (JMoE, 2009, 2016), Lebanon in 2001 and 2011 (LMoE et al., 2001, 2011), Saudi Arabia in 2017 (GAMEP, 2017), the United Arab Emirates in 2015 (UAEMoEW, 2015) and Yemen in 2001, 2003 and 2008 – have produced national SoE reports. As of late 2018, Kuwait was in the process of preparing a report. Some but not all of these reports would qualify as GEO-related. Iraq in 2013 and Oman each completed one using the GEO framework, with the Omani report remaining to be published. In summary, most countries in West Asia have produced at least one SoE or GEO-like report. Within the wider Arab region, Egypt has produced an SoE report annually since 2004 (EMoE, 2021). Tunisia was perhaps the first country in Northern Africa to produce an SoE report on a regular basis, even if it was not annual and did not closely follow the GEO methodology (Adel Farid Abdel-Kader, personal communication, 20 May 2020).

UNEP conducted national capacity-building workshops in most West Asian/Arab countries. These workshops supplemented regional training that included IEA concepts, scenario development, policy analysis, data and indicators, communication and outreach, impact strategy, and policy development. All of the global-level GEO training manuals were customized for the region, translated into Arabic and made available online. *Guide-*

*lines for GEO-Cities* reporting were also prepared for the region. In national training, UNEP worked with the countries to develop a framework for national SoE reports, and some countries directly followed the GEO methodology in preparing these.

In conclusion, one could speculate that national GEO reports were not carried out by developed countries because active environmental reporting by responsible bodies – a ministry of environment, an environmental protection agency or similar – already had the mandate to do so. But where UNEP's GEO process came along at the right time for a given country, it was often taken up as a result of the international legitimacy of the IEA methodology and the support offered to countries by UNEP in getting started. This typically occurred when countries were just beginning to report on environmental state and trends and having requirements mandated by national legislation.

## 6.4 Local-level GEO reporting

The initiation of local-level IEA reporting, mainly the GEO-Cities series of reports, was a unique development, again with strong regional particularities. With by far the greatest number of GEO-Cities reports from the LAC region, which pioneered this level of reporting, a good half-dozen for Europe, and a smattering in Africa, Asia and the Pacific and West Asia, the phenomenon was widely if very unevenly spread. It was nevertheless a validation that the global approach had utility and could be popularized at the local level, typically engaging dozens of local stakeholders in a single process.

African localities prepared only a few GEO-Cities or similar reports, and only Dakar used the GEO-Cities trademark name as part of its title. However, these were clearly inspired by the series of reports done in other regions, mostly LAC.

At the local level, Zambia seems to have been a champion of GEO-style reports, with its capital Lusaka having prepared a *City State of Environment Outlook* in 2008 (LCC and ECZ, 2008). Five districts – Chipata, Kabwe, Kitwe, Livingstone and Solwezi – produced similar Outlooks[22] between 2008 and 2010. The Lusaka report even contains three future scenarios following business-as-usual, investment and policy reform projections, similar to parent regional and global GEO reports. The Kabwe and Kitwe reports also present scenarios, while the Livingstone report has a

22 Only the reports of Kabwe, Kitwe and Livingstone could be retrieved. These are listed in Annex IV.

scenarios section without scenario development. In addition, the Lusaka report cites not only UNEP and the United Nations Human Settlements Programme (UN-Habitat) for their support, but specific UNEP staff who provided expertise, if not supervision, for the project.

The only other African cities producing GEO-style reports at the municipal level are Johannesburg, South Africa in 2003 (EMFCJ, 2003), Nairobi, Kenya in 2007 (UNEP, UN Habitat, et al., 2009), Dakar, Senegal (IAGU, 2009), Dar-es-Salaam, Tanzania in 2011 (DEVPO and UNEP, 2011) and Kigali, Rwanda (REMA, 2013) (Annex IV). The model of GEO-Cities reporting, as popularized particularly in the LAC region, did not catch on more broadly, probably due to a lack of financial and human resources.

For the Asia and the Pacific region, five local GEO-inspired SoE reports and outlooks were produced in the 2000s, namely for Dhaka City, Bangladesh, around 2005 (UNEP 2005c), Timpu City, Bhutan, in 2007 (MoWHSoB and UNEP, 2008), the Kathmandu Valley, Nepal, in 2007 (ICIMOD et al., 2007), Shenzhen, China in 2007 (Peking University and UNEP, 2007) and the *Bangkok Assessment Report on Climate Change* from Thailand (BMA et al., 2009). A fourth reporting process for Ulaanbaatar, Mongolia, was undertaken and all but completed, when the national focal point for the project absconded with all of the funds, and the report was never published (Tunnie Srisakulchairak; personal communication, 6 December 2018). For various reasons, the GEO-Cities model did not replicate much in this region, but these three examples at least demonstrate a certain interest in reporting at the municipal level.

The few GEO-Cities reports prepared in the European region were closely linked with UNEP's capacity development efforts in the Eastern European subregion, with the one exception of the 2009 report for the town of Vitoria-Gasteiz, Spain.[23] Beginning in the early 2000s, UNEP's DEWA conducted an extensive capacity development programme known as Environment and Natural Resources Information Networking in developing regions of the world, plus transitional areas of Eastern Europe, the Caucasus and Central Asia. Under this umbrella initiative in Eastern Europe, and with implementation by the staff of two prominent GRID centres, Arendal and Geneva, numerous GEO-Cities processes were put in place, with a focus on the Caucasus and particularly Armenia. Not all such efforts were successful: while reports for Tbilisi, Georgia, and Yerevan, Alaverdi, Gyumri, Hrazdan and Lake Sevan in Armenia were produced, a GEO-Cities report for Baku, Azerbaijan, failed due mainly to institutional reasons. A few other reports

[23] The exceptional case of Vitoria-Gasteiz resulted from a Spanish town in Europe wanting to follow the example of dozens of Latin American municipalities.

were released – Donetsk, Ukraine, for example – but were not issued as GEO-Cities reports nor were they truly GEO-compatible.

While the motivation of particular cities to participate in such a process was certainly important, the availability of limited donor funds was also a factor. DEWA oversaw the apportioning of such funds to the various regions to assure that examples of GEO-Cities reports would be widely available. It is noteworthy that for the European region, other potential GEO-Cities reports were foreseen, and discussions were undertaken with Tirana, Albania, for instance, but the process did not go forward for administrative reasons. This again underlines the critical nature of having political will, sufficient funding and, in at least some cases, UNEP leadership to implement such projects.

Once again, the LAC region surpassed all of the others in terms of GEO-Cities reporting processes between the late 1990s and early 2010s. UNEP and partners in this region made a systematic effort to cover all subregions and most countries, with the spirit of leaving none behind. While it was imperative that planning of a GEO-Cities assessment would start only upon receipt of an official written request from the local government, UNEP and GEO collaborating centres conducted extensive outreach, including on the support available for those who wished to have it. The favourable circumstances for the overwhelming success of this reporting series are explored in Section 6.5.

In addition to the GEO-Cities reports, a more limited series of ECCO reports was prepared for five cities in the LAC region[24] between 2011 and 2013. The ECCOs focused attention on linkages between climate change and its impacts on the human and natural environments in an urban context and were funded by Belgium through UNEP's programmes of work for 2011–12 and 2013–14.

While North America did not produce any GEO-Cities reports, the West Asian region has accounted for at least two. Sana'a, the capital of Yemen, is the only city here to have published a GEO-Cities report (UNEP and YEPA, 2010). Dubai, United Arab Emirates, also produced such a report, but it is not publicly available. UNEP also supported the production of a report for the Al Fayha' Union of municipalities covering three municipalities in Tripoli, Lebanon. In West Asia, Abu Dhabi has led in producing subnational reports for the Emirates, with three reports produced since 2007 (Annex IV).

[24] Quito (Ecuador 2011) (UNEP and FLACSO, 2011), Aguascalientes (Mexico 2013) (SEMADESU et al., 2013), Trujillo (Peru 2011) (UNEP et al., 2011), Canelones and Colonia del Sacramento (Uruguay 2011) (UNEP, 2011a).

## 6.5 The special case of the Latin America and Caribbean region

If numbers alone could tell the story, GEO reporting in the LAC region would already stand out as truly exceptional. Between 1999 and 2010, the region released over 50 local GEO-Cities reports, including several ECCOs and nearly as many GEO national reports. LAC also produced numerous subregional ones for the Caribbean, Central America and MERCOSUR countries (countries of the Southern Common Market); at least ten GEO for Youth reports at regional to country levels; ecosystem-specific reports for Amazonia and Lake Titicaca; thematic GEOs such as GEO Health; and three full LAC regional reports in that decade. UNEP and its experts from the LAC region even led a global assessment, the 2006 *Global Deserts Outlook* (UNEP, 2006c). But what lay behind this prolific output of GEO reports in little over a decade? What were the precise circumstances and region-specific factors that enabled or even encouraged so many reporting processes to be undertaken and mostly succeed? The following section examines key elements such as human, institutional and resource-related ones, along with particularities of the LAC region, to draw a picture of how this occurred.

A thorough analysis of material extracted from in-depth interviews of former UNEP staff and expert-participants familiar with the GEO process in the LAC region has led to the identification of seven major factors for GEO's marked success in the region, as follows:

1. UNEP's institutional role in the LAC region, specifically as Secretariat for the LAC Forum of Ministers of Environment, put UNEP in the driver's seat, increased appreciation for environmental assessments and statistics among policymakers and facilitated the political mainstreaming of GEO.
2. The motivation and direct involvement of UNEP's regional team in the Regional Office of Latin America and the Caribbean, in Mexico City until 2007 and then in Panama City, included staff from the Division of Regional Cooperation and DEWA, which had the scientific and technical lead for GEO.
3. The investment in and nurturing of a trusted core group of collaborating centres in the LAC region that were either universities or technically-oriented non-governmental organizations had excellent standing and credibility in the eyes of national governments. Key staff of these collaborating centres augmented UNEP staff in many set-

tings for GEO reporting across the region and helped UNEP introduce the GEO methodology and processes in many countries and cities.

4. Partnership with subregional entities that held mandates to keep the environment under review added legitimacy to UNEP's GEO.
5. A desire to be in the vanguard and a healthy competition among and between many countries and cities in the region that were keen to adopt the GEO reporting approach provided critical government buy-in and human and in-kind support for GEOs.
6. Significant and flexible donor financial support from countries outside of the region, including Belgium, Canada, Norway, Spain and Sweden, allowed GEO processes in LAC not only to diversify but to expand in numbers and popularity.
7. Spanish is the dominant language in most LAC countries, making cross-fertilization and transfer of results from one location to another possible and rapid.

In addition, certain existing tendencies in the LAC region also favoured UNEP's reporting process. According to one DEWA Regional Coordinator who served in the late 1990s, "The region had well-advanced science, [although] less advanced technology, but the Latin American spirit ensured a willingness to collaborate. [We at UNEP] just had to produce the right environment for that collaboration." (R. Norberto Fernandez interview) A second former DEWA Regional Coordinator said, "Latin America was more aware than any other region of the urban dynamic. The majority of the population were living and would continue living in cities, and they had a very specific kind of dynamic that could be addressed through a GEO kind of process." (Kaveh Zahedi interview) And a third former DEWA Regional Coordinator commented on what she perceived as some cultures in the region being interactive and keen to participate by nature, thus favouring the development of many GEO processes and sharing these with a global audience beyond the region itself (Kakuko Yoshida interview).

The following paragraphs offer, through the testimony of multiple interviewees, how the combination of these factors allowed the GEO process to prosper in the LAC region.

First, UNEP serving as the Secretariat for the LAC region's Forum of Ministers of Environment played a crucial role in helping GEO become well-implanted there. According to a former UNEP staff member,

> Through that ministerial mechanism, we [UNEP] made sure that environment assessment using the GEO methodology was the intervention that

> we encouraged all governments to try to do. [Understanding that] the IEA approach was better than doing just a state of the environment report… was very strong among ministers…[and] having the recommendation of the ministerial board in LAC was very instrumental. – (Kakuko Yoshida interview)

Another DEWA Regional Coordinator seconds this view for the region, and states, "The GEO became the basis for the report that we would make to the Forum of Ministers of Environment. We took our scientific knowledge, and we made it the basis of our conversation [with] our ministerial forum in Latin America." (Kaveh Zahedi interview)

Finally, a former Minister of Environment and President of the United Nations Environment Assembly confirmed the importance of GEO for the LAC Forum of Ministers of Environment and the Forum's role in supporting the GEO approach: "GEO was a main source for setting up the agenda for the LAC regional meetings of Ministers. The Forum was based on the main findings that we had from our regional GEOs." (Edgar Gutiérrez-Espeleta interview) A decision had been made earlier in the region for the global GEO to become a source for ministers to review the SoE report for LAC, based on the collaborative, science-based, independent-from-governments GEO approach set up by UNEP.

In summary, strong political support at the LAC regional level in the most prominent environmental forum was a key factor in the enthusiasm generated for, and by, GEO.

Second, the development and steady presence of a strong UNEP team – exceptionally, one cutting across multiple divisions – to initiate and lead GEO reporting processes was also a major and probably necessary factor towards GEO's enormous success in LAC.

Several former UNEP staff have testified to the LAC regional office's solidarity and the strong desire of key persons to champion the GEO process. One stated that

> The staff of UNEP in the region…were great promoters of the early GEOs… the issue here was how pro-active at the beginning of the GEO process… the Regional Director and the DEWA [Regional] Coordinator were there, because much of the success over time and the sustainability has been because of the initial processes and how clearly and how legitimate they were perceived to be (Graciela Metternicht interview).

DEWA's Regional Coordinators "grew and sold the process and product to the countries" along with at least two influential Regional Directors of the

office, who saw "value in the report and the process and [also] sold it to the countries." (Graciela Metternicht interview)

Other UNEP staff and participants from collaborating centres in the region cited the support of one Regional Director in particular as critical in expanding the portfolio of GEO reporting processes and in the start-up and rapid growth of the GEO-Cities series in particular. This Director was reported as saying, "GEO was UNEP's calling card [in the LAC region], and it was on the back of GEO that we do everything else that we need to in a country. That's an acknowledgement of what power GEO had" (Kaveh Zahedi interview). A second Regional Director was even said to have

> put the jersey on; he said I'm with UNEP and he was pushing GEO and went to every meeting with a copy of the latest GEO report under his arm... we had very strong cooperation and support from the [LAC] regional directors. This is something that did not necessarily replicate on the global level or take place in other regions (R. Norberto Fernandez interview).

Third, a key set of collaborating centres (Table 6.5.1) was nurtured by UNEP to promote, conduct and disseminate GEOs at many levels within the LAC region. This development of a core set of well-trained and trusted expert centres was another of the key reasons that the GEO process in the LAC region was overwhelmingly successful in terms of total products/reports produced.

**Table 6.5.1. GEO collaborating centres for the LAC region**

| Name | Location | GEOs involved in |
|---|---|---|
| Brazilian Institute of the Environment and Renewable Natural Resources[25] | Brasilia, Brazil | *GEO-2000*, *GEO-3* and *GEO-4*, *GEO LACs-1 & 2*, *GEO-Brasil* |
| Centre for World Economic Research[26] | Havana, Cuba | *GEO LACs-2 & 3*, *GEOs-4 & 5*, *GEO-Cuba* |
| Latin American Centre for Social Ecology[27] | Montevideo, Uruguay | *GEO LACs-2 & 3*, *GEO-4*, *GEO Mercosur*, *GEO Uruguay* |
| University of Chile, Centre for Public Policy Analysis[28] | Santiago, Chile | *GEO-LACs 1-3*, *GEOs 1-4*, all *GEOs for Chile* |

[25] Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renovaveis in Portuguese.
[26] Centro de Investigaciones de la Economia Mundial in Spanish.
[27] Centro Latino Americano de Ecologia Social in Spanish.
[28] Universidad de Chile / Instituto di Asuntos Publicos in Spanish.

| | | |
|---|---|---|
| The Earth Council | San José, Costa Rica | *GEO-2000* and *GEO-3* |
| University of Costa Rica, Development Observatory[29] | San Pedro, Costa Rica | *GEO LACs 1-3, GEO-2000, GEO-3, GEO-4, GEO-6, GEO Central America* |
| University of West Indies, Center for Environment and Development | Mona, Jamaica | *CEOs 1999* and *2005, GEO LACs-1 & 2, GEO-2000, GEO-3, GEO-4* and *GEO-6* |
| University of the Pacific[30] | Lima, Peru | *GEO-4* and *GEO-5*; multiple GEO-Cities; *GEO Amazonia* and *GEO Andino* |
| Island Resources Foundation | US Virgin Islands | *GEO LACs-2* & *3*; *GEO-1, GEO-3, GEO-4* |
| International Centre for Tropical Agriculture[31] | Palmira, Colombia | *GEO-1* and *GEO-2000* |
| Interamerican Association for Environmental Defense[32] | Mexico City and San Francisco | *GEO-2* only |
| College of Mexico[33] | Mexico City | *GEO-1* only |
| College of Science, Technology and Applied Arts | Trinidad and Tobago | *GEO-5* only |
| Interdisciplinary Environment Laboratory of the Federal Institute | Rio de Janeiro | *GEO-5* only |
| Institute Oswaldo Cruz | Rio de Janeiro | *GEO-5* only |
| Institute for Sustainable Development | Bogota, Colombia | *GEO-5* only |
| International Centre for Sustainable Development | Panama City, Panama | *GEO-5* only |
| National Agricultural Technology Institute | Buenos Aires, Argentina | *GEO-5* only |
| Secretaria de Medio Ambiente y Recursos Naturales | Mexico City, Mexico | *GEO-5* only |
| The Cropper Foundation | Trinidad and Tobago | *GEO-5* only |
| Universidad Autonoma de México | Mexico City, Mexico | *GEO-5* only |
| University of São Paulo, Brazil | São Paulo, Brazil | *GEO-6* only |

[29] Universidad de Costa Rica / Observatorio de Desarrollo in Spanish.
[30] Universidad del Pacifico in Spanish.
[31] Centro Internacional de Agricultura Tropical
[32] Asociación Latinoamericana de Derecho Ambiental in Spanish.
[33] El Colegio de México in Spanish.

The essential roles played by these collaborating centres are testified to by many of DEWA's Regional Coordinators who oversaw the GEO processes in the region during this period. For example, one of those involved in the development of the first GEO LAC report stated,

> GEO and its early success were in large part thanks to the network of collaborating centres we put together. It helped [in developing the GEO LACs] that we had a very strong dynamic group of collaborating centres…that could be the engines to produce the regional ones, in particular the group of Edgar [Gutiérrez-Espeleta] in Costa Rica. So, we very quickly moved on that, and it was a very great success in terms of our outreach, in terms of our positioning, of UNEP in every sense. – (Kaveh Zahedi interview)

Another former DEWA Regional Coordinator, who led the development of GEOs in LAC from the regional down to the local level for many years, explained how the collaborating centres played several vital roles. For example,

> We had a mixture of experts [from] the collaborating centres [who] often not only provided technical expertise on certain areas, but they also took some coordinating role geographically or subject-wise because of their knowledge of the GEO methodology and the participatory process, [such as to make] sure all other chapter contributing authors follow the same methodology and ensure that the subregional representation of information or regional representation of information was adequate. So, that was a very important role of the collaborating centre (Kakuko Yoshida interview).

The collaborating centres also played a major role in assuring the sustainability of the process and linkages between the periodic global GEO reports and regional ones.

> The collaborating centre was a bridge between the global process, regional process and national process; they stayed on in between two global assessments to ensure this ability of understanding about policy [and] about changes in the state of the environment in the region or a country…so when the global assessment comes around next time, we are in a better position institutionally, knowledge-wise, full of experts, better than two or three years ago (Kakuko Yoshida interview).

And to make the processes more sustainable, "we started to use some of the GEO processes, especially national GEOs [and] GEO-Cities for capacity-building so that the governments and expert groups will have a better understanding of methodology and be capable of continuing periodic assessments like GEO at their own resources and costs." (Kakuko Yoshida interview)

The selected collaborating centres also had to have a certain level of expertise with environmental data: "They were the right partners at the country level, a partner that would be able – particularly with the process at national level – to assemble the right stakeholders and facilitate and open doors to access the data sets that were needed in the process." (Graciela Metternicht interview)

UNEP's use of the core set of collaborating centres was mutually beneficial and reinforcing, a win-win, as further described:

> We [UNEP] invested a lot, trusted those centres and really were the advocate for their important role in the GEO process…whenever we identified some funding to be dedicated to a subregional or national GEO, the first ones that we go to and consult are these trusted collaborating centres. We know they know the GEO process so well. So, we ensure that the new GEO processes at the subregional and national level add to the collaboration, often under the technical supervision of one of these collaborating centres. And they really help us because they know the region or the country so well, they ensure that…the linkage between science and policy happens at their level (Kakuko Yoshida interview).

Perhaps most impressively: "Because we had such a strong collaboration with these collaborating centres, they became our eyes and ears, arms and legs, and they really could make the expansion [that is, in GEO reporting at multiple levels] that we saw possible." (Kakuko Yoshida interview)

"We managed somehow to put together a process, a network, a group, that was almost extraordinary. And to look at the Latin America case, the group that we assembled for GEO, the collaborating centres, of the group that we have, [many of] those subsequently became ministers, vice-ministers and high-level environment officials." (Kaveh Zahedi interview) (Box 6.5.1)

In short, the wide range of GEO processes and reports that stemmed from the LAC region would never have been conceivable, even less achieved, without the trusted core group of collaborating centres and UNEP's investment in and nourishment of this network to a depth and extent not seen in other regions. As the application of the IEA methodology matured and diversified, a conscious effort was also made to bring new institutions and individual experts into the GEO community, beyond the remit of the collaborating centres for specialized GEOs.

### Box 6.5.1: Prominent GEO Participants in Latin America and the Caribbean

Several experts from the LAC region who worked on one or more GEO reports went on to occupy prominent political posts in their countries and elsewhere. One example is Edgar Gutiérrez-Espeleta, the former Director of the Observatory for Development at the University of Costa Rica from 1997-2005, who went on to become the Minister of Environment and Energy of Costa Rica and the President of the 2017 United Nations Environment Assembly, UNEP's Governing Body. Other examples include Peru and Uruguay, where former collaborating centre staff went on to become ministers or governmental advisors. From Peru, Rosario Gomez in 2009 became the vice minister of *Desarrollo Estratégico de Recursos Naturales del Ministerio del Ambiente*, and Elsa Patricia Galarza Contreras, an economist, served the Peruvian government as Minister of the Environment from July 2016 to April 2018.

Fourth, a number of key partnerships with subregional organizations in LAC, such as the Andean Community and the Caribbean Community, helped greatly to advance the GEO cause and the adaptation and use of the related methodology. Through the GEO process, UNEP and the environmental authorities that it supports – most prominently the LAC Forum of Ministers of Environment – had access to statistical and analytical information on the state and trends of the environment whose geographical coverage matched the regional political/administrative coverage. The GEO reports were considered a reliable and convenient source of information to underpin policy discussions on the environment and sustainable development. Statistics and analyses from GEOs regularly appeared in the official reports of the LAC Forum of Ministers of Environment.

Also, the regional and subregional GEO processes were valued for their ability to generate an overview of the environment across geographical areas that are diversified due to differing historical, political and economic developments. Its participatory IEA process allowed policymakers, scientists and others to gather and have structured, data- and evidence-based discussions. Priorities and future trajectories or scenarios that emerged also formed an excellent basis for subregional intergovernmental bodies such as the Andean Community and the Amazon Cooperation Treaty Organization to start building their programmes on environmental protection and sustainable development.

Fifth, the GEO process became the popular format for environmental reporting among the countries and cities of the region, generating ever-growing interest once the first GEO LAC report had been done and momentum for the process grew within the region. The reasons for this popularity were numerous and stemmed from some of the factors described above and the very nature of the GEO approach itself.

The endorsement of the GEO approach by the LAC Forum of Ministers of Environment was a watershed moment for UNEP's team in the dissemination of the IEA methodology. As one former DEWA staff member explains:

> We approached this whole process in such an open and integrated manner that we were very believed by the governments…they had no other choice than join or perish, I would say…We were the first region in which the GEO process was fully institutionalized. [As recording secretary to the LAC Forum of Ministers,] I was in direct contact with 33 ministers. I could call them up…and I would say, look, we have this idea, who in your ministry should we work with? And they would call their assistant and say, "You will work with them. They are coming with a great idea; we want to be part of this." Governments that had not done a state of the environment assessment, integrated assessment particularly, [saw] all the other ministries and governments having done that, and then they had this pressure that we have to do a periodic assessment of environment using the integrated methodology and participatory process like GEO suggests (R. Norberto Fernandez interview).

The GEO process had the good fortune of arriving at the right time, as "many countries had legislation requiring environmental reporting, but often neither the human capacity nor the financial resources to do an SoE report."[34] (Graciela Metternicht interview). UNEP's GEO was able to step into the breach, as "environment ministries saw the value and would call for UNEP's help." (Graciela Metternicht interview) This direct interface with governments and a relationship of trust was a key reason many ministries bought into the GEO approach and were willing to try it in their own countries and cities. As governments were UNEP's primary audience, "They were very happy to be included in [such a] scientific assessment. They were able to put their experts, individuals and scientific institutions, and also immediately look at the science-policy interface side of this process." (R. Norberto Fernandez interview)

[34] A similar situation can be seen in many of the African, Asia and the Pacific and West Asian countries: national law stipulates that an SoE report be conducted, so that even where the GEO methodology was at least partially applied, the official title of the report remained 'State of the Environment' due to the national legislation.

The highly participatory and bottom-up nature of the GEO process also contributed to its adoption and success in many LAC countries. For example,

> ...the fact of having government officers, not necessarily ministers, I'm talking about level of directors, so senior technical people...participating actively in the GEO process, even as a writer or reviewer, had the major benefit for the content of GEO [and allowed] them to take back some of the information to their own government and reflect on that (Kakuko Yoshida interview).

There were other aspects of the methodological approach that countries and cities found appealing, as highlighted by another DEWA staff member:

> On the back of [GEO's] success, we basically found demand. We found that countries said that we want this. It has a structured methodology, we like the inclusive process producing it, so we would like to see one in our country. So, I think we were more responding to the demand than to anything (Kaveh Zahedi interview).

Also, the varied nature of the GEO reports – subregional, national, local – helped to target different audiences and "generate the same conversation that we [UNEP] were having on the global level about priorities and what we could do about some of the main issues in the region. There was a democratic side to it." (Kaveh Zahedi interview)

Furthermore, according to the same colleague, the GEO report was often used as a reference product within LAC Ministries of Environment. High-level staff could use a GEO report to validate and strengthen their own positions at the Cabinet table. "They could say, 'Listen, we're not making this up, it's a regional issue which has been validated at the regional level, so you should pay attention to deforestation or whatever [the issue] was.'" (Kaveh Zahedi interview)

Two other witnesses verify the influence of the GEO process and reports on environmental policymaking. A DEWA Regional Coordinator stated that:

> For me, the most important role of the product is that it was seen as authoritative in many governments, very much used for advocacy and the media and the non-governmental organizations in the region... Through the GEO process, some networks began and were maintained after the process was over...like a nexus between stakeholders (Graciela Metternicht interview).

From the government side, a former Minister of Environment stated, "we were able in LAC…to turn GEO from an academic book into a policymaking sort of supporting book… GEO was part of the movement in Latin America; the methodology of GEO was being used everywhere by many people." (Edgar Gutiérrez-Espeleta interview). He went on to call GEO a living legend in the region.

In summary, the regional popularity of GEO at the height of its influence – with more than 40 national and more than 50 cities' reports, plus over 10 subregional or thematic products – owed much to the nature of the region itself. There was a vast demand from countries and cities to participate in the 'GEO wave' throughout the region during the late 1990s through the early 2010s.

Sixth, it is undeniable that strong donor support also played an essential role in the LAC region's proliferation of regional to local, plus special thematic, GEO reports. Funding in general for GEO activities came from contributions to UNEP's Environment Fund, UNEP trust funds or bilateral partnership agreements with individual countries. But in the case of major efforts such as a regional GEO report or a series of GEO-Cities reports, donors would be approached individually to support one project or another. The success of UNEP staff in the LAC Regional Office in attracting donor funding for various GEO processes was thus a vital factor in their replication across the entire LAC region.

One of DEWA's Regional Coordinators in LAC who served for several years recalls:

> Prior to my arrival, there were a couple of substantial funding injections[35] for GEO-Cities. Donors gave a lot of money, and therefore there was money to travel and promote the product. I remember there were half a million dollars…for GEO-Cities processes, and that was a good boost to begin many processes at the same time. I think we cannot dissociate the importance of the financial motivation or the financial support, particularly at the beginning of these new processes when you need to promote them to governments (Graciela Metternicht interview).

Norway, Spain and UN-Habitat were among the major donors for GEO-Cities projects. Another DEWA Regional Coordinator recalls:

> Norway [was] one of the donors with which UNEP had a continuous global partnership agreement. Norway was happy to [fund] subregional

[35] From Belgium, Norway and Sweden; as recalled by G. Metternich.

> assessments like for the Caribbean as well as national ones. In the case of UN-Habitat and Spain, they were interested in supporting the Millennium Development Goals at the national level and improving urban environment: that's how GEO-Cities came about. There were more than a few GEO-Cities where UN-Habitat and UNEP got together supporting the same city (Kakuko Yoshida interview).

Support from donor entities sometimes came as in-kind contributions, including as staff. "We were lucky...that we had three or four interns from International Institute for Sustainable Development who were very competent and really helped us in [GEO-Cities] processes." (Graciela Metternicht interview). Under the Young Canadian Leaders for a Sustainable Future programme, funded by the Canadian government, "We had between $600-1000 to help pay for their accommodation. But the Canadian government would [also] pay their coming to do traineeships. They were very good and learned quickly." (Graciela Metternicht interview)

Governments themselves contributed significantly through their own staff time to GEO processes in the LAC region. As recalled by one of the former UNEP staff there:

> One thing I can say, there were no GEOs in Latin America [where] we paid for the time of government officers. All the time was at their own cost; sometimes they needed to find a temporary consultant or writer to do things [which had a] cost, but because that's what the government wanted to do...they paid for it themselves (Kakuko Yoshida interview).

As a result, each assessment process that typically lasts a year or more becomes quite cost-effective. At least two face-to-face workshops were necessary, one for training on the methodology and identification of major issues in the early part of the process and one stakeholders' consultation when a first draft was available. Each assessment costs around US$ 25,000 to 45,000 per city or country, which includes 500 or more copies of the report printed and available for distribution at the end.

Thus, one of the reasons for the high point of GEO reporting in the LAC region from 2001 to 2010 was UNEP's success in raising funds for GEO activities there. While there is no way to retroactively determine how much was raised for GEO reporting in the LAC region, it certainly surpassed by far what was made available for any other single region by donor countries and UNEP itself.

Finally, the predominance of Spanish in much of the LAC region, excluding Brazil and parts of the Caribbean subregion, was also a factor in GEO's rapid dissemination and replication in many countries and cities there. A former DEWA staff member explained:

> It [was] very easy for us to take examples of [the GEO] process or even publications from Peru to Mexico, Costa Rica to Ecuador. And the experts who had been working in one GEO process as experts could be asked to join another country to share what they have done at home (Kakuko Yoshida interview).

Thus, the relative cultural and linguistic homogeneity of the LAC region, compared with the Asia and Pacific region, for example, also played a facilitating role in GEO's success.

In summary, from the early 2000s up to nearly the mid-2010s, the LAC region became the most prolific source of authentic GEO reports at regional, national and local levels due to the confluence of factors described. These were complemented by a variety of other GEO products inspired by the approach's popularity,[36] the willingness of many governments and other stakeholders to participate in the process, and the enthusiastic efforts of UNEP's team in the LAC regional office. As nothing succeeds like success, many donor countries came to support these efforts, to the point where they were replicated in other regions such as Asia and the Pacific and Europe.

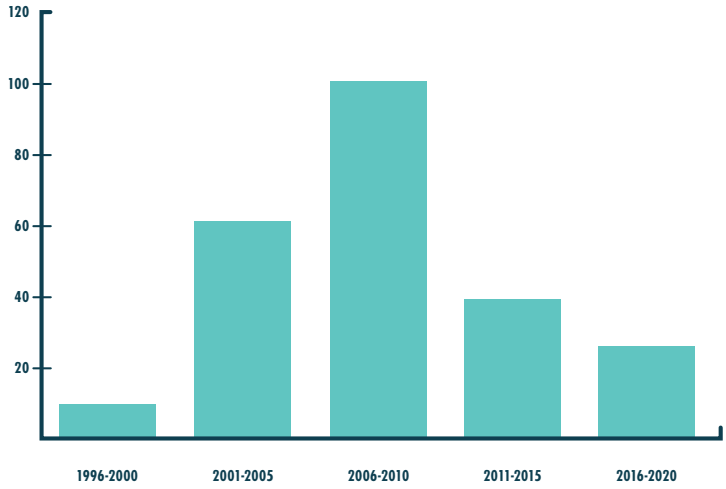
But no wave can be sustained forever, and with the flagging of donor enthusiasm and funding and inevitable changes in UNEP staff, there has been a major decrease in such reporting projects since the early 2010s. Ideally, many countries and cities involved in earlier efforts, including those that did produce multiple GEO reports, should have continued such efforts periodically. It remains to be seen if many or any LAC countries and cities will carry on such reporting into the 2020s.

[36] Other GEO LAC regional products include *GEO Health for LAC*, a Capacity Building manual and a *Methodology Guide for GEO for Youth in LAC*, and one on *GEO-5 Policy Options for LAC*. These products are covered in Chapter 7 on GEO Support Systems (Chapters 7.4 on capacity building and 7.9 on companion products).

## 6.6 Conclusions

The main purpose of this chapter has been to demonstrate that beyond the well-known global GEO report series, an entire ecosystem of subglobal reports exists, emerging from all regions of the world and covering multiple geographic levels. If taken together, these prove that the IEA/GEO approach was adaptable to use and fully viable in many different settings. They also prove that the GEO brand name and methodology appealed to diverse stakeholders from around the world. When and where UNEP appeared on the scene, proposing to apply the IEA/GEO approach – often along with seed funding and training to execute such projects – governments and regional bodies responded enthusiastically, with few exceptions. That enthusiasm for subglobal GEO reports may have diminished in the mid-2010s (Figure 6.6.1), primarily due to reduced UNEP leadership and new DEWA management with other priorities.[37] However, a rich and varied set of examples of GEO reports at all levels and of multiple types is available for those who might like to emulate such an integrated environment assessment approach in the future.

**Figure 6.6.1. Number of subglobal GEO reports by five-year periods**




*Particularly during the 2000s, GEO inspired many subglobal assessments on environment and development*

[37] For example, the *GEO-5* Terminal Evaluation report (Rowe et al., 2014, para. 148), reads in part "Capacity building was the main victim of the budget reductions in the *GEO-5*. In particular capacity development for policy analysis and enhancing use of the assessment at different scales and by different stakeholder groups was largely absent from the *GEO-5*."

Chapter

7

# Global Environment Outlook Support Systems

## 7.1 Introduction

As the Global Environment Outlook (GEO) developed, various support systems grew with it. The systems served to generate and discuss methods, data and information and to make these elements transparent. Support structures further included mechanisms to obtain and account for finance and in-kind support and for a core group in the Secretariat of the United Nations Environment Programme (UNEP) to plan the process, coordinate production and ensure institutional memory. Over the years, various incarnations of a GEO manual appeared, serving both the production of GEO and GEO-like assessments and building the capacity for similar work across the globe. From the beginning, a system of evaluation was in place for each edition.

Last but not least, next to GEO's main editions, an assortment of companion products has been produced to serve specific audiences, such as the business community and on issues such as progress towards the Sustainable Development Goals. In researching this chapter, a wealth of additional GEO-related products was uncovered (Annex IV). This chapter summarizes the development and challenges of each of these support structures.

## 7.2 Process coordination

### *Introduction*

Activities that are international, collaborative, participatory and multi-year, but time-bound, present a considerable coordination challenge, and the GEO has been no exception. Multiple coordination tasks and skills are required to ensure the smooth and efficient running of the entire process, the high quality and on-time delivery of products, and ultimately the end satisfaction of many different stakeholder groups. Responsibilities for coordinating the GEO process include project scoping, planning, documentation and gaining approval from UNEP programme directors and member states; budgeting and securing funding; negotiations and agreement on contracts with partners, consultants and others; and liaison with other UNEP divisions and other United Nations (UN) agencies. The work involves developing integrated environmental assessment guidelines; organizing relevant capacity-building; supporting advisory groups; overseeing content preparation and production, including organization of meetings and consultations, review processes, quality control, and other standards; and monitoring progress against milestones. In addition, communication demands require regular outreach with all stakeholders and participants, product distribution, organization of launch events, and meeting obligations for project reporting and evaluation.

Most of these coordination functions are related to key process elements and described in more detail in other sections or chapters. The rest of this section looks at the transitions in GEO coordination that have occurred since *GEO-1* and some of the key challenges and opportunities that have been experienced.

## *Coordination teams*

Once the new participatory, collaborative approach to keeping the world environment under review was initiated in 1995, coordination by the UNEP Secretariat became an essential part of the process. The intricacies and workload of this new undertaking were initially underestimated, especially considering that everything had to be done within the constrained time frame of just over a year. Once *GEO-1* got underway, it became apparent, perhaps contrary to expectations, that this was not a task doable by a single staff member. Consequently, about halfway through the process, a six-person GEO Team was set up within the division responsible for global environmental assessment at UNEP headquarters in Nairobi to oversee all aspects of the process.[1] One UNEP staff member interviewed for this History observed, "A small but very energized army of people in the Division of Early Warning and Assessment (DEWA) were the champions of GEO, and they were the ambassadors of GEO, and by that virtue, they were almost friends of the community of people who were giving their time and goodwill."

Experiences during *GEO-1* also made it obvious that coordinating regional activities from a single global hub was not the best approach. For *GEO-2000*, in addition to some shuffling of and further support made available to the GEO Coordinating Team in Nairobi, a GEO Support Team was established that included assessment division staff co-located with UNEP's six regional offices. These two groups of UNEP assessment staff worked hand-in-hand to make GEO happen: the headquarters group, responsible for coordinating and delivering the global report, and the group of regional coordinators who managed regional inputs and activities for the global GEOs and supported related assessment activities in their specific regions.[2] In addition to increasing the relevance of global GEOs in the regions, this split of responsibilities underpinned the replication and escalation of environment outlook activities that subsequently occurred at regional to local levels in many parts of the world (Chapter 6).

While the names accorded to the various coordinating teams changed from one GEO to the next and individual members of the groups changed, the groups have cooperated in harmony for more than 20 years. For *GEO-3*, in addition to the 14 individuals named as part of the Nairobi and Regional

[1] The division responsible for global environmental assessment has had several name changes over the lifetime of GEO. Originally the Division of Environmental Information, Assessment and Early Warning (DEIA&EW), it became the Division of Early Warning and Assessment (DEWA) in 2000, and most recently the Science Division.

[2] Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, North America and West Asia

coordinating teams, another 25 UNEP staff were now listed as the GEO Support Team, including a considerable number of people from other divisions. Although most worked only part-time on GEO, the broader range of expertise brought to the process from across the organization was visible and publicly acknowledged for the first time. But despite broader UNEP engagement in the GEO process from *GEO-3*, it did not seem to have encouraged the rest of the organization to take ownership or use the findings of GEO in any obvious way (Chapters 4 and 8). "Whenever I interacted with other divisions, I didn't see their attachment to GEO. They always mock the GEO for its size, as a door stopper, and its big budget. My message to UNEP is that there should be wider ownership, across the divisions, of GEO…It is everyone's product" (Clever Mafuta interview).

While the size of the coordinating teams for *GEOs-4* and *5* expanded to 19 and 21 respectively, both reports also acknowledge the support of around 80 additional UNEP staff.[3] While many are just listed as part of an extended UNEP team, some support functions are made more explicit. They include production and peer review coordination; support for data, maps, graphics and other design elements; and outreach and communications. In addition, *GEO-5* also singled out two closely associated UNEP partner institutions – UNEP-World Conservation Monitoring Centre and GRID-Arendal – for special recognition as contributors.[4]

The UNEP staff coordinating *GEO-6* may have had the most challenging task. Leaving aside the initial 2015-16 process of preparing the six *GEO-6* regional reports, where assessment-related staff in the regions played a significant role,[5] the core coordination of the global *GEO-6* was in a dire situation by mid-2018. A Mid-Term Evaluation reported, "The current staffing level of the core Secretariat team supporting the Global Environment Outlook is at its lowest point in history" (UNEP, 2018b, para. 90). Noting that the core team consisted of one senior and two junior staff members, one administrative assistant and one logistics assistant, the evaluation recommended that eight additional staff be contracted to help complete the not inconsiderable end stages of the process. The situation was subsequently rectified to a certain extent for the final months of the project, as the number rose to seven by the end of 2018. An added complication was that, from the start of *GEO-6* in 2014 to its completion in 2019, not a single

[3] The reference to other UNEP staff contributing to the GEO processes in this section does not include staff who are listed separately as reviewers.

[4] These same partner institutions had been listed as 'Associated Centres' in *GEO-2000.*

[5] These were no longer staff of the assessment division but UNEP Regional Office staff, with assessment responsibilities. Many of them had worked on at least one previous GEO and were therefore familiar with the process components.

member of the core Secretariat team in Nairobi had had any previous experience with GEO. Regarding support from the wider UNEP community, as with previous GEOs, the Science Division managers gave strong backing, and the assessment-related staff in the regions contributed some coordination functions. In addition, an October 2018 update on *GEO-6* noted that there were 15 UNEP chapter coordinators (UNEP, 2018d), so the responsibilities had spread across the organization to a certain extent.

## *Coordination challenges and opportunities*

*GEO-6* has highlighted one of the major challenges facing a coordination team: personnel turnover. There are many reasons why this happens in any institution: individuals change jobs or are given alternate responsibilities; they retire or leave the organization for other reasons. Usually, this happens one by one, and after a while, a new team has taken over; sometimes not. During *GEO-2000*, four-fifths of the team transferred to new jobs within a few weeks of each other. However, this was at a fairly late stage in the process, the draft report was well advanced, and, apart from a few delays, there was little overall disruption once new team members were identified.

Intuitively, it might be assumed that to change the team between the completion of one GEO and the start of the next would be ideal timing. However, experience shows that this is not the case for maintaining an established, ongoing process like GEO. Even though the assessment continues to evolve, and each GEO is a unique report, significant practices characterize the process and are expected to continue. If the core Secretariat team is unaware of or unfamiliar with what has happened in the past, then it is much harder for them to meet these expectations as they take the process forward. As one interviewee observed:

> This continuity issue is very, very important. That's not to say that you need the same constellation of players for every iteration of GEO. But you need something to transcend these different allegiances, these different agendas. We did have that continuity in *GEO-1* right up into *GEO-4* because whoever took over had been involved in the earlier work. So, they knew what had happened and how to take it forward.

For *GEO-5* and *GEO-6*, an almost completely new headquarters coordination team took over at the start of each process. With virtually no institutional memory to carry them forward, the GEO coordination challenge was considerably greater than if there had been more team continuity. While

there were assessment staff changes in the regions, these were less tied to the GEO cycle. As a result, it seems that GEO institutional memory in the regions has been passed on or retained more readily than at headquarters. Maybe this has also been aided by the fact that many assessment activities were more consistent in the regions than the stop-and-go global GEO process at headquarters.

Since 1995, GEO has been the chosen mechanism for UNEP to deliver on its mandate to keep the world environmental situation under review. Senior management backing is an essential criterion for any organization to meet its obligations successfully, and GEO is no exception. The support of senior managers at the divisional level helps to ensure adequate staffing and funding, builds team morale, can provide valuable top-down oversight and advice, and may encourage the rest of the organization to participate. At the highest organizational level, positive and visible interest from the Executive Director (ED) filters down to encourage greater goodwill and engagement across the organization. But that interest can raise the profile considerably of this and other aspects of UNEP's work in a much broader arena within the UN and other organizations, across member states and even to the general public. At the same time, the ED can gain considerable visibility in their own right by raising awareness of the report and disseminating its key messages to target audiences. As one interviewee remarked, "It's important to have the ED on-board to recognize it, to value it" (Felix Dodds interview).

From the start of *GEO-1* through to the completion of *GEO-6*, senior managers of the assessment division, without exception, provided strong support for all aspects of this deliverable and the teams responsible. Gaining the unconditional support of the ED was not always so easy. While *GEO-1* was embraced wholeheartedly by ED Elizabeth Dowdeswell, subsequent EDs did not adopt subsequent GEOs immediately and unquestionably. Further observations on this issue are provided in Chapter 8, which focuses on ED-GEO interactions up to *GEO-3*. The affiliations between subsequent GEOs and EDs have tended to repeat this story: an extended period of seeming indifference until the potential positive spin-offs from the process and the final products, in particular, were recognized.

Not surprisingly, the level of senior management support also appears to have been an influential factor for GEO uptake in the regions. Significantly, strong and visible support from the UNEP Latin America and the Caribbean Regional Director made a substantial contribution to the notable proliferation of GEO-related assessments in the region (Chapter 6.4). "He

was very supportive, and he opened many doors for me to operate in the region… he was pushing GEO, and he went to every meeting with a copy of the latest GEO report under his arm" (R. Norberto Fernandez interview).

The effective coordination of GEO depends on continuous and reliable communication throughout the process and across the entire range of individuals and institutions involved. Over the years, communication has been both a challenge and an opportunity, not least because of the remarkable coincidence between the life of GEO and the takeover of the global communications landscape by the Internet.

Tim Berners-Lee is credited with inventing the World Wide Web in 1989 and, in 1990, developing the first web server and the first web browser. Originally the Internet served to connect laboratories engaged in government research, and since 1994 it has expanded to serve millions of users and a multitude of purposes in all parts of the world. As of the 2010s, the World Wide Web is the primary tool billions use to interact on the Internet (Table 7.2.1).

**Table 7.2.1. Internet usage**

| | Users | |
|---|---|---|
| | million | % of world population |
| 1995 | 16 | 0.4 |
| 1997 | 70 | 1.7 |
| 1999 | 248 | 4.1 |
| 2000 | 361 | 5.8 |
| 2003 | 719 | 11.1 |
| 2005 | 1,018 | 15.7 |
| 2007 | 1,319 | 20.0 |
| 2009 | 1,802 | 26.6 |
| 2011 | 2,267 | 32.7 |
| 2013 | 2,802 | 39.0 |
| 2015 | 3,366 | 46.4 |
| 2017 | 4,156 | 54.4 |
| 2018 | 4,313 | 55.6 |
| 2020 | 5,053 | 64.2 |

Note: measured in December of each year

Source: Internet World Stats (2021)

During the first decade or so of the public Internet, the immense changes it would eventually enable in the 2000s were still developing. Few individuals possessed their own computers, laptops were bulky, data rates were slow, and media storage transitioned slowly from analogue to digital. However, these limitations did not stop ambitions to make maximum use of the communications potential of the Internet from the early days of GEO.

The first noteworthy GEO application was to conduct the North American regional consultation on the draft *GEO-1* report in 1996 by Internet rather than through a face-to-face meeting. Fortunately, this option was not attempted for the rest of the world, as it was close to being a total disaster. There was virtually no response from anyone in North America! And this explains why, unlike for every other region, there is no North American consultation listed in *Appendix 3: International GEO Consultations* of *GEO-1*. (UNEP, 1997c, pp. 260–262). It may also explain why all subsequent GEO consultations with governments at the global or regional level have been actual meetings.

However, the GEO process was not discouraged from using the Internet more extensively. In the following year, recognizing that "The World Wide Web is an ideal platform for group review and global document distribution," *GEO-1* was posted on UNEP's website "as a complement to the printed versions" (UNEP, 1997c, p. 16). This was done even though less than two per cent of the world's population was using the Internet at the time of *GEO-1*'s publication (Table 7.2.1).

As *GEO-2000* got underway, there was an early recognition of the potential benefits to be gained by using the Internet for sharing documents and other files during report production. The following comments were recorded in the report of the first *GEO-2000* drafting meeting held in November 1997:

> Several participants suggested that GEO should have a site on the web to post GEO drafts and allow GEO participants to work on these drafts. This would greatly increase the efficiency of the GEO production process, particularly at the later stages. However, due to slow and haphazard operation of the Internet in Nairobi such a site is not yet feasible. If, of course, the Mercure system would become operational in Nairobi serious consideration will be given to the development of a website for GEO-2[000] production and review[6] (UNEP, 1998, p. 16).

[6] In fact UNEP's Mercure satellite communications system designed by the European Space Agency became operational during the preparation of *GEO-2000*, making a huge difference to the organization's ability to communicate with the rest of the world (GC/UNEP, 1999).

The Internet limitations facing UNEP's headquarters in Nairobi at that time would also have been experienced by many other GEO participants and collaborators, especially those in other developing countries. The same meeting report suggested a possible alternative communications channel – a GEO discussion forum already established by the National Institute for Public Health and the Environment (RIVM) in The Netherlands and the European Environment Agency – that GEO might use. "If GEO partners consider this website useful and feasible from…their location inside or outside Europe, a GEO-wide effort could be considered, with the help of UNEP.net and/or other facilities." (UNEP, 1998, p. 16).

In just a few decades, "the Internet consolidated itself as a very powerful platform that has changed forever the way we do business and the way we communicate. The Internet, as no other communication medium, has given an international or… a 'Globalized' dimension to the world" (Internet World Stats, 2021). Essentially this has meant that internal communication is no longer such a challenge for GEO coordination. Instead, the evolution of the Internet offers many new opportunities for GEO: in communication and outreach and the report's preparation processes. A feature of the *GEO-6* process, for example, was the setting up of Communities of Practice on the online knowledge management platform UNEP Live. By July 2015, there were seven Communities of Practice, with over 1000 members. Designed to support Working Groups by enabling knowledge-sharing and partnership building within and between the groups, they were probably more active during the preparation of some of the regional *GEO-6* reports than for the later global *GEO-6*. Massive open online courses were also planned for *GEO-6* on integrated environmental assessment, data sharing and knowledge generation, although only one materialized (UNEP, 2018b).

Mobile technology has enabled a much greater Internet reach, increasing the number of users everywhere. Table 7.2.1 indicates that over half the world's population is now connected. This provides a potentially huge target audience that GEO could reach in a timely manner and might enable UNEP to become much more widely known. The interviewees made several suggestions:

- "We can do much more through social media, blogs, Instagram. Any different channel of communication to reach out to the wider public will be possible now, which we didn't have ten years ago." (Kakuko Yoshida interview).
- "…the lady that is responsible for UNEP at our agency said, 'ah, if it were only Wikipedia in wiki format it would be great.'" (Ninni Lundblad interview).

- "The problem now ... is that the report takes years and years to produce... if there is a network and...people are willing to provide more frequent updates, as some things change faster than others, it might be interesting to have that on the GEO site" (Michael Keating interview).

In the other direction, the Internet now enables access to a much wider range of data and information sources than was available to earlier GEOs, so there is no excuse for not using the best available knowledge. This also raises a new challenge for the process: ensuring that each and every source is reliable.

## 7.3 Expert and advisory groups

### *Introduction*

To date, all global GEOs established specialized groups to guide and advise the process in one way or another. Collectively, these have aimed to strengthen the information base and scientific credibility of the process and end products, maximize their policy and strategic relevance, and improve communications and outreach to stakeholders and end users. This section gives a broad-brush overview of the various groups and their support roles. Table 7.3.1 summarizes the groups that have supported each GEO.

**Table 7.3.1. GEO support groups**

| | Groups | Function | Membership |
|---|---|---|---|
| GEOs-1 and 2000 | Modelling Working Group | Develop new models; harmonize and link existing modelling activities | World experts |
| | Scenario Working Group | Articulate a range of possible futures and examine their plausibility, desirability and sustainability | |
| | Policy Working Group | Review alternative policy and response options for GEO consideration | |
| | Data Working Group | Harmonize and coordinate data activities of the GEO collaborating centres and relevant UN and international organizations | |

| | | | |
|---|---|---|---|
| GEO-3 | Scenarios Working Group | Provide advice and support, particularly on integrated assessment methodologies and process planning | World experts |
| | Data Working Group | | |
| | Capacity Building Working Group | | |
| GEO-4 | Data Working Group | Advise on indicator use, strengthening data capacities in developing regions, filling data gaps and improving data quality | World experts |
| | Capacity Building Working Group | Support, advise and guide GEO capacity-building activities, including aligning the training manual with the GEO-4 methodology | |
| | Outreach Working Group | Support and advise UNEP in outreach activities involving media and other target audiences; develop a communications strategy; connect to global networks | |
| | Human Well-being Expert Working Group | Agree the working definition and valuation of human well-being | |
| | High-level Consultative Group | Provide guidance on strategic issues related to the assessment and inputs to the draft Summary for Decision Makers | High-level individuals from policy, science, business and civil society backgrounds |
| GEO-5 | High-Level Intergovernmental Advisory Panel | Identify the internationally agreed goals to be assessed, provide strategic assessment advice and guidance on the Summary for Policy Makers and on aligning the GEO-5 process with Rio+20 | High-level government representatives (policy experts) from all six regions |
| | Science and Policy Advisory Board | Strengthen the scientific credibility and policy relevance of GEO-5; provide high-level strategic advice; evaluate the assessment | Distinguished scientists and senior representatives from the policy community |

| | | | |
|---|---|---|---|
| GEO-5 | Data and Indicators Working Group | Provide support on the use of core data sets and indicators | World experts |
| | Outreach Working Group | Prepare the GEO-5 outreach strategy; identify target audiences and relevant meetings to disseminate the same | One member of each chapter expert group + UNEP experts |
| GEO-6 | High-Level Intergovernmental and Stakeholder Advisory Group | Provide guidance on the policy assessment process, leadership on the Summary for Policy Makers, and substantive support to relevant outreach activities | Five members from each UN Regional Groups of Member States plus five stakeholder representatives |
| | Scientific Advisory Panel | Guide the assessment process and ensure scientific credibility and overall quality and integrity of GEO-6 | Two/three experts from each UNEP region and up to six global experts |
| | Assessment Methodologies, Data and Information Working Group | Provide guidance on assessment methodologies and guide the overall quality assurance of data and information flows | Experts from each UNEP region, plus up to six global assessment, data and information experts |

Sources: *GEO-1* (UNEP, 1997c, p. 16), *GEO-2000* (UNEP, 1999g, p. xiv), *GEO-3* (UNEP, 2000c, 2002e, 2004d), *GEO-4* (UNEP, 2007b, pp. 499–500), *GEO-5* (UNEP, 2012a, pp. vi, 491–492), *GEO-6* (UNEP, 2014c, 2019e, p. vi).

## *Group guidance for global GEOs*

The support groups established for the early GEOs had common goals to ensure that methodological developments in integrated assessment were brought to bear in the production of the GEO reports, that they were globally coordinated and that the studies conducted by different collaborating centres (CCs) could be compared and compiled.

> We had four Working Groups because there was so much methodology still in the process of being developed while we were doing *GEO-1*, from modelling and data harmonization to scenario and policy development. The four Working Groups were there to bring these emerging scientific disciplines to bear in the production of the GEO reports (Veerle Vandeweerd interview).

How successful these groups were in the early days is debatable. A positive response was received from interviewee Paul D. Raskin: "The Global Scenario Group became the Scenario Working Group for *GEO-1*. So, we tried to orient our work to be in the service of GEO, at the same time GEO was helping our work, so there was a lot of back and forth."

On the other hand, the report of the *GEO-3* Start-up Meeting of November 1999 notes, "it was widely recognized that the Working Groups established for *GEO-2000* made little contribution to the report for a number of reasons, mainly institutional" (UNEP, 1999i). Specific recommendations were made on how this could be improved for *GEO-3*. After *GEO-3*, the evaluation of the process showed that CCs generally considered the groups to be important (UNEP, 2004d), so improvements had occurred. The Data Working Group (DWG) got the highest rating, followed by the Scenario and Capacity Building Working Groups. And with data persisting as such a critical underlying resource for environmental assessment, it is not surprising that there has been a DWG for all six global GEOs to date, the only topical area that has been supported consistently (Chapter 7.5).

The GEO coordinating team identified members of the Working Groups for *GEO-1* through *GEO-3* based on their particular areas of expertise. As reputable experts, they participated in an individual capacity, even if partner institutions employed them. With GEO being a relatively new process, their work focused on strengthening information sources and developing appropriate methodologies for different analytical components of the reports. The four Working Groups exemplify this for *GEOs-1* and *2000*: Data, Scenarios, Modelling, and Policy.

Subsequently, an Intergovernmental and Multi-stakeholder Consultation (IGMSC) was introduced at the start of each GEO process from *GEO-4* onwards (Chapter 3). With the consultation's 2005 recommendation to involve a wider range of expertise from around the world, more stringent measures were put in place to nominate and select individuals engaged in many aspects of GEO, including the expert and advisory groups. Nominations were submitted by governments and other key stakeholders, with the final selection of individuals being made by the GEO coordinating team.

While several of the support groups continued to help strengthen GEO's analytical approaches and participant expertise, the IPCC-ization of the process also produced an upgrade in the advisory arena:

> The main change between *GEO-3* and *GEO-5* was to establish two advisory bodies, and that was really very successful. Therefore, we were able for *GEO-5* and also for *GEO-4* to have a very good report with key messages on the state of the environment at a global level. Also, having a very good policy analysis and outlook analysis with key messages checked and validated at the scientific level by an advisory body, the SAP [Scientific Advisory Panel], and then…brought to this intergovernmental negotiation led to having a very good summary for decision makers with main messages presented and discussed (Nicolas Perritaz interview).

This positive opinion on the advisory bodies was endorsed by the Terminal Evaluation of *GEO-5*, which noted that "the key *GEO-5* node for global legitimacy (and salience) was the High-Level Intergovernmental Advisory Panel and this was a truly representative group" (Rowe et al., 2014, p. 37). The evaluation also mentioned that some members of the panel carried the messages of the assessment to delegates and participants at the Rio+20 Conference (Rowe et al., 2014, p. 72), so there was a positive effect on outreach as well. More recently, the Mid-term Evaluation of *GEO-6* confirmed the overarching role of the Scientific Advisory Panel together with the UNEP Chief Scientist's Office in ensuring that *GEO-6* was scientifically credible, technically accurate and quality assured (UNEP, 2018b, para. 75). It also confirmed the role of the High-Level Intergovernmental and Stakeholder Advisory Group in monitoring the policy relevance of the process (UNEP, 2018b, para. 72). However, it also noted that there was substantial disagreement within the *GEO-6* community on the relative roles of the High-Level Group, the Scientific Advisory Panel, the GEO Secretariat and the authors. The Evaluation indicated that the jury was still out on whether undue influence had been exerted by advisory bodies or the Secretariat on authors (UNEP, 2018b, para. 73).

## *Summary*

Expert and advisory groups have provided a range of support functions to every global GEO to date. With their technical and political guidance, access to the best available data and information has improved considerably. Also, the analytical methods and standards for integrated environmental assessments have been raised. GEO reports have become more policy relevant and better aligned to user needs. They are now more likely

to reach a broader target audience. At the same time, the full implementation of proposals and recommendations from the advisory bodies continues to be dependent on their acceptance and adoption by participants and, to a certain extent, on adequate funding. In recent GEOs, the latter has been a key factor in implementing the outreach proposals in particular (Chapter 8).

## 7.4 Capacity building

### *Introduction*

Assessing the state and direction of a planet in serious environmental turmoil is a non-trivial science-policy undertaking, with few precedents before GEO and practically none with comparable conceptual and procedural breadth. State of the Environment (SoE) reports aim to be evidence-based status and trend assessments, but they rarely consider future directions. They often focus on the national level and limit their focus on the environmental dimension. Reports such as *World Resources 1986* by the World Resources Institute (WRI and IIED, 1986) or Worldwatch's *State of the World 1984* (Brown et al., 1984), and subsequent reports headed by these institutes, were global. However, they were produced by small groups of experts based mainly in developed country think-tanks and did not directly interact with policy processes. Thematic reports published by various UN bodies or Convention Secretariats, which focused on specific issues such as natural resource sectors or specific environmental problems, have had science-policy interactions, but they typically limited their attention to the focus issue.

Given these precedents, elements of GEO's integrated environmental assessment approach built on the knowledge and experience of individual experts and institutions gained from earlier assessment-related activities (Chapter 1). Yet, due to its overall ambition and scope, GEO required additional assessment capacities not readily available. Identified early on, these capacities were related to critical gaps in expertise, including rigorous use of assessment frameworks such as Driving forces-Pressures-State-Impacts-Responses, the assessment of different types of data, the quantification of policy impacts, or the construction and use of integrated assessment models in analyzing future scenarios (Bakkes et al., 1998).

At the same time, integrated environmental assessment not only requires but also builds and develops capacity. The differences between building

new and developing pre-existing capacity are discussed in Box 7.4.1. This reflected a learning-by-doing approach where individual experts and institutions engaged in the assessment process develop applied knowledge and in-depth familiarity with assessment methods while contributing to assessment products. According to Maas et al. (2020), the contribution of integrated environmental assessment to capacity is recognized as an enabling function for policy development by processing the results of assessments and for scientific advancement by supporting scientific networks and early-career scientists. Given its global perspective and reach, capacity building under GEO represented a pioneering effort to create synchronized but distributed environmental assessment and reporting processes, products and institutional capacity at the planetary level. A testament to the influence of GEO's capacity-building potential is the hundreds of integrated environmental assessment reports listed in Annex IV using the GEO approach, even if not all of them grew out of specific capacity-building efforts.

### Box 7.4.1: Capacity building vs. capacity development

During the lifetime of GEO, there have been changes in the way the practitioner and scholarly community refers to capacity. Two of the critical terms are capacity building and capacity development, defined as follows (UNDP, 2009, p. 54):

- "Capacity building: A process that supports only the initial stages of building or creating capacities and assumes that there are no existing capacities to start from.
- Capacity development: The process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time."

In contrast with the earlier concept of capacity building, according to these definitions, capacity development recognizes that there is almost always some existing, inherent capacity that can be enhanced instead of being built from the ground up, using primarily external resources and know-how. During its early years, GEO referred to capacity building and, in some cases, shifted to capacity development after *GEO-3*. However, from the beginning, the strategies, materials and activities that referred to capacity building assumed most target groups brought some capacity to their integrated environmental assessment activities that could be further enhanced to their and GEO's benefit. While we recognize differences

between the two definitions, we use capacity building in this volume, given its still common use in GEO.

This section provides an overview of the conceptualization and development of the capacity-building programme developed under GEO from its early days. Out of necessity, these activities initially aimed at addressing capacity gaps related to the production of the global GEO through training. However, partner agencies in many countries soon found the GEO approach relevant for their own national or regional-level assessment and reporting, so they also invited and welcomed capacity building and training addressing their own needs. The GEO capacity building programme was the most active between *GEO-2000* and *GEO-4*, with systematic efforts to develop training materials, training events and other support for integrated environmental assessment processes at the regional, national and local levels. A Capacity Building Working Group was established during *GEO-3* and was active throughout *GEO-4*. Working Group members included headquarters staff and several regional coordinators of UNEP DEWA and CCs involved in developing and delivering capacity-building programmes at the regional and national levels. A significant shift started during *GEO-4* with the move towards the model of the Intergovernmental Panel for Climate Change (IPCC). As discussed in Chapter 3.4, this involved putting more focus on building the capacity of individual experts through GEO internships, for example, rather than capacity at the institutional level of CCs and other partners.

With a broader view of capacity building, many more GEO activities support capacity, such as developing new integrated assessment models, improved monitoring, better access to data, or events to introduce GEO's findings to journalists and help their reporting. This view was most clearly reflected in a UNEP DEWA work plan developed after *GEO-3* and summarized in Box 7.4.2. According to the terminal evaluation of *GEO-5*, capacity shortfalls limit the use of assessment results, so capacity building is essential for GEO to play a role at the national level (Rowe et al., 2014). This section's primary focus is on capacity building to enhance skills and expertise as the core element of the assessment process.

**Box 7.4.2: Comprehensive capacity building for integrated environmental assessment and reporting**

Capacity building is much more than training, and this broader view was clearly reflected in a review of UNEP's capacity-building priorities during the implementation of the *GEO-3* process (UNEP, 2002b).

A key goal of the capacity-building work plan (UNEP, 2003b) was to improve the compatibility of reporting and assessment based on the GEO approach at regional, subregional and national levels. By doing that, it also aimed to strengthen GEO itself, given its reliance on such assessment processes and products and the capacity of GEO partners to produce them. Consequently, target groups included GEO CCs and other organizations involved in integrated environmental assessment at the national and regional levels.

The work plan differentiated between global and regional tools and activities. At the international level, its priorities included upgrading tools for integrated environmental assessment and GEO, methods and training materials related to data and all components of integrated environmental assessment, trainer guides, training activities for GEO CCs, and hands-on involvement in both *GEO-4* and annual GEOs (*GEO Year Books*).

At the regional level, it envisioned developing regional-scale strategies, regionalizing training materials and data portals, enhancing regional networks and regional activities such as training events, and twinning partnerships as a way of post-training support.

The total proposed cost of the programme for the 2003-2005 time period was US$ 3,446,000 (UNEP, 2003b).

## *The GEO training programme*

> The GEO process brings together the experts. The training programme produces new experts (Michael Keating interview).

Capacity building to enable primarily developing countries to conduct integrated, policy-relevant assessments was a goal right from *GEO-1* (Box 7.4.3).

**Box 7.4.3: Envisioning GEO's capacity building role in *GEO-1***

"The process is designed to provide in the long run an effective mechanism for international environmental policy setting, engaging experts and decision-makers from industrial and developing worlds and from international agencies as equal partners.

The process endeavours to gradually become an umbrella for global and regional environmental assessments, providing a framework and a mechanism for wide participation and co-operation that will also help build the capacity in developing countries for conducting integrated, policy-relevant assessments. As such, it should become a way to integrate and link sectoral and regional assessments, as well as a mechanism for aggregating and disseminating their results."

Source: (UNEP, 1997c, p. 15)

The need for capacity building was inherent in the integrated environmental assessment approach, so GEO adopted it as a conceptual and methodological foundation for several reasons:

First, while GEO recognized the role of CCs in bringing important regional perspectives in a credible and legitimate way, their capacities greatly varied. CCs had relative strengths in some GEO-relevant areas and weaknesses in others. In some cases, even the centres with the best understanding of regional issues had relatively weak expertise and technical capacity in environmental assessment.

Second, while GEO adopted a learning-by-doing approach overall, given the uneven and periodic nature of the assessment, the learning opportunity was limited and focused mainly on the specific contribution of a given participant. Most of the interactions concentrated around the peaks of the assessment process, often separated by long periods of inactivity.

Third, while the involvement of CCs meant some stability in institutional involvement, the actual staff involved often changed. This limited institutional memory and raised the need to regularly bring new contributors up to speed.

Fourth, integrated environmental assessment was, and still is, a new and dynamically evolving field, with new methods, concepts, data and approaches. Even with eminently capable contributors, this would require ongoing capacity building to make sure contributions are coherent and different pieces of the assessment fit together and build on each other.

Fifth, many CCs developed a keen interest and a significant role in initiating and participating in integrated environmental assessments at the regional, national or local level. However, while their role in the global GEO was often related to specific sections of the assessment, in regional or national processes, they were assumed to have integrated environmental assessment expertise overall.

Development of a structured GEO training programme started during the *GEO-2000* process when the need for strengthening integrated environmental assessment capacity was met with active and enduring donor interest from *GEO-2000* through *GEO-4*, as discussed in Chapter 7.9. At a 1998 global meeting in Brasilia, Brazil, the GEO Secretariat requested the International Institute for Sustainable Development (IISD) to scope out a training manual in collaboration with the International Development Research Center. While the latter's involvement turned out to be limited, IISD, Ecologistics and the GEO Secretariat prepared a training manual in integrated environmental assessment and reporting (Pintér et al., 1999). Subsequently, a training component developed within the GEO process (UNEP, 1999g, p. xiv). The training manual framed GEO's generic integrated environmental assessment approaches and methods in a way that made the materials useable at almost any scale and in any regional context. The pedagogy of the training manual engaged with active learning and intended to unfold in a four-day face-to-face, interactive session led by expert facilitators. The draft manual was pilot tested the following year in a West Asia regional workshop at the Arabian Gulf University in Manama, Bahrain.

By the end of 2000, at least eight training courses had been held – in Africa, Asia-Pacific, the Caribbean and West Asia – with 172 participants (UNEP, 2004b). The initial primary purpose of the training manual and capacity-building programme was to strengthen the ability of CCs to contribute to the global GEO assessments. However, it soon became apparent there was an additional and possibly even more critical need: developing integrated environmental assessment capacity to conduct assessments and reporting at the regional, national and even subnational levels. As a result, the programme ultimately targeted practitioners beyond those directly involved with GEO. The West Asia region provides a good example of this diversification, described in Box 7.4.4.

A second, significantly expanded version of the training manual, referred to as the *GEO Resource Book*, was published in 2007 (UNEP and IISD, 2007), distributed in electronic format and translated from English into the other five official UN languages – Arabic, Chinese, French, Russian and Spanish.

The *Resource Book* built on the earlier Training Manual in terms of active learning pedagogy, illustrating conceptual points with examples, and having participants go through interactive exercises. However, it had a modular design, based on the idea that capacity needs may vary from case to case and delivering an entire programme may not always be necessary or feasible. The *Resource Book* also incorporated new knowledge from *GEO-4* and the broader assessment literature. Developers also anticipated that the modules might need to be selectively updated or new ones added as new needs or integrated environmental assessment knowledge emerged.

**Box 7.4.4: Regionalization of integrated environmental assessment capacity building: The example of West Asia**

UNEP conducted national capacity-building workshops in most West Asian/Arab countries and at regional meetings that included concepts of integrated environmental assessment, scenario development, policy analysis, data and indicators, communication and outreach, impact strategy and policy development. All global GEO training manuals were customized for the region, translated into Arabic, and made available online. GEO teams also prepared GEO-Cities reporting guidelines for the region. In national training, UNEP worked with the countries to develop a framework for national SoE reports, including objectives, mandate, priority issues, setting up the team, an outline of the chapters and their content, timeline, and mapping of the data sources and actors to engage in the process. Annex IV lists SoE reports for Abu Dhabi, Bahrain, Iraq, Jordan, Lebanon, Saudi Arabia, the United Arab Emirates and Yemen. Some countries directly followed the GEO methodology in preparing these SoE reports. As one lead researcher from the Arabian Gulf University reports, "the capacity development and a methodological input from the GEO process was really rewarding for this process and my career; I can guarantee that" (Waleed Khalil Zubari interview).

There were also other specialized training resources developed, such as a methodology for environment and health assessment (PNUMA and OPS/OMS, 2009), manuals for preparing 'GEO-Cities' reports (UNEP and Consorcio Parceria 21, 2009), and a training module on vulnerability and impact assessment related to climate change (Bizikova et al., 2009). As time went on, many of the CC participants became practitioners and trainers in their own right, as they took responsibility for subglobal reporting processes in their countries and regions (Chapter 6 and Chapter 10).

GEO-Cities reporting offered the opportunity for capacity building with local authorities in many regions of the world. Staff from the Latin America and the Caribbean region prepared a Cities-customized version of the integrated environmental assessment training manual (PNUMA, 2003), later duplicated in several other regions, including Europe and West Asia and in languages such as Arabic, Chinese and Russian (UNEP, 2005d; UNEP and Consorcio Parceria 21, 2009; UNEP and ECAT, 2009; UNEP and Zoi Environment, 2011). For each GEO-Cities reporting process, UNEP staff and affiliated experts provided a multi-day training course. So when members of a local authority undertook their city's report, they had appropriate knowledge of how to proceed and continuing support from UNEP in its execution.

As part of a strategy to expand training capacity, in 2008, UNEP DEWA's European office and IISD held a taining of trainers workshop in Geneva. UNEP DEWA established an online Integrated Environmental Assessment Community Learning Platform to keep track of integrated environmental assessment capacity building and learning events worldwide, to capture regional and thematic case studies that emerged in capacity-building workshops, and to maintain a contact database and knowledge exchange among qualified integrated environmental assessment instructors. Recognizing that face-to-face training was not always needed or affordable and that reliable broadband connection was becoming more commonplace, all modules of the *Resource Book* were converted into an e-learning format by IISD's Measurement and Assessment Program and made accessible online. As e-learning requires a different pedagogical approach, a global e-learning based train-the-trainers session was held by IISD and hosted by UNEP DEWA's Latin American office in Panama in late 2009. Due to the de-prioritization of funding for capacity building during the continuing IPCC-ization of GEO after *GEO-4*, the e-learning programme has never been rolled out. Capacity-building efforts during *GEO-5* ground to a halt as a direct contribution to the global report, except for the Fellowship Programme (Chapter 7.9). As the *GEO-5* terminal evaluation explains, "while it is entirely likely that capacity of participants was enhanced through the cross-disciplinary undertaking to produce the chapters, developing countries were less represented among the chapter contributors. Overall capacity building by *GEO-5* was judged moderately unsatisfactory" (Rowe et al., 2014, p. 3).

During the *GEO-6* process, UNEP produced a new set of integrated environmental assessment guidelines (UNEP, 2019f), responding to requests from the United Nations Environment Assembly (UNEA). Following the 2007 training manual structure, they aimed at practitioners carrying out

thematic and rapid response assessments and global and regional integrated environmental assessments.

## *GEO fellowships*

To ensure some continuity of capacity building in the global process, despite the declining role of the CCs, the UNEP Secretariat introduced a GEO Fellowship initiative in August 2005 that engaged young and qualified professionals in *GEO-4*. Even before the GEO Fellowship initiative, GEO benefited from the contribution of fellows through programmes managed by some of the CCs. This included the Young Canadian Leaders for a Sustainable Future programme that involved training and placing young Canadian scholars with UNEP and various GEO CCs, several of whom subsequently undertook formal roles in the GEO process. However, the GEO Fellowship programme had a more representative global intake and provided a real learning-by-doing opportunity for the 34 Fellows from 27 countries, selected from 115 applicants to participate as contributing authors. They could attend authors' meetings, undertake some drafting, and meet and network with a broad group of specialists in their own and other fields. Their home institutions met participation expenses as in-kind support to the overall GEO process.

A few lessons were learned from this initial round: arriving partway through the process made it difficult for Fellows to know how best to contribute, and it would be good to give them an orientation session early in the process (IUCN and UNEP, 2008). The GEO Fellows initiative continued through *GEO-5* and *GEO-6*. *GEO-5* engaged 21 Fellows from 18 countries, and the *GEO-5* terminal evaluation considered it a success (Rowe et al., 2014). Fellows were chosen for their capacity to contribute and the likelihood of benefiting significantly from their association with *GEO-5*. A larger proportion of Fellows – compared to *GEO-5* author teams and most advisory/consultative groups – were women and came from developing countries (Rowe et al., 2014). There were 27 fellows from 15 countries involved in *GEO-6*. These early-career professionals individually participated in all but one of the 25 chapters of *GEO-6*, and several were involved in more than one chapter.

"I think one of the very useful things that GEO has done is that it brings in GEO Fellows, these professionals at a very early stage of their career and exposes them to internationally experienced authors and scientists of different sorts" (Peter Noel King interview).

## *Integrated environmental Assessment capacity building: Overall insights*

Capacity building has been recognized as an inherently important component of GEO from early on. While its importance has never been questioned, its objectives, approaches, activities and products, and not the least the attention paid to it, varied. While no systematic evaluation of GEO's overall influence exists, the rapid increase of regional, national and city-level integrated environmental assessment processes and products – mainly within the 2005 to 2010 period that followed GEO's development, customization and use of integrated environmental assessment capacity-building materials and services – indicates a significant influence. This relationship is supported by several interviewees who contributed to or benefited from capacity building through either their contribution to the global GEO reports or the development of subglobal integrated environmental assessment products. An increase in the number of integrated environmental assessment processes and products is not the only measure of impact. Better qualified scientists and assessment experts, higher scientific quality of integrated environmental assessments and ultimately better decisions that result from integrated environmental assessments are equally important, if harder to quantify.

Since the peak influence of integrated environmental assessment capacity building occurred in a particular period, the characteristics of the approach leading up to and during those years offer some hints about several of the supporting conditions:

- UNEP's prioritization of integrated environmental assessment capacity building across the entire geographical range, from the global GEO to regional, national and city-level integrated environmental assessments broadly following the integrated environmental assessment approach
- Donor interest and willingness to invest in integrated environmental assessment capacity building at scale and over an extended period (Chapter 7.9 and Table 7.9.1)
- Adequate maturity of integrated environmental assessment methods and their translation into general knowledge products that are suitable for customization and use under a wide range of contexts typical of institutions interested in conducting integrated environmental assessments
- An institutional framework that includes both UNEP's headquarters and regional offices, working with CCs connected to GEO at the

institutional level, familiar with the integrated environmental assessment approach through their role in the global GEO process, and recognized as credible actors in their region

- Ongoing support for a learning-by-doing approach that allowed partner organizations to learn through continuous participation, recognizing that building genuine capacity requires persistent effort and treating integrated environmental assessment as a dynamic, evolving body of knowledge

Apart from such supply-side conditions, a policy environment conducive to the knowledge and information generated through integrated environmental assessment is also essential. Keeping both sides in mind, considerations for the future of integrated environmental assessment capacity building are discussed in Chapter 11.

## 7.5 Data support

### *Introduction*

The data and indicators work underlying all six of the global GEO reports, and many of the subglobal reports as well, was an essential support element of the reporting series that contributed to the credibility of the reports from the beginning of the GEO series. The fundamental role of data and derived indicators in integrated environmental assessment reporting processes such as GEO was taken very seriously by the UNEP Headquarters' GEO Coordinating Team (Chapter 7.2). This led the GEO coordinators and wider support team to establish an international set of contacts and ongoing working relationships for data-related work within the UN system and beyond, with GEO and other reporting processes being the focus for the cooperation.

In addition to the basic need for producing the book, the early data work for GEO was influenced by two developments: positioning GEO in terms of the activities and publications of the United Nations Commission for Sustainable Development and issues relating to the use of global data sets versus country data that arose with the publication of *GEO-1*. From 1994, efforts were kickstarted by collaboration with a close UNEP partner, RIVM, and focused on acquiring comprehensive environmental statistical and geo-referenced data sets (van Woerden et al., 1995).

The second issue of countries' own data versus globally harmonized data sets has persisted during GEO's lifetime. Comments from Brazil and China

on data used in *GEO-1* resulted in those countries hosting the next working meetings for *GEO-2000*. But their complaints about data also helped establish a UNEP-led entity that could be used to obtain, process, and redistribute international data sets and oversee data-related discussions in a fully transparent manner. The following section tells the story of how GEO data work was led, conducted and organized over the lifetime of the GEO series, along with the structure, systems and products it engendered.

## *GEO Data Working Group and its activities*

From *GEO-1* onwards, there was always a Data Working Group (DWG) (Table 7.3.1). As of *GEO-5,* it had a longer name and perhaps a wider brief for its activities, but the intent was always primarily the same: to guide the collection, harmonization and provision of data and derived indicators for use in the successive global GEO reports. While participation in the *GEO-1* DWG was very much, although not exclusively, a UN inter-agency one, the DWGs for the next three were more technical in nature, in that they were mostly composed of CC representatives and UNEP staff. With *GEOs-5* and *6*, an entirely new set of individuals from governments constituted the DWG, a shift that accords with the IPCC-ization of the GEO process (Chapter 3).

A precursor of GEO's DWG was a group symposium sponsored by the National Aeronautics and Space Administration of the USA, the United Nations Development Program, and UNEP on "Core Data Needs for Environmental Assessment and Sustainable Development Strategies" held in Bangkok, Thailand, in November 1994. But the first real meeting of the "Core Data Working Group for IEA/GEO studies" was the one that took place at the United Nations Commission for Sustainable Development in January of 1996. It was attended by over 20 representatives of UN agencies, intergovernmental organizations and private research institutions active in the field of environmental data, including major global data reporting agencies (UNEP, 1996, p. 1). This first formal DWG meeting had as objectives to:

> ...list a limited number of existing core data sets for Integrated environmental Assessments and Global Environment Outlook studies; identify major data gaps and shortcomings; [and] devise a realistic strategy and agree on joint actions to make such data more easily accessible, more freely and openly available to major global data-producing and reporting agencies and institutions and developing countries in general, and to collaborating scientific centres working with UNEP to prepare the GEO studies in particular.

Several governments did make comments about data used in *GEO-1* after the fact. In particular, the USA suggested that greater efforts were needed to fill existing data gaps, and China proposed that some countries would have preferred to verify data used in the report.[7]

The first and particularly the second GEO DWGs made impressive efforts to think through the whole of GEO in terms of ambition, scope and target audiences before coming to their data implications. Their participation and delivered input show a firm connection with the community committed to measuring progress through indicators (UNEP and RIVM, 1999).

Much of the work of GEO DWGs from *GEO-2000* through *GEO-4* focused on producing a list of core data sets for integrated environmental assessments, global environment outlooks, and related studies. The main idea was to obtain these data sets, further process them if necessary, and make them available online for a broad audience. UNEP's Global Resource Information Database (GRID) data centre in Geneva, Switzerland, was tasked with leading this effort, with support from several key partners such as the IISD, RIVM and several other GEO CCs.

Numerous meetings were held at UNEP headquarters in Nairobi and UNEP regional offices, such as Geneva, Bangkok and Mexico City, to expand and update the core data sets' list and check on progress made to fill identified data gaps. Later, in the formal evaluation of *GEO-3* (UNEP, 2004d), the DWG received the highest rating of all the Working Groups. Beginning in 2000, the GRID-Geneva centre was responsible for developing the GEO Data Portal, an online application that provided the core data sets in various formats to the CC network and beyond, and access to all of these data sets was free and open.

Most of the DWG members for *GEO-1* through *GEO-4* remained the same data or technically-minded persons, but members' profile type changed with *GEO-5*. The DWGs for *GEO-5* and 6 became less technical mechanisms than international groups of government-nominated experts providing guidance on data-related and methodological issues for the benefit of GEO and other integrated environmental assessment processes. In the case of *GEO-5*, the specific responsibilities of the Data and Indicators Working Group were to "update and maintain the global and regional data portals; provide support on data collection and verification throughout the assessment process; ensure strict application of quality controls for data and

[7] Comments made at GC-19 on *GEO-1* during "Friends of the Chair" meeting, 29 January 1997.

information; and develop specific indicators and scenario analysis to support components of *GEO-5*" (Rowe et al., 2014, p. 27). However, the group was set up late in the *GEO-5* process, just months before the first chapter drafts were due. And it met only one time and "was, thereafter, hardly functional due to a lack of UNEP leadership" (Rowe et al., 2014, p. 28).

In the case of *GEO-6*, the relevant group was renamed as the Assessment Methodologies, Data and Information Working Group, signalling a broadened role. Its key mandate was "to provide guidance on assessment methodologies and guide the overall…data and information flows," having been established to provide advice and inputs on all of these issues as well as related quality assurance procedures (UNEP, 2020a). This data working group met three times during the development of *GEO-6* to "provide guidance on the use of core data sets and indicators. They consulted with experts to review the methods used in *GEO-6*, identify priority environmental indicators as well as data gaps and related issues" (UNEP, 2019e, p. 666). In the end, it cannot be stated with certainty that the key messages conveyed in the Assessment Methodologies, Data and Information Working Group reports were fully taken on-board or have been acted on by the UNEP Secretariat in the aftermath of *GEO-6*.

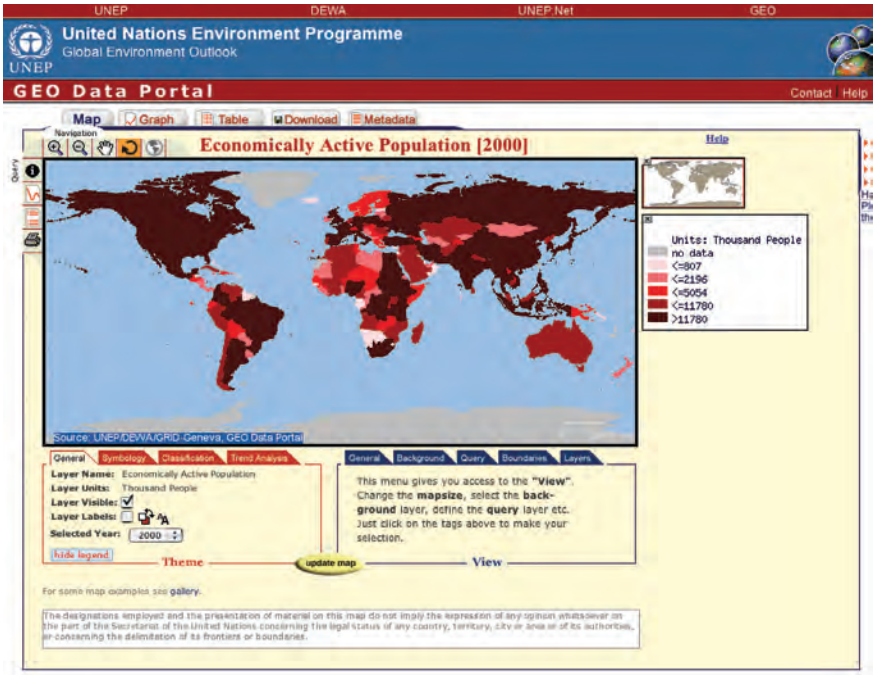
Notably, of the 18 DWG members for *GEO-5*, only four had been part of the previous one for *GEO-4*. Even more surprisingly, only one member of *GEO-6's* DWG had been part of the *GEO-5* DWG, meaning that minimal first-hand knowledge of past DWG processes remained for *GEO-6*. Perhaps this is because the perceived purpose of the DWG itself had changed from a hands-on technical data-serving function to a purely advisory role on assessment methodologies and data.

## *The GEO Data Portal and regional data portals*

At the GRID-Geneva centre, work began to develop the GEO Data Portal in early 2000. The concept of the Portal was to be a one-stop data shop, supporting the drafting and analytical work of the GEO CCs and providing access to core data from internationally recognized sources. A common database was developed to harmonize and streamline the reporting process, focusing on the major environmental themes and related core data sets. The near-term results were greater consistency in the data and thus better underpinning for *GEO-3*, facilitation of the production process, and aiding the regional and subregional GEO inputs to be better substantiated, harmonized and illustrated.

Already by June 2001, more than 100 variables had been made available in the form of country data, UNEP subregional and regionally aggregated statistics, or geospatial data. Temporally, the data sets covered to the extent possible *GEO-3's* 30-year retrospective period since the Stockholm Conference: 1972 to 2002. The Data Portal allowed data to be visualized and queried online, as well as downloaded for further analysis (Figure 7.5.1). Documentation in the form of meta-data and hyperlinks to relevant sources and useful Internet sites was also included. A CD-ROM version of the GEO Data Portal was released and distributed to GEO partners in March 2001. Developed mainly to serve the data needs of partner organizations limited by poor Internet connectivity, the CD-ROM was extracted from the main web portal.

**Figure 7.5.1. A page of the GEO Data Portal**




The GEO Data Portal in fact became the hub of an entire online system of thematic websites meant to serve relevant data to all of UNEP's partners. The Director of UNEP's Division of Early Warning and Assessment (DEWA, the parent of the GRID network) in the early 2000s was determined to build a far-reaching online system consisting of around 20 thematic and regional websites that he styled as "UNEP.net," for which GRID-Geneva was designated as the Global Data Centre. The GEO Data Portal and associated

thematic and regional websites made full use of Geographic Information Systems (GIS) and Internet Map Server (IMS) technology. Many junior technical consultants were hired to implement UNEP.net, and an RIVM staff member transferred to UNEP to serve as the GEO Data Coordinator to oversee these activities and focus on the priority needs for data and indicators. However, while the GEO Data Portal survived well into the 2010s, the wider UNEP.net structure was never fully completed nor was it maintained, and fell out of use by the mid-2000s. In the end, the UNEP.net concept was a single person's vision and not sustainable financially for UNEP.

By the time of the publication of *GEO-4*, the GEO Data Portal offered access to over 450 "harmonized environmental and socioeconomic data sets from authoritative sources at global, [UNEP] regional, subregional and national levels, and allow[ed both] data analysis and creation of maps, graphics and tables" (UNEP, 2007b, p. 499). Examples of data-set content subjects included climate, forests, freshwater, economy, education, health, environmental policies and human population. At one stage, a Human Environment Index was calculated for all countries, based on data from the Data Portal and meant to provide an environmental equivalent to the Human Development Index of the United Nations Development Programme. However, UNEP decided not to go public with this index, probably over concern that a variety of countries might challenge its scientific basis.

The way the GEO Data Portal supported GEO reporting turned out to be less as analytic data input in the drafting of GEOs since many contributions came with data already embedded, but more as a base for review, transparency and a service to readers. This was accomplished through the GEO Data Compendium and CD included with the *GEO-3* report. Ideally, report authors would have used only the Data Portal, but this proved impractical if not impossible for many reasons.

Ultimately, however, and following multiple changes in DEWA management and staff and limited resources for data and information technology support, the GEO Data Portal fell out of favour. While it was not formally discontinued, it was barely "maintained or updated as [before], and hardly used by chapter authors" in *GEO-5* (Rowe et al., 2014, para. 65, p. 28). The functioning and maintenance of the GEO Data Portal, and related regional ones, that had been in the *GEO-5* budget at a level of US$ 800,000 went completely unfunded by UNEP due to managerial decisions at the time[8]

[8] See Table 13 "Main Budget Reductions in *GEO-5*" and specifically Output B (Rowe et al., 2014, p. 62).

(Rowe et al., 2014, p. 62). In the run-up to *GEO-6*, its contents were subsumed within yet another in-house data system introduced by DEWA, UNEP-Live.

In its heyday, after *GEO-2000* and up until *GEO-5* was well underway, there were efforts to develop several regional data portals. The more prominent were the Centre for Environment of the University of Costa Rica for the Latin America and the Caribbean region, the Centre for Environment and Development for the Arab Region and Europe in Cairo for Africa and West Asia, and the UNEP Regional Office for Asia and the Pacific in Bangkok for Asia. The GRID-Warsaw centre was responsible for developing a data portal to support the UNEP-led Carpathians Environment Outlook process (Chapter 6). Consultants from GRID-Geneva who had developed and maintained the global Data Portal assisted their colleagues in the regions to programme their own portals, which were populated initially with regional data extractions and then more local/regional data sets. However, much like the global Data Portal, once funding dried up in the 2010s, these regional data portals also were abandoned or, at best, became dedicated to other, strictly regional roles.

## *GEO regional groupings*

To carry out reporting on a geographic basis – that is, by designated subregional and regional groupings of countries – it is necessary to combine statistics pertaining to groups of individual countries to obtain subregional totals, averages and other indicators. This was one of the major contributions of the GEO Data Portal work from the late 1990s. The meticulous verification of hundreds of data sets from international sources, the entry of these data into tables, and the combination of these data by subregional and regional groups of countries provide annual and other temporal statistics not just at the national level, but for all UNEP's subregions and regions (Chapter 5.4).

These regional and subregional groupings need to be stable through time and not easily influenced, if at all, by politically motivated regrouping impulses, if valid comparisons over time are desired by decision makers and other end users of integrated environmental assessments and GEO reports. UNEP itself was responsible for at least one such anomaly, in its shifting of the Central Asian subregion between its Asia and the Pacific region and its European region twice in the course of GEO's history (Chapter 5.4). There were also numerous requests to change or combine the countries designated as part of the Northern Africa subregion with

other Arab countries of UNEP's West Asia region. These requests had to be fended off by UNEP management, although they were treated as a common region for the *Environment Outlook for the Arab Region* published in 2010 (UNEP et al., 2010). And individual countries were sometimes made to change their region or subregion, as Mexico experienced when added to North America for selected sections and issues in *GEO-2000*.

Having aggregated numbers allowed for GEO authors to conduct their analyses under various environmental themes and to make comparisons between different subregions of the same region, such as Eastern and Western Africa within Africa, and among UNEP's six regions. This allowed for calculating absolute totals and other numbers, including averages weighted by population size for socioeconomic variables and by land area for physical environmental variables. These aggregated numbers for most GEO Data Portal data sets – data sets based on remotely- sensed satellite data were not included – were also essential for the modelling and scenarios work conducted in the GEO outlook chapters and for comparisons through time that could illustrate environmental improvements or degradation.

GEO's regional grouping was first published in *GEO-2000* and then again in *GEO-3* (UNEP, 2002e, pp. xxx–xxxiii) and *GEO-4* (UNEP, 2007b, pp. xxiv–xxxi). As with any regional grouping, compromises – accepting pragmatic solutions when moving from analyses to map-making – were necessary. One instance of this is Israel's formal inclusion in the UN region of Europe, to which UNEP is bound in its publications, but by necessity included in projections of freshwater use in the West Asia region. Thus, the disclaimer in GEO reports on the presentation of national boundaries is significant. One limitation of GEO's regional groupings is that it is biased towards the presence of people, that is, on land. Marine issues eventually required a complementary grouping, borrowed from the United Nations Food and Agriculture Organization Fisheries Statistics.

## *UNEP-Live (Environment Live)*

While the early development of what was to become UNEP Live was already underway by mid-2012, the arrival of a new Director of DEWA in late 2013 raised this new technology platform to the fore. UNEP-Live was a far broader concept promising to do much more but still covering data support for GEO reporting. According to a 2012 UNEP brochure, the idea of UNEP-Live was to develop "both a conceptual framework and a technology platform to organize and manage knowledge and capacity-building

activities for environmental assessment, monitoring and reporting" – an ambitious undertaking for the UN's environment agency (UNEP, 2012c).

The stated goals of UNEP-Live were admirable: "to create and share knowledge for environment assessment" and "[offer] an innovative way to keep the environmental situation under review," the latter being one of UNEP's key missions (UNEP, 2012c). It was intended to cover three main functions: provide access to environmental information assets held by UNEP and its partners; enable countries to collect, manage and share data supporting environment assessment processes for national priorities; and assist countries in moving towards data-driven SoE reporting. While UNEP-Live may have partially succeeded in the first of these for the *GEO-6* cycle, it is not clear if it achieved the other two.

This design concept originated in a European context, where a similar system put into place over at least one decade by the European Environment Agency was used by member countries to maintain a central database for pan-European reporting in a highly distributed fashion and according to strict quality control criteria. It appears that in trying to develop a similar application for global use, UNEP overlooked the fact that there were significant cost, developmental time and capacity-building needs associated with its use by countries.

The prototype of the UNEP-Live platform was formally launched at the 10th Plenary Session of the Group on Earth Observations and its Geneva Ministerial Summit on 16 January 2014. Under great time pressure and resource-intensive development from early 2014 onwards by an in-house UNEP team, the application was promised for rollout in time to support the *GEO-6* reporting cycle. While much was accomplished towards what could have become a genuinely operational system, the vast financial and human resources made available (that is, in a UNEP context) proved insufficient for the task. Aside from resources, the technical challenges faced in running the system from UNEP Headquarters in Nairobi and getting country stakeholders to actively use the system when little or no training was offered proved to be major obstacles in making UNEP-Live operational.

What started as UNEP-Live was renamed Environment Live in 2016 under a new ED. The DEWA Director who initiated work on the system departed, and the entire application was once again transferred back to the GRID-Centre in Geneva, where it currently resides under the broader umbrella known as the World Environment Situation Room.

## *Illustrations: figures, graphics, maps, photos and satellite images*

Over the various editions of GEO, numerous attempts were made to enliven the texts with graphics, maps, photos, satellite images, tables and other types of illustrations. Many of these illustrations were included in the texts, but some also appeared as separate complementary publications, such as the electronic booklet *Vital GEO Graphics* prepared by GRID-Arendal within the popular *Vital Graphics* series, meant to promote communication of scientific findings in accessible, easily readable and environmentally friendly format (GRID-Arendal, 2009), along with the infographics of *GEO-6*.

Coordinating Lead and other authors of GEO chapter drafts were strongly encouraged to find or devise such graphics, maps and tables to enhance their texts. UNEP staff, particularly those working on the GEO Data Portal (which may explain the large increase in graphics and maps that came with *GEO-3*), worked closely with authors to assist them in illustrating their chapters. This was true, at least, for the two middle *GEOs-3* and *4*.

*GEO-1* is the least illustrated of all six global GEOs to date with, for example, a mere 17 basic map compositions. Many chapters lack any chart, figure, table or other illustration, and not a single photo appears in the entire volume. At nearly twice the length of *GEO-1*, *GEO-2000* contained barely 20 maps, although there were copious figures and tables but still no photos. Also, the palette of colours used for both *GEOs-1* and *2000* was very limited; in the first case, only brown-orange, olive and grey tones, and in the second case shades of blue, orange and grey, giving both volumes a pallid look. The cost of using a full range of colours is most likely the reason for this initial dullness.

**Table 7.5.1. Maps and satellite images in global editions of GEO**

| | *GEO-1* | *GEO-2000* | *GEO-3* | *GEO-4* | *GEO-5* | *GEO-6* |
|---|---|---|---|---|---|---|
| Maps | 17 | 20 | 50 | 40 | 35 | 55 |
| Sat images | 0 | 0 | 40 | 20 | 15 | 6 |

Note: numbers are approximate

All of this changed dramatically from *GEO-3* onward. *GEO-3* contained nearly 50 maps and over 40 satellite images, and a vast number of photos, which taken together make *GEO-3* much more interesting to look at and read. *GEO-4* included around 40 maps and 20 satellite images, whereas,

in *GEO-5,* these same numbers fell off to 35 and 15. The much longer *GEO-6* featured nearly 55 maps but had only six satellite images. However, all four volumes after *GEO-2000* are copiously illustrated with a large number of figures, photos and tables, as well as explanatory boxes, and they use a full range of colours. For *GEO-6*, aside from the usual illustrations, infographics on specific topics were prepared to explain policies, the way forward, and drivers of environmental change and to illustrate air, biodiversity, freshwater, land and other themes.

## *Conclusion*

From the beginning of GEO reporting in the mid-1990s, the issue of data and how they are used in GEO reports has always been a major consideration for UNEP and its close partners. In several ways, the arc of data work related to the GEOs seems to imitate the broader GEO process that it supports. The late 1990s was a period of ramping up data-related efforts through early DWG meetings and initial collections of international data sets. The decade of the 2000s saw the full development of the DWG as a technical support group in direct relationship to the expanding GEO Data Portal. Then for *GEOs-5* and *6* in the 2010s, the DWG became more an advisory group than a technical one. The Data Portal was abandoned for what was meant to become a technology platform that governments could interact with and claim. This evolution in data for the GEOs tracks nicely with the IPCC-ization of the broader GEO process and the desire of governments to play a more significant role in its underlying mechanics.

Arguably, GEO's data work has provided the richest and most extensive of its support structures after the work of the GEO Coordinating Team at Headquarters. The time it took to build up the data structure, from conception in the mid-1990s to the successful production by the early 2000s, was considerably longer than one GEO edition. This is typical of any solid data system, even if the total funding for such an operation was limited. Contrary to initial thinking, the GEO Data Portal operation, and probably all GEO data work, served less as input for GEO drafting and more as a base for review, transparency, and direct service to readers.

It remains to be seen how data elements would be handled for a putative GEO-7. But it is worth recalling that for *GEO-6*, one of the specific objectives of the global and six regional assessments was to "keep the state of environment under review based on enhanced access to country data provided through Environment [UNEP-] Live" (UNEP, 2018b, para 31, bullet 1). Despite this, the *GEO-6* Mid-Term Evaluation mentions that "a number

of respondents indicated that relationships should be restored with the major international data collectors"[9] (UNEP, 2018b, para. 60), which appears to be less than a sweeping endorsement of what UNEP-Live made available in terms of data and functionality. Further along, the Evaluation states that "it seems clear...that the scientific credibility of the GEOs would be enhanced if strong relationships with data collectors are restored. This would mean reintroducing the [earlier] collaborating institutions model used in previous GEO processes" (UNEP, 2018b, p. 139).

If taken seriously on its own, the latter statement would have major implications for the entire direction of the broader GEO process and not just the realm of data, as UNEP and close institutional partners chart the path towards a seventh Global Environment Outlook.

## 7.6 Report preparation process

### *Introduction*

With UNEP's governing body giving clear orders and specific delivery dates for every global GEO, it has been important to map out, early on, the key activities that need to be undertaken with an accompanying timetable to ensure the timely completion of the report. Some of the plans and preparations for *GEO-1* began before the Governing Council (GC) took Decision 18/27 in May 1995 requesting a new kind of state of the global environment report (Chapter 1). The head start was fortunate as there was only a year and a half before *GEO-1* had to be delivered in early 1997. *GEOs-2000* and *3* were not on quite such a tight schedule: *GEO-2000* had around two and a half years of preparation time; *GEO-3* was even more fortunate as the decision for its go-ahead was made several months before *GEO-2000* had even been completed. Moving to a five-year cycle from *GEO-4* onward certainly eased time constraints on the preparation process, with *GEO-4* delivered in 2007 and *GEO-5* in 2012 (Annex I). However, the process itself also became somewhat more complex and time-consuming due to the IPCC-ization of the report (Chapter 3). With the introduction of regional *GEO-6*s, supposedly to feed into the global report, the UNEP Secretariat ended up requesting the UNEA, which took over from the GC as governing body in 2012, to amend the issue date of *GEO-6* to 2019, extending the gap to seven years.

[9] The Evaluation's formal *Recommendation 3* is that "Whatever structure is chosen for potential future GEOs, consideration should be given to significantly strengthening relationships with important international data providers" (UNEP, 2018b)

This section summarizes the sequence of key process elements taken to prepare GEO reports and process adaptations that have occurred in successive GEOs. More detailed information on the preparation processes can be found in the front or end matter of each report.

## *Elements and milestones in GEO report preparation*

Once the mandate was clear, the activities required to undertake a GEO report can be grouped into three stages: planning, content development and production. Table 7.6.1 summarizes what needs to be carried out during each phase.

**Table 7.6.1. The three phases of GEO report preparation**

| Planning | Content development | Production |
|---|---|---|
| Decide on scope & objectives<br>Decide on analytical framework<br>Prepare report outline<br>Draw up process time frame and milestones<br>Prepare methodology guidelines & data provision to author teams<br>Identify & enlist participants and agree respective tasks<br>Calculate budget and secure funding<br>Agree and sign contracts | Authors meetings<br>Advisory group meetings<br>Consultations with governments and other stakeholders<br>Underlying database development<br>Chapter drafting<br>Chapter review<br>Chapter revision<br>Preparation of front & end matter<br>Compilation of full report<br>Report sign-off<br>Preparation of spin-off products | Editing<br>Preparation of maps & graphics<br>Design & layout<br>Proofreading<br>Translation<br>Printing and publishing |

Other parts of the process were intended to happen continually and strengthen from one GEO to the next but following a slower development cycle. They include support systems such as capacity-building and constructing the GEO Data Portal and data collection; interacting with planning, sponsoring and executing methodology research; further developing the network of CCs; and reaching out to stakeholders. These are described elsewhere in the book (Chapters 3, 7.4, 7.5 and 8) and are not covered in this section.

Progress monitoring has been another ongoing activity, being vital to ensure that milestones and deadlines were being met. GEOs were all undertaken within the framework of UNEP's Programme of Work to enable regular reporting to UNEP's senior managers, the Corporate Services Division, and member states. An additional process component that aims to link one GEO to the next is evaluation: how well did the process and report meet expectations and what lessons can be learned for the next GEO. This is also described, in Chapter 7.7, as one of GEO's support systems.

## *Evolution of the GEO report preparation process*

While the elements in Table 7.6.1 have been common to all GEOs, how some of them have been achieved has varied quite considerably. A comparative analysis of the six reports illustrates how key parts of the process were adapted to meet the circumstances under which each report was prepared.

*GEO-1* got off to a smooth start, as much of the planning for the new report had already been thought through and even tested before the GC decided it should be implemented. Two meetings were also held with prospective CCs, and potential funding sources were explored (Chapter 1.4). So once GC Decision 18/27 was passed in 1995, the team was ready to develop content. The main task of chapter drafting was undertaken by different CCs, with help from the GEO Team in Nairobi, and advice and support provided by the four working groups (Chapter 7.3). All member states were invited to review the draft report and participate in regional or subregional consultations held from July to September 1996.[10] The remaining content development and book production tasks were followed through rapidly after this. One of the CCs, the World Resources Institute, took responsibility for most of the final stage. *GEO-1* was launched during GC-19 in February 1997.

To a large extent, *GEO-2000* followed the same model but over a longer period and with more participants; over 800 individuals contributed to its preparation. After the Inaugural Meeting of UNEP's GEO CC Network in March 1997, a consultation on the framework of *GEO-2000* in April and a planning meeting in May of that year, drafting began around the world on the core state of the environment reporting and on policy and futures

[10] Regional consultations were held for Africa, Europe, Latin America and the Caribbean and West Asia. Four subregional consultations were held in Asia and the Pacific. For North America it was decided to hold a virtual consultation to save money and try out in 1996 the relatively new Internet technology. There was an extremely low response rate from this region.

chapters. CCs and individual authors came together for two drafting meetings during the next nine months, with the first draft of the report compiled in February 1998. It was distributed to governments, other UN organizations and experts for review. Nine policy consultations, organized by UNEP Regional Offices and with CC representatives as resource persons, were held in April and May. Work then started redrafting the core chapters for a second review and preparing the remaining inputs for the report to move into the production phase in time for distribution at the next GC in May 1999.

However, several unanticipated things disrupted this plan. First, it was realized from the initial review that it would take longer than planned to revise the core chapters, and two of them would need drastic reorganization. Second, the date of GC-20 was brought forward from May to February of 1999, so there was no way that the report would be published by then. And third, the five-person GEO Coordinating Team at UNEP headquarters disintegrated in the second half of 1998, with all but one of them moving on to other jobs. In the end, and with the partial reconstruction of the Coordinating Team, there was a six-month extension to the original plan, GC-20 got a comprehensive brief, and *GEO-2000* was officially launched in September 1999.

Two months after the launch, a start-up meeting for *GEO-3* was held in Nairobi, followed by the First Production Meeting in April 2000 in Bangkok. There was a series of inception meetings for regional CCs to plan their respective contributions in May and June. A Second *GEO-3* Production Meeting took place in Mexico in April 2001, resulting in a complete draft ready for external review and regional consultations that followed in May and June of that year. In the meantime, there was a second set of very key meetings for the participatory development of the *GEO-3* Outlook chapter. For the first time, a full set of innovative scenarios were being purpose-built for GEO (Chapter 5.2). To elaborate the four scenarios and quantitative evaluations at both global and regional levels, the process started with global meetings in mid-2000, followed by a series of meetings exploring the scenarios for each region. The process culminated in a final interactive meeting where participants agreed the final storylines from all viewpoints and their implications for respective regions.

The chapter review and regional consultation processes for *GEO-3* followed a similar approach to that of *GEO-2000*. However, the number of regional consultations expanded to 12, with six in Asia and the Pacific and two in North America. There was a second innovation towards the end

of the content development of *GEO-3* when UNEP ED Töpfer suggested a two-round Delphi questionnaire process to explore future environmental policy development with external policy experts. After the Delphi process results were received and analyzed, the ED followed up by chairing a meeting in November 2001 with UNEP's Senior Management Group to help formulate the Options for Action in the report's final chapter. Once the report content was finalized, there was nearly half a year left for carrying out the necessary production tasks before publication and launch in May 2002.

Two meetings were held in 2004 to plan and design *GEO-4,* and a series of multi-stakeholder regional consultations took place in the same year to identify key regional issues. Then in February 2005, the IGMSC formed the culmination of the design process and came up with a clear set of conclusions and recommendations on the objectives, process, outline and key questions for *GEO-4* (Chapter 3.3). While the critical elements of the content development remained – drafting, reviews, regional consultations, revision and other processes – the main responsibility for specific chapters was passed to working groups of individual experts. Over the next two years, there were more than 20 chapter-focused meetings, three broader Production and Authors' Meetings attended by between 90 and 200 participants, and numerous meetings of the high-level and advisory groups. The regional consultations were convened in June and July of 2006 to consider the first draft of the report, and the complete text of *GEO-4* was signed off by coordinating lead authors in May 2007 and then passed to the production team. A second IGMSC took place in September 2007, the month before the launch of the full report, to consider and endorse the *GEO-4* Summary for Decision Makers (SDM). Thus, having been shifted to the five-year report cycle, there was time to adjust the *GEO-4* preparation process to accommodate the new recommendations of member states. In the end, the overall process was completed in a little over three years.

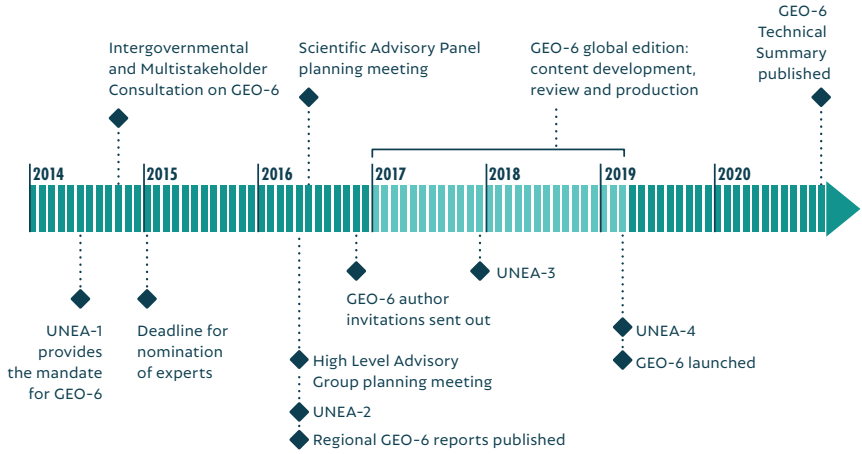
The First Expert Group meeting on *GEO-5* was held in October 2009 to take a first cut at planning the next report and using the lessons learned from *GEO-4* as a starting point. An Expert Working Group Meeting in January 2010 made further preparations for the IGMSC in March 2010, which subsequently finalized and approved the objectives, scope and process for *GEO-5*. The preparation of *GEO-5* followed a fairly similar sequence to that described above for *GEO-4*, but the schedule was tighter. Following the first IGMSC, the nomination and selection of expert authors for chapter working groups took another four months, so the First Production Meeting was held in November 2010.

Meanwhile, the regional consultations were brought forward in the process, with seven held in September and October 2010 to determine priority environmental challenges and potential policy options for each region. Following advisory group meetings, two global authors' meetings, more than 30 chapter working group meetings, and three rounds of review, the content was signed off by the authors late in 2011, with report production completed in May 2012 before the global launch in early June. The Summary for Policy Makers (SPM) was negotiated and endorsed by an Intergovernmental Meeting at the end of January 2012 and launched in February at the 12th Special Session of the GC/Global Ministerial Environment Forum.

In line with earlier GEOs, UNEA-1 in June 2014 requested the preparation of *GEO-6* for endorsement by UNEA no later than 2018. It requested the ED to consult with all regions regarding their priorities to be taken up in the global assessment. The IGMSC in October 2014 noted the recommendations from the *GEO-5* evaluation; defined the scope, objectives and process for the next report; and took a new approach by agreeing that *GEO-6* would build on regional assessments. To do this required a new, full set of regional *GEO-6*s. Their simultaneous preparation took almost the next two years. They were released in May 2016 during UNEA-2 and in each region, although the launch events were low-key.

In the margins of the 2014 UNEA, the High-Level Intergovernmental and Stakeholder Advisory Group and select members of the Scientific Advisory Panel developed an annotated outline and provided guidance for the preparation of the global *GEO-6*. Subsequently, some authors and co-chairs from the regional assessment process plus some members of the Scientific Advisory Panel met in Bangkok in mid-2016 to develop a list of prospective co-chairs, vice-chairs and authors for the global assessment. The prospective authors were sent invitations to participate in late 2016, and *GEO-6* finally got off to a start in February 2017 at the first global authors' meeting held in Frascati, Italy. Recognizing that time was too short for delivery in 2018, the UNEP Secretariat requested UNEA-3 in 2017 to grant an extension to deliver the final report at UNEA-4 in 2019 (UNEP, 2017c, para. 8). This was duly agreed (UNEP, 2017b). Figure 7.6.1 illustrates the prolonged run-up and delayed completion of the *GEO-6* process.

**Figure 7.6.1. The extended life of *GEO-6***




*Designing and producing a global GEO edition is a matter of years.*

Source of information: *GEO-6* (UNEP, 2019e)

The global *GEO-6* work programme is summarized in Figure 7.6.2. In many ways, it resembles the preparation processes of the earlier GEOs, with authors' meetings interspersed with alternating drafting and review periods. In reality, many additional elements and events over the remaining two years are not included in this timeline graphic.

*GEO-6* contains 25 chapters. It was decided to prepare them in two batches. The first two global authors' meetings focused on Chapters 1–9, which then moved into the review and revision process. The third global authors' meeting initiated work on the remaining 16 chapters. Supplementing these in-person meetings, there were hundreds of virtual meetings for individual chapters.

A new element, very visible and adding to the multilevel character of the *GEO-6* process, was the introduction of two Co-chairs and Vice-chairs to lead the production of the report (UNEP, 2019f, pp. i, vi, xxviii–xxxi). In a UNEP press release of 21 October 2016, the Chief Scientist stated, "working with hundreds of leading scientists from around the world, the co-chairs will bring focus and scientific excellence to the process" (UNEP, 2016i).

The advisory bodies (Chapter 7.3) were active throughout the process. In addition to face-to-face meetings – for example, the High-Level Group met in person seven times between 2015 and 2018 – each of the three

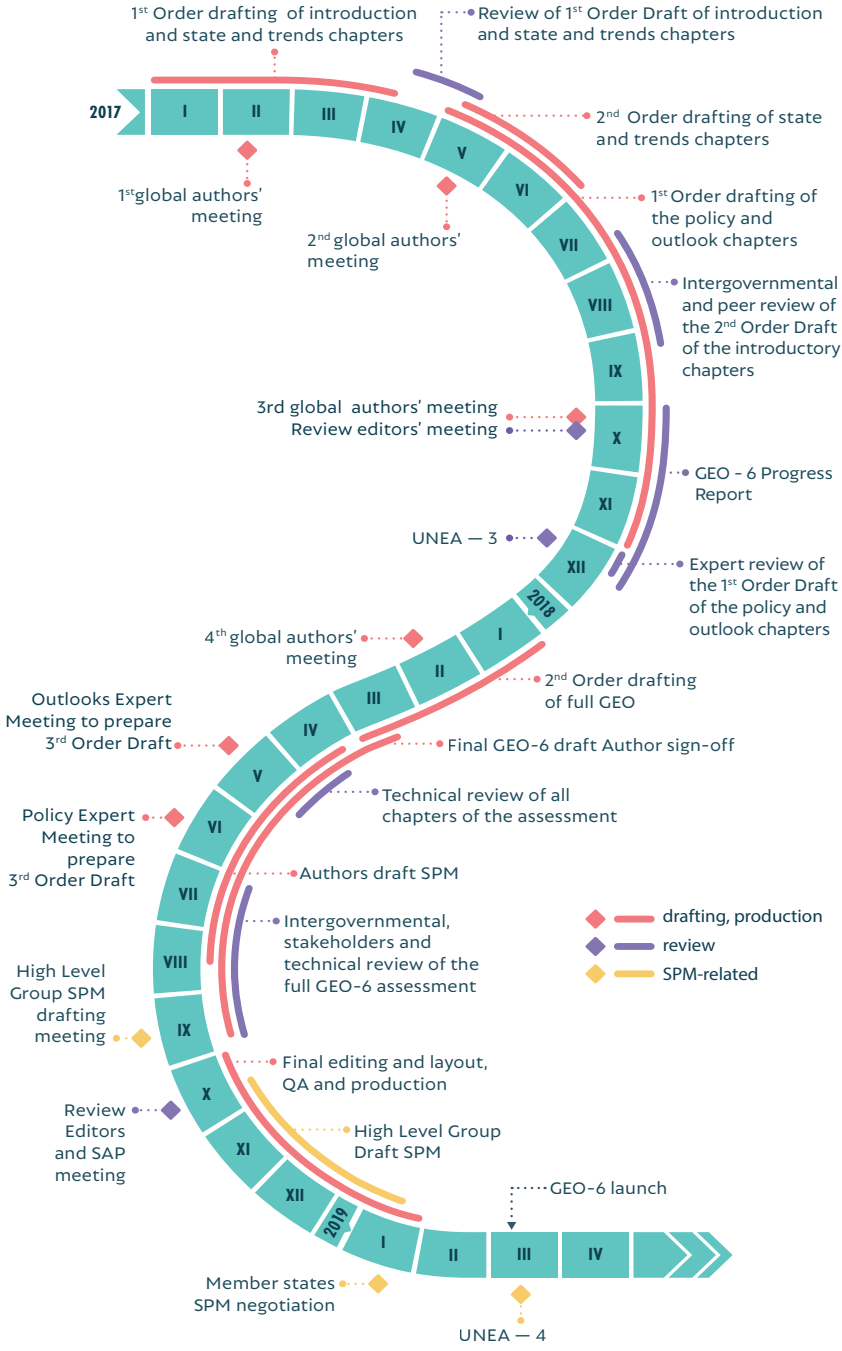
groups met virtually, often on a monthly basis. Towards the end, the High-Level Group assisted with the formulation of the SPM, and the Scientific Advisory Panel issued a statement confirming the scientific credibility of the report. Continuing the enhanced review processes introduced in *GEO-4*, the global assessment underwent five rounds of review, although only the final round included all 25 chapters. Terms of reference and guidelines were drawn up for reviewers, and the mainly online process was overseen by review editors who also attended meetings (Chapter 3.8).

Following in the footsteps of the IPCC, the combination in later GEOs of establishing scientific advisory groups and strengthening review processes may indicate an increased emphasis on quality assurance. While scientific credibility has always been important, additional standards and principles have been introduced as the science of natural systems and human societies has gained a higher profile. These include more scrutiny to ensure reliable and verifiable data sources; guidelines on acceptable knowledge sources; screening contributor credentials; more chapter reviews and greater oversight of the review process; and verification of the scientific credibility of end products by the science advisers.

This trend is perhaps best exemplified by inclusion of a confidence statement for every finding listed in the SPM and the Executive Summary of each chapter of *GEO-6*. There are four categories: 'well established' indicating much evidence and high agreement, 'unresolved' meaning much evidence but low agreement, 'established but incomplete' denoting limited evidence but good agreement, and 'inconclusive' suggesting limited or no evidence and little agreement (UNEP, 2019e, pp. 22, 625–628).

Final editing and layout of *GEO-6* took place from October 2018, and the SPM was drafted and circulated before the end of 2018, before its negotiation by member states in January 2019. The full *GEO-6* report and the SPM were both welcomed with appreciation by UNEA-4; looking forward, the ED was requested to prepare both a long-term data strategy and an options document on the future of the GEO process (UNEP, 2019j). A Technical Summary (a novelty for GEO) was published in 2020, focusing on method, content and evidence (UNEP, 2020f).

**Figure 7.6.2. The GEO-6 Process - drafting, review and production**




Source of information: *GEO-6* (UNEP, 2019e)

### *Conclusion*

While the time interval between global GEO reports has lengthened by two to three times over the past 25 years, the process of preparing these reports has also become much more complex, particularly with the IPCC-ization of the process from *GEO-4* onward, which places increasing demand on participants and the GEO Secretariat alike. Meeting the essential attributes of relevance, legitimacy, and credibility has always been a top priority. Hopefully, lessons are passed from one GEO to the next, and they have likely been considerably strengthened.

As the *Review of the Initial Impact of the GEO-4 Report* stated:

> An assessment's influence flows to a great extent from the process through which it creates knowledge... This requires at all times good management of the production and consultation processes and the weighing of benefits and disadvantages when dealing with the potential tension between scientific credibility and political relevance and buy-in (IUCN and UNEP, 2009, pp. 59 and 69).

There are useful take-home messages from some of the challenges that have been faced during the GEO preparation processes:

- Careful planning of each stage in the process is a must, including setting milestones
- Ensure there is adequate time allocated for each stage and its related activities
- As far as possible, include participants early on, so they feel part of the process and take ownership
- Be flexible where necessary – even the best-laid plans may need to be modified
- Allow for contingencies to deal with the unexpected, and
- Institutional memory is a very useful asset.

## 7.7 Evaluation process

### *Introduction*

One underlying purpose of evaluation is to learn from the past to improve for the future, so in essence, this is part of GEO's continuous learning- by-doing practice. Evaluation is also a key tool for proving concrete outcomes

and impacts of a process and its products – to justify the efforts and costs that were committed. Every GEO has undergone at least one evaluation process, most of them following completion of the report. Some evaluations have encompassed a wide range of topics across the report and process; others have focused more narrowly on operational parts of the process and impacts.

Evaluation is a regular and compulsory component of UNEP's Programme of Work procedures, and there is an internal Evaluation Office with responsibility for ensuring that this is carried out periodically by external consultants. In addition, several GEO evaluations have been carried out by the GEO Team or commissioned separately by employing independent experts and institutions to avoid bias and gain additional insights. Academic studies and less formal feedback from various sources have contributed to a better understanding of what has worked well for GEO and where improvements were needed. As a bottom line, UN member states have collectively and individually evaluated GEOs since their start. Through GC/UNEA decisions, they have made formal adjustments to the process and products to better meet their needs.

This section summarizes the more prominent evaluation processes carried out on global GEOs, with examples of some of the follow-up that has resulted in process and product evolution.

## *The role of evaluation in GEO's evolution*

Since 1997 when *GEO-1* was launched, GEO-related decisions/resolutions of UNEP's governing body (GC/UNEA) have encapsulated the collective opinions of member states on the GEO process and products. They constitute an initial, high-level evaluation of whether government expectations were met and provide requests or directives to the ED or others on what should happen in the future.

*GEO-1* experienced government evaluation from the day it was launched in 1997. Many member states commented on the report, and its preparation process, during a side meeting of the Programme Subcommittee. The majority welcomed the report, its interactive process and regional focus. They also suggested future improvements based on perceived shortcomings that included data issues, the consultation process, inadequate resources, and inconsistencies between GEO findings and UNEP's Programme of Work. Some of the major concerns to be addressed were included in Decision GC19/3 requesting the next GEO. Many additional

examples of how the member state evaluations since *GEO-1* have been translated into recommendations for subsequent GEOs can be found in Annex I.

Two more structured evaluations were carried out, analysing both *GEO-1* and *GEO-2000* in the same exercise (Attere, 2000; UNEP, 2004b). Table 7.7.1 summarizes their main evaluation components. Since the Attere (2000) evaluation was commissioned by UNEP's Evaluation and Oversight Unit in connection with the approved programme of work, the GEO Team was required to prepare an official response to each of the 14 findings and recommendations. The subsequent Implementation Plan prepared in mid-2001 outlined proposed actions. A few of the recommendations were considered unfeasible, and some funding and staffing issues remained, while some measures fell beyond the remit of the GEO Team. However, action had already been taken on many of the recommendations.

**Table 7.7.1. Formal evaluations of *GEO-1* and *GEO-2000***

| Evaluation components | ***Evaluation Report of Global Environment Outlook -1 and -2 Processes*** (Attere, 2000) | ***Global Environment Outlook: User Profile and Impact Study*** (UNEP, 2004b) |
|---|---|---|
| Stated purpose of evaluation | To establish if the GEO project achieved its objectives<br><br>To contribute to an improved GEO in the future<br><br>To determine the ability of GEO to provide policymakers with the most adequate information to allow them to make appropriate decisions at national, regional and international levels | To respond to GC Decision 20/1 requesting a "Global Environment Outlook user profile and qualitative analysis of the actual use of the first and second Global Environment Outlook reports and the Global Environment Outlook process." |
| Methodology | Desk study and interviews with UNEP staff at headquarters and Africa office as well as information provided by 10 CCs for analysis of UNEP 2004a | Document review and questionnaires to five groups, including government representatives, CCs and report readers<br><br>Interviews with UNEP staff and others<br><br>Case studies |

| | | |
|---|---|---|
| What aspects of the GEO process were assessed? | The appropriateness of the process, scientific reliability of information collected and the process by which it was collected<br><br>UNEP staffing issues, budget and involvement of other UNEP divisions<br><br>Role of CCs and other UN agencies<br><br>Capacity-building needs<br><br>Data issues<br><br>Reactions of different regions to *GEO-2000* launches | A qualitative, and where possible a quantitative, profile of users of the *GEO-2000* and *GEO-1* reports, including a typology of users<br><br>How readers were using the GEO reports<br><br>A qualitative, and where possible a quantitative, analysis of the impact of the GEO reports and process |
| Evaluation outcome | Fourteen 'Findings' and related recommendations on all the above issues | Forty-five 'Findings' mainly related to *GEO-2000* on product distribution, user profiles, product use, impacts of products and process and suggested improvements |

Among other improvements, a web-based GEO Data Portal had been set up at GRID-Geneva (Chapter 7.5), a medium-term capacity-building proposal had been prepared, some vacant posts had been filled, other UNEP divisions had designated GEO focal points, and several new CCs had been identified to fill geographical gaps. Although many of the recommendations would have already been considered logical ways to improve the future of GEO, the fact that they were embodied in an official programme of work evaluation probably gave them added justification, and senior management support, for being carried through.

In late 2001, the IISD was commissioned by UNEP to carry out an evaluation based on the views of CCs that had participated in *GEO-3* (UNEP, 2004d). In 2002, a survey distributed to 36 CCs received responses from 28 of them. These responses were analysed as part of the preparations for upgrading the GEO system for *GEO-4*. To find out more about GEO users and usage, a reader survey feedback form was included with the *GEO-3* report, and 355 responses were received from users between May 2002 and July 2004. Web usage of *GEO-3* was also monitored over the two years following its launch in May 2002, revealing monthly totals, a steady increase in use over time, the most popular sections downloaded and the geographical distribution of visitors (UNEP, 2004e). The two *GEO-3* evaluations are summarized in Table 7.7.2.

**Table 7.7.2. Formal evaluations of *GEO-3***

| Evaluation components | ***SWOT Analysis and evaluation of the GEO-3 process from the perspective of GEO collaborating centres*** (UNEP, 2004d) | ***Use of the GEO-3 Report: user feedback analysis and the GEO website statistics*** (UNEP, 2004e) |
|---|---|---|
| Stated purpose of evaluation | To review lessons learned and make recommendations regarding the reporting cycle, production process, communications, products and other aspects of GEO from the CCs' perspective | To gain information on<br>Users of *GEO-3*<br>How readers have used the report<br>Users' views, opinions and requests relating to *GEO-3*<br>Web usage |
| Methodology | A questionnaire sent to *GEO-3* CCs including a SWOT analysis relating to GEO as well as specific questions on CC performance and the *GEO-3* process | A user survey questionnaire was included in the *GEO-3* report containing 16 questions about the report and the users. Responses were collated in Excel spreadsheets before analysis. GEO website traffic was monitored on UNEP headquarters site |
| What aspects of the GEO process were assessed? | Performance of GEO as an assessment and reporting process<br>Performance of GEO CCs and the CC network<br>UNEP's performance in coordination and management<br>Assessment and reporting methods<br>Capacity issues | User affiliations and geographic distribution<br>Ratings for chapters and various report attributes, such as structure and readability<br>Most useful report components, such as global and regional coverage<br>Policy significance<br>Website visits, views, hits and downloads |
| Evaluation outcome | Strengths of GEO plus many suggestions for upgrading the system to the next level, including CC capacity-building needs and network interaction, more stakeholder involvement, data gaps, integrated policy assessment, inadequate funding | What audiences did *GEO-3* reach, how did they use it, and what did they like and dislike about the report<br>Statistics on web usage |

The GEO Coordination Team in Nairobi also took a less formal but fast-track approach to evaluate various aspects of *GEO-3's* performance while it was still fresh in their minds a month after the May 2002 launch. Over four days, they carried out a series of Strengths, Weaknesses, Opportunities and Threats (SWOT) analyses to explore the overall GEO process, capacity-building initiatives, ongoing data and indicators issues, associated products and distribution, and future issues, including report intervals and potential topics. Many practical suggestions, including how to improve future GEO coordination, resulted from this team brainstorming initiative.

Two formal evaluations were carried out in relation to *GEO-4* and are summarized in Table 7.7.3. The first was commissioned by UNEP to the International Union for the Conservation of Nature two years before *GEO-4* was completed. It was intended to capture the lessons learned from participants involved in the preparation process. A self-assessment survey was carried out in 2005-6 and sought insights from the *GEO-4* chapter expert group participants. A total of 167 participants responded – approximately half of the members of the chapter groups and with representation from all *GEO-4* chapters and UNEP regions (IUCN and UNEP, 2008).

A second *GEO-4* evaluation, also commissioned by UNEP to the International Union for the Conservation of Nature, was conducted in 2008, 10 months after the report's launch, to look at the use and impact of the main report and its SDM. Quantitative data were compiled after interviews with 152 individual users, almost 75 per cent of whom had been involved in *GEO-4's* production. In terms of affiliation, the biggest group was government representatives at 30.8 per cent, followed by academics at 23.3 per cent and non-governmental organizations at 21.1 per cent. While impact was at the core of this study, it can take years for science to influence policy or strategy. How and by whom the products were being used at this early stage were considered the best indications of its potential to have influence and impact over time (IUCN and UNEP, 2009).

**Table 7.7.3. Formal evaluations of *GEO-4***

| Evaluation components | ***Findings of the GEO-4 Self Assessment Survey*** (IUCN and UNEP, 2008) | ***Review of the Initial Impact of the GEO-4 Report*** (IUCN and UNEP, 2009) |
|---|---|---|
| Stated purpose of evaluation | To capture the lessons from participants of the process towards the preparation of *GEO-4* | To inform the GC and provide information and lessons towards design options for *GEO-5* |
| Methodology | Self-assessment survey questionnaire completed by *GEO-4* authors and interviews | Interviews with a broad representative sample of users – policymakers, scientists, non-governmental organizations, civil society, media, public, youth –and web-based analysis of *GEO-4* use and referencing and a desk study |
| What aspects of the GEO process were assessed? | Relevance, effectiveness and efficiency, and added value of the *GEO-4* assessment process<br><br>Specific issues include functioning of working groups, extent to which objectives were met, management and leadership of the process, motivation and satisfaction of participants | The extent to which the *GEO-4* Report and SDM reached their intended target groups<br><br>The actual use of these products in relation to the intent<br><br>Their impact to date in relation to intent |
| Evaluation outcome | Nine findings including general satisfaction with, and motivation to be part of, the GEO process and its added value for participants; improvements needed in management and administration, clarity on roles and responsibilities, and on aspects of policy, private sector and development, among others | Fifty findings on user groups, how they were using the report, factors that enhanced or constrained its relevance, credibility and legitimacy, report accessibility, outreach, among others. Suggestions for refining the niche of GEO, establishing impact pathways to increase use and relevance, improved outreach to specific audiences |

The most comprehensive and detailed evaluation of any global GEO to date was carried out on *GEO-5* in 2014 (Rowe et al., 2014). Commissioned by UNEP's Evaluation Office to meet project requirements, it looked in detail at the project's performance against a broad range of criteria (Table 7.7.4). The findings were also able to draw lessons for future GEOs. The recommendations from the *GEO-5* evaluation formed a basis for planning the *GEO-6*

process – putting into practice the ethos of lessons learned. The Director of the Science Division articulated this at the IGMSC that initiated *GEO-6* in 2014.

*GEO-6* was able to incorporate several of these planned responses, such as:

- the fellowship programme
- guidelines for use of grey literature
- inclusion of indigenous knowledge.

However, some other very important recommendations were not or not fully achieved – most notable of which were:

- relevance at all scales (regional and global assessments of *GEO-6* being conducted and reported in separate volumes and years apart)
- securing adequate funding
- translating the report into all UN languages.

In 2018, the Evaluation Office commissioned an independent Mid-Term Evaluation of the *GEO-6* project that had been approved in May 2013 (UNEP, 2018b). In line with the UNEP Evaluation Policy, this evaluation should have been undertaken approximately halfway through the project to determine "...whether the project is on-track, what problems or challenges the project is encountering, and what corrective actions are required" (UNEP, 2018b, p. 15). Because it was carried out only ten months before the completion of *GEO-6*, it was acknowledged that the Evaluation could only have a marginal impact on the design of the remaining project activities and their products. However, it used the opportunity to look forward and contribute to the design of the future GEO processes, particularly a potential GEO-7 (Table 7.7.4). The Evaluation recommended (UNEP, 2018b, p. 12):

> At the very least, options for complete redesign of the overall structure for a potential GEO-7 should be considered. If embarking on a new GEO process, UN Environment should undertake a thorough "scoping" of ideas as to how the overall process should be structured. This scoping exercise should be fully open to stakeholders and should take place over the course of 12 months.

This recommendation has been followed. As noted in Annex I, UNEA-4 of 2019 requested the ED to prepare an options document for the future of the GEO process, in consultation with member states and other stakeholders, overseen and managed by a Steering Committee. The Steering Committee submitted the options document to the resumed 5th session of UNEA (UNEA 5.2) in 2022 to allow a decision on the future form and function of the GEO (UNEP, 2022g). UNEA remains the ultimate, high-level evaluator of the GEO, expressing its opinions through deliberation and decision-making processes.

**Table 7.7.4. Formal evaluations[11] of *GEO-5* and *GEO-6***

| Evaluation components | ***Terminal Evaluation of the Project Fifth Global Environmental Outlook: Integrated Environmental Assessment*** (Rowe et al., 2014) | ***Mid-Term Evaluation of the UN Environment Project: Global and Regional Integrated Environmental Assessments (GEO-6)*** (UNEP, 2018b) |
|---|---|---|
| Stated purpose of evaluation | To provide evidence of results to meet accountability requirements of UNEP's evaluation policy<br>To promote learning, feedback, and knowledge-sharing through results and lessons learned among UNEP and *GEO-5* partners | To provide evidence of results to meet accountability requirements<br>To promote operational improvement, learning and knowledge-sharing through results and lessons learned among UNEP, the GEO High-Level Group, the GEO Scientific Advisory Panel, the GEO Assessment Methodologies, Data and Information Group, as well as the UNEA and the project partners |
| Methodology | Administrative data review and electronic surveys with (a) the *GEO-5* core team and regional focal points; and (b) with authors and reviewers contributing to the assessment and interviews plus review of relevant documents | Questionnaire surveys and interviews with multiple *GEO-6* participants plus document review and bibliographic and similar searches |
| What aspects of the GEO process were assessed? | Strategic relevance<br>Achievement of outputs<br>Attainment of objectives and planned results<br>Sustainability and replication<br>Efficiency<br>Project implementation and management, including financial management<br>Stakeholder participation<br>Monitoring and evaluation | Strategic relevance<br>Project design<br>Effectiveness of report content and project management<br>Financial management<br>Efficiency<br>Monitoring and reporting<br>Sustainability<br>Project performance |

[11] From 2014 it became compulsory to develop a Theory of Change (ToC) during the design of UNEP projects and to use it during their evaluation to determine whether the desired results were achieved. While the *GEO-5* project was underway before this became a requirement, a 'reconstructed' ToC was developed for the Terminal Evaluation based on design documents, literature and interviews (Rowe et al., 2014, sec. 1.12). The *GEO-6* project did develop its own ToC and this was reviewed and reconstructed during the Mid-Term Evaluation (UNEP, 2018b, sec. 4). For more information on the use of ToC in project evaluations see *Use of Theory of Change in Project Evaluations* (UNEP Evaluation Office, 2017).

| | | |
|---|---|---|
| Evaluation outcome | Evaluation ratings for each criterion. Recommendations for: enhancing the future use of GEO; the need for adaptation and improved planning and management in next GEOs; using improved approaches to address policy issues; building capacity of key stakeholders to contribute to, and use, GEO; and securing adequate staff and financial resources before project initiation and improving oversight systems. | Evaluation ratings for each criterion. Recommendations for optimizing *GEO-6* and for a potential GEO-7 pending the finalization of *GEO-6* and an assessment of its impact. |

In addition to the formal evaluations that ultimately informed member states and other UNEP stakeholders and funders of whether the Secretariat was meeting performance expectations, GEO was the focus of several other types of appraisal. Many of the Memorandums of Understanding with CCs required a brief evaluation report on the CCs' network operations as implemented during GEO preparations and honest recommendations on aspects that needed to be improved, added or abandoned, or where additional attention was required. For example, RIVM in The Netherlands submitted a very frank six-pager reflecting on their experiences with *GEO-2000* soon after its launch in 1999. Multiple suggestions were included for thinking outside the latest GEO box and stepping up on a wide range of report and process issues (Jan Bakkes, personal communication, 20 November 1999).

Further analyses that have provided useful insights on GEO over the years are those in academic papers. Most have looked at GEO within a broader global environmental assessment context. Notable examples include an evaluation by Clark et al. (2006) of the influence of global environmental assessments and a set of papers resulting from the interdisciplinary and transdisciplinary collaborative research project, *The Future of Global Environmental Assessment Making*. The project was initiated in 2013 by UNEP and the Mercator Research Institute on Global Commons and Climate Change to explore global environmental assessments in the emerging landscape of international environmental governance. The papers were published in a special issue of *Environmental Science & Policy* (Kowarsch and Jabbour, 2017b).

### *Conclusion*

Evaluation in one form or another has been a component in each GEO cycle to date. Having revealed both positive and negative aspects of processes and products, each evaluation has become a potential source of guidance on ways and opportunities to improve future GEOs, and successive GEOs have adopted, and adapted to, many of these lessons learned. Evaluation has also served a valuable purpose in tracking the use of the GEO reports and the impacts that their use, and the GEO process itself, has had over the years. These results are further analysed in Chapter 9.

## 7.8 Additional GEO products

### *Introduction*

From the first GEO published in 1997, all of the global and several subglobal reports have been accompanied and complemented by numerous additional products. The first category of such reports is comprised of companion or derivative products, defined as those that relate directly to one of the global or subglobal GEO reports, in particular, the SDMs or, later, the SPMs. A second major category is process-related products, a broad-ranging group including technical reports, methodology guides and training manuals, and meeting and evaluation reports. A third such category is intermediary products, which bridge the time interval between global GEOs. These were the *GEO Year Book*, and later the *UNEP Year Book*, series of reports (Annex IV).

While many of these additional or supporting products are mentioned elsewhere in this book, the purpose of this section is to offer a brief description and a typology of these other GEO documents. These various GEO products again highlight how broad the integrated environmental assessment approach became over the nearly three decades of its evolution. They also illustrate how GEO both required many types of inputs and resulted in many types of outputs. On the input side, process-related products were often associated with integrated environmental assessment methods and capacity building, and many entailed their own self-contained processes. On the other hand, output-related companion products such as various summaries were typically linked with – and meant to complement – one of the global GEOs, directly or indirectly. Annex IV includes a list of dozens of these products going back to the mid-1990s.

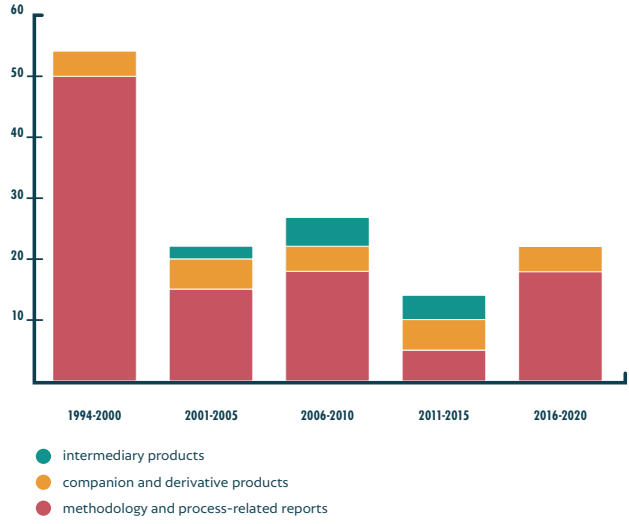
Table 7.8.1 offers a brief typology for these products, including their approximate numbers through *GEO-6*. Each of the three product categories is subsequently described, with a few examples illustrating their function in the overall GEO process.

**Table 7.8.1. Typology of additional GEO Products**

| *Product type* | *Subtypes* | *Reports identified* |
|---|---|---|
| Companion and Derivative products | Summaries, including SDMs and SPMs; Data and Indicators publications; products for specific audiences, such as Youth | 22 |
| Methodology and Process-related products | Training and capacity development manuals; Methodology guides; Technical, Meeting reports and Evaluation reports | 106 |
| GEO-related intermediary products | *GEO Year Books* and *UNEP Year Books* | 11 |

Figure 7.8.1 provides some insight into the timing of these additional products. As might be expected, there was a preponderance of methodology and process-related reports during the early years of the GEO process and a significant dip between 2011 and 2015 as *GEO-5* was completed and *GEO-6* had yet to get underway.

**Figure 7.8.1. GEO-related reports other than assessments**




Note: the number of reports other than assessments comprises all geographic levels. For example, a report on *Methodology for GEO for Youth in LAC* (PNUMA, 2004) is included.

## *Companion and derivative products*

Companion and derivative products have probably been the most visible of the additional products. Some form of summary was prepared for each of the global GEOs to offer ministers and other highly placed persons a succinct overview of the main findings, policy options, and recommendations. They were typically around 16 to 30 pages in length and from *GEO-2000* onward produced in all six UN languages to facilitate better understanding in ministries of environment and other relevant ministries around the world. *GEO-1* and *GEO-2000* had an Overview document, *GEO-3* a Synthesis, and *GEO-4* an SDM that shifted to an SPM for *GEOs-5* and *6* (Annex IV). This evolution probably reflects the growing desire to showcase the GEO report as a means of influencing environmental decision-making and to synchronize GEO with the IPCC reports, which also have an SPM.

A limited number of companion products were data- and indicator-related publications that highlighted UNEP's use of data to chart environmental thematic and socioeconomic changes, such as driving forces and pressures on the environment, over time. Production of the *GEO-3 Data Compendium* (UNEP, 2002d), for example, is the only time UNEP published the full underlying database that was used to support the preparation of one of the global reports. Three reports, *Keeping Track of our Changing Environment* issued in 2011 (UNEP, 2011c) and two iterations of *Measuring Progress* issued in 2012 and 2019 (UNEP, 2012b, 2019g), offered visualizations of numerous environmental indicators and their trends over the years, based almost entirely on data extracted from the GEO Data Portal.

Many other GEO products and reports targeted more specific audiences than the global GEOs 1–6. Several products derived from GEO reports were, for example, prepared to accompany *GEO-5* and *GEO-6*: GEOs for Business, Local Government and *GEO for Cities* reports (UNEP, 2013b; UNEP and ICLEI, 2012; UNEP and UN-Habitat, 2021). These are interesting to note on their own because they show UNEP reaching out to specific stakeholder audiences.

A major set of companion products was the GEO for Youth reports. The archetypal first version in 1999, *Pachamama* (Mother Earth) (UNEP and PCI, 1999), went global in 10 other languages, including all six UN languages. Prepared by youth, for youth, there were similar GEO for Youth publications that followed at the regional level, particularly in the Latin America and the Caribbean region (Annex IV). A *GEO-5 for Youth* (UNEP, 2013f) volume was produced at the global level, and a similar volume was issued as a derivative product of *GEO-6* in 2021 (UNEP, 2021c). Finally, a *GEO-6*

*for Youth* of the Asia and the Pacific region (UNEP, 2019b) and a *GEO-6 for Youth* of Africa (UNEP, 2019d), which is based on the *GEO-6 Africa* regional report (UNEP, 2016a) as opposed to the global *GEO-6*, are the latest volumes to appear in this companion series. Not only did these products help in GEO's outreach to youthful audiences, but young people were also fully engaged as the principal authors of these volumes.

## *Process-related products*

The second major type of additional GEO products were process-related, including manuals and guidelines, technical reports, and meeting and evaluation reports. Prominent among these were the extremely influential integrated environmental assessment training and capacity-building manuals prepared over the years. These manuals, beginning with *Capacity building for integrated environmental assessment and reporting* (Pintér et al., 1999), were used in many training sessions, particularly in the following decade, for international to local-level training events. They were also adapted to suit other companion integrated environmental assessment processes such as the GEO-Cities series, including multiple languages. In parallel with these manuals were guidelines or methodologies for processes such as GEO-Cities and GEO for Youth or for specific regions such as Europe and West Asia (Annex IV).

One of the richest sources of information on how and why the GEO global assessments were designed and made can be found in technical, meeting and evaluation reports. Research for the current book identified a total of 79 such reports (Annex IV and Figure 7.8.1). These are somewhat overlapping categories – as meetings for GEO typically produce substance, while meeting and evaluation reports both address process. As can be seen in Annex IV, the large majority of these reports date from times when GEO was designed, tested and growing; many are still relevant today. Throughout the history of GEO, such reports served three archetypal purposes, which can be described as follows:

1. Methodology development has often been contributed by specialized organizations. For example, in the early years, RIVM outlined an overall methodology for what would underpin GEO (Swart and Bakkes, 1995). At the time of *GEO-1*, the United States Geological Survey prepared a report on the use of remote sensing imagery for global assessments, a first step towards accessing a key information source for GEO (USGS and UNEP, 1997).

2. Dissemination of results in full regional detail reaches beyond what fits the global GEOs. The technical reports backing up parts of GEO's first three global editions are good examples (Potting and Bakkes, 2004; UNEP, 2003a). Download statistics suggest consistent use of these reports over the years, including in education. This use of technical reports borders on GEO' companion products' but focuses more on detail and explanation.

3. Documenting the process marks steps taken and supports learning-by-doing. Examples include the *Report of the Inaugural Meeting of UNEP's GEO Collaborating Centre Network* (UNEP, 1997e) and the three further preparation and drafting meetings for the second global GEO, making it a series (UNEP, 1997d, 1998). Noteworthy were the locations of these four meetings, proudly announced in their subtitles and illustrating the spread of GEO to involve the global south actively. *Assessing Human Vulnerability to Environmental Change: concepts, issues, methods and case studies* (UNEP, 2003a) is another example, one combining methodology and regional insights for a major component of *GEO-3*. Integrated with process are the GEO evaluation reports prepared on all global GEOs.

Combining some or all of these three archetypal functions is common to many process-related reports. For example, the technical reports on the outlook part of GEO combine a discussion of detailed results with one of methods and robustness (Bakkes and van Woerden, 1997; Potting and Bakkes, 2004; van Vuuren and Bakkes, 1999). Another small series of outlook-related reports prepared by the Global Scenario Group inspired wide-ranging scenario work that was eventually taken up in the preparation of *GEO-3* (Pontius and Raskin, 1996; Raskin, 2000; Raskin et al., 1998). Other environmental assessments feature a similar pattern in their technical reporting: a spike in methodology reporting when the assessment is set up[12] and publication of detailed results, tools and robustness when modelling has been applied (Bakkes and Bosch, 2008).

Typically, the UNEP-published technical and meeting reports were produced by collaborating centres under contract with UNEP. This ensured UNEP review as well as a consistent look-and-feel of the reports.[13] Additional reports with related, GEO-relevant material were sometimes published under the flag of the specialized organization – not UNEP – if it

[12] Papers and reports in the Knowledge Hub of the Global Land Outlook, the United Nations Convention to Combat Desertification (for example Orr et al., 2017).

[13] At least within a report cycle, as UNEP changed its corporate style a number of times.

suited that organization's interest, particularly in the early years of GEO around 1995. Some CCs acted as co-publisher with UNEP of the technical reports they produced, ensuring for the future that their work could be found through online catalogues even if UNEP's system stopped functioning.

The meeting reports by themselves cannot be taken as a proxy for the number of GEO-related meetings. On the one hand, meetings for *GEO-6* were typically accompanied by two reports: one documenting inputs to the meeting and another documenting its results. On the other hand, and perhaps more importantly, many GEO-related meetings were hands-on and informal and never required an agenda or official report. For example, one of the authors recalls a week-long, purposefully-convened session in UNEP's Environment House in Geneva in preparation for *GEO-2000*: "One evening, the security guard on his round entered the main meeting room at street level. There were about eight of us around the circle of desks, all silent, looking at notes or screens or typing. The guard was a bit puzzled, nodded and left."

Some of the technical reports, especially those with much detail underpinning a GEO, took multiple staff years to produce, above and beyond the customary UNEP contracts. Considering all the GEO reports, this has been a sizeable in-kind contribution to the process. To be fair, there was also an element of pride in this from the side of the co-publishing institute. Many of the early GEO-related technical reports were developed at the initiative of CCs.

The IPCC-ization of GEO (Chapter 3) caused a shift in GEO's publication channels for some companion and process-related products and background information. Up to *GEO-4*, CCs were key in developing methodology and analyses, while later editions relied primarily on individual scientists. Moreover, in the style of the IPCC, teams for GEO segments such as its forward-looking part began to rely less on their own creativity and more on harvesting the literature (UNEP, 2019e, pp. 466–467) (Paul Lucas, personal communication, 31 January 2020**)**. In this vein, GEO-related spin-offs now appear mostly in journals, as communications (for example Gupta et al., 2019) or as regular articles (for example Jacob and Ekins, 2020) as opposed to GEO technical reports. Conceivably, in the future, special issues hold a promise as an important currency in attracting scientists to devote time to GEO (Klaus Jacob, personal communication, 16 December 2020).

Published evaluation reports proved to be valuable outcomes of the more formal of these exercises by not only meeting obligatory UNEP reporting requirements but by revealing impartial and honest third-party conclusions on both positive and negative aspects of each GEO process and outcome.

The published reports have always been freely accessible to interested readers,[14] providing a source of practical information to the wider integrated environmental assessment community and guidance for future GEOs.

## *Intermediary products*

The third major type of GEO-related reports were intermediary products, bridging the time interval between successive global editions. In the spirit of learning-by-doing, the earliest GEO editions were compiled in quick succession. In contrast, the publication rhythm of global editions from *GEO-3* onwards reflected user needs, namely a longer time period between each edition. In between these later editions appeared the *GEO* and later *UNEP Year Book* series (Annex IV). They responded to a request from GC-22 in 2003 for the production of "annual global environment outlook statements" when the global GEO was extended to a five-year cycle in the same session (GC/UNEP, 2003b, p. 26). Intended to bridge the time gap between global GEOs, the 2003 to 2014 *Year Books* focused on emerging environmental issues and significant events and, to a certain extent, provided yearly analyses of the world's changing environment in a briefer fashion than the global GEO reports.[15]

## *Summary*

These additional and highly varied products once again demonstrate the wide appeal of the integrated environmental assessment/GEO approach and the strong outreach efforts to a broad range of stakeholders made by the UNEP Secretariat and close partners. Such tailored products helped make the Global Environment Outlook and the integrated environmental assessment process that it adopted more accessible and useful to a much wider variety of audiences and individual users worldwide.

[14] At least for as long as they have remained properly archived on websites.

[15] The *Year Book* has since been replaced by an annual *Frontiers* report, again focusing on emerging issues of environmental concern.

## 7.9 Funding support

### *Introduction*

Like other major assessment processes, GEO reports require considerable funding. This section starts with a brief introduction to UNEP funding and an overview of resource flows for GEO, financial and in-kind. After this, the section homes in on funding for GEO: budgets, allocations and expenditures, and the funding sources that have supported GEO processes and products. It also briefly considers the implications of funding shortfalls.

Research for this section was hampered by difficulties in establishing real and comparable amounts, partly through inconsistent reporting and the rounding off of many total figures. The quoted monetary values are in nominal dollars, not adjusted to reflect inflation over the half-century since UNEP was established.

### *Funding sources for UNEP*

UNEP's funding comes from three sources: the UN Regular Budget, the Environment Fund and earmarked contributions. UNEP receives a relatively small but dependable proportion of its funding - approximately five per cent - from the UN Regular Budget while relying on voluntary contributions (Environment Fund and earmarked contributions) for the remaining 95 per cent.

When UNEP was first established in 1972, its main functions were to provide environment-related catalysing and coordinating functions within the UN. In contrast, the implementation of on-the-ground activities in regions and countries was considered the responsibility of implementing agencies like the United Nations Development Programme and the Food and Agriculture Organization of the United Nations. UNEP's Secretariat was therefore considered to need a relatively small budget and was allocated a very small part of the UN Regular Budget. UNEP's functions have broadened considerably over the years, and its funding from the UN Regular Budget has also risen in recent years, from less than US$10 million for the 2002-03 biennium to almost US$45 million for the 2018–19 biennium (UNEP, 2020c).

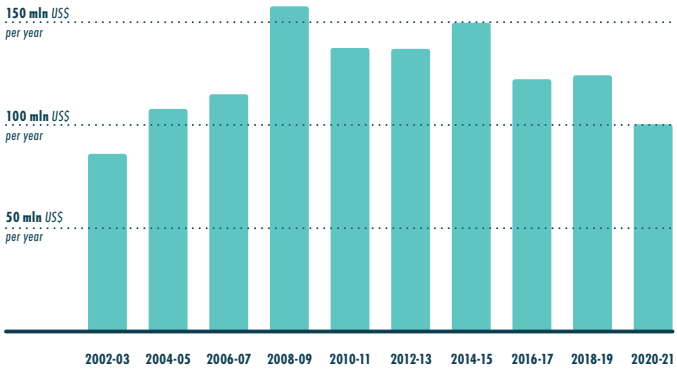
The Environment Fund is provided directly by member states and is the core source of flexible funds, currently comprising around 15 per cent of UNEP's total income. Unlike the UN Regular Budget, where member state payments are mandatory and assessed on the basis of their economic capacity, the Environment Fund is comprised of voluntary contributions.

In 2020, for example, only 86 out of the 193 UN member states, or 45 per cent, pledged a contribution to the Environment Fund (UNEP, 2021a).

To complicate matters, these contributions cannot be reliably predetermined or guaranteed if member states' payments are late or they change their minds about contributing. In 2018, for example, US$135.6 million was budgeted and approved for the Environment Fund, but only US$67.7 million – 50 per cent – was received (UNEP, 2019h). Figures were similar for 2019 (UNEP, 2022c). In 2020, the Environment Fund provided US$74.4 million, totalling 74 per cent of the approved budget of US$100 million. Of the 86 member states that made pledges, only 81 made payments (UNEP, 2021a).

The anticipated Environment Fund for each biennium is allocated in advance to different divisions and programme activities, set out in a costed work programme by the Secretariat and approved by UNEP's governing body. Since 1972, there have been considerable fluctuations in the size of the approved Environment Fund, with both ups and downs. Figure 7.9.1 illustrates this for the period 2002–2021. For the 2020–21 biennium, the approved annual Environment Fund budget dropped to US$100 million per year. This is UNEP's only flexible funding source and includes both staff and activity costs. These allocations are inadequate to cover the full costs in many instances, and additional funds need to be raised.

**Figure 7.9.1. Environment Fund amounts approved by UNEP's governing body**




*The envelope of the Environment Fund decreased after the mid-2010s. The total of realized contributions into the Fund tends to be significantly less than the total pledged amounts.*

Note: Although the budget is agreed for each biennium, donors pay, and funds are allocated to recipient divisions on a yearly basis. The columns in this figure show the annual amounts agreed for each biennium.
Amounts shown are approved by UN member states. Amounts actually received may differ.
Amounts are in nominal dollars, not adjusted to inflation.
Source of data: (UNEP, 2022d)

Over the years, UNEP has also acquired many trust funds and other earmarked contributions, including from the Global Environment Facility, dedicated to specific activities and now making up the most significant proportion of the overall budget. In total, UNEP's overall funding has increased, especially as far as this third source is concerned. In the 2018-2019 biennium, earmarked contributions and global funds made up 81 per cent of UNEP's total income. "As earmarked income makes up a significant share of the total income...it tends to skew programme delivery towards the priorities of specific funding partners" (UNEP, 2020c). A similar percentage was contributed by these funds in 2020 (UNEP, 2021g).

## *Funding sources for GEO*

GEO has been a prominent and persistent component of UNEP's programme of work for the past 25 years. As such, many would assume that it is also guaranteed adequate funding. As expressed by one interviewee, "the GEO report should be funded because it is a flagship assessment process by UNEP... it's part of the core mandate and should be part of the core budget" (Nicolas Perritaz interview). However, this has never been the reality for GEO, and over the years, funding has become more problematic.

The first two GEO processes were primarily funded from the Environment Fund, but all of the GEO processes to date have received and benefited from additional external funding (Table 7.9.1). This is because there is no trust fund established for GEO, unlike the support arranged for many other major UNEP activities. The Government of the Netherlands led the way by providing considerable additional support for the planning and execution of *GEO-1*. Although the donor base changed somewhat for *GEOs-2000* to *4*, the donor funding focused mainly on building developing country CC capacities in integrated environmental assessment through formal training programmes and learning-by-doing involvement in the global process. As one interviewee mentioned, "each collaborating centre got money not only for the remuneration of the authors but also for some kind of capacity-building" (Ruben Mnatsakanian interview). Later on, other donors were keen to back the IPCC-ization of the GEO process. One former government representative recalled that "to try to support the international knowledge-generating processes, like the GEO, like the IPCC, IPBES [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services]... we were able to find extrabudgetary resources" (Anonymous interviewee).

**Table 7.9.1. GEO donors**

| | DONORS ACKNOWLEDGED IN GEO REPORTS OR BRIEFING DOCUMENTS | FUNDING PROVIDED TO SUPPORT |
|---|---|---|
| ***GEO-1*** | Government of The Netherlands (National Institute of Public Health and Environment - RIVM) | Development of GEO methodology and preparation of the modelling chapter |
| ***GEO-2000*** | Government of The Netherlands (Ministry of Foreign Affairs, Department of Development Cooperation) | Participation of all 16 developing country CCs in *GEO-2000*, thereby facilitating the transfer of the GEO methodologies to these centres and building connections with associated centres in other parts of the world |
| ***GEO-3*** | United Nations Fund for International Partnership | Capacity-building and involvement of developing country CCs in *GEO-3*; development of the GEO Data Portal |
| ***GEO-4*** | Governments of Belgium, The Netherlands, Norway & Sweden. United Nations Development Account | Capacity-building in environmental assessment and GEO outreach |
| ***GEO-5*** | Governments of Canada, Norway, Republic of Korea, The Netherlands, Sweden, Switzerland. Gwangju Metropolitan City (Republic of Korea). GRID-Arendal. Inter-American Development Bank. Elion Charity Foundation, China | Meetings and other components of the *GEO-5* process; translation of *GEO-5* into Spanish and Chinese |
| ***GEO-6*** | Governments of Norway, Italy, Singapore, China, Mexico, Switzerland, Denmark, Egypt and Thailand; The European Union. | Primarily meetings (some providing local costs); some other unspecified activities |

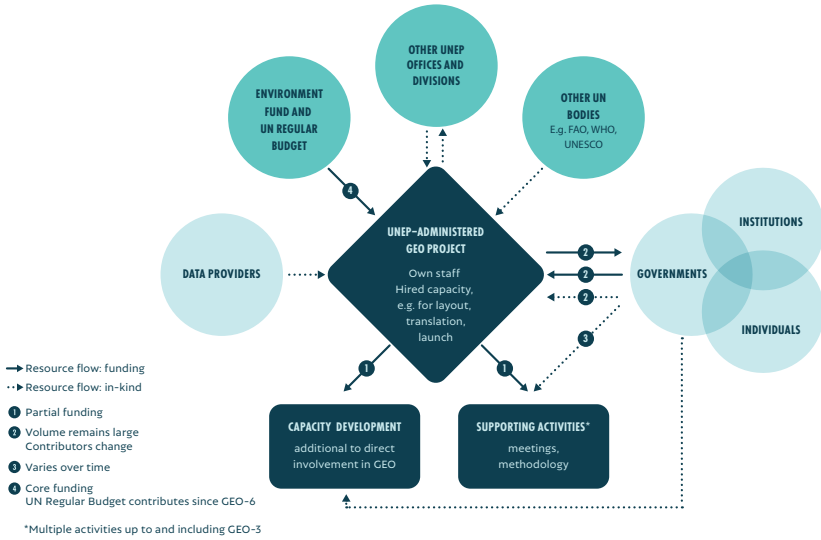
Note: Some donations included in-kind contributions

In addition to the donors listed in Table 7.9.1, GEOs have relied on an extensive medley of in-kind contributions from participating entities. The majority of individual experts, such as authors and reviewers, have contributed their time and knowledge in-kind to the process. It was estimated that, for example, individual experts provided the equivalent of more than US$1.4 million in in-kind contributions to the *GEO-4* process between 2004 and 2007 (Chenje, 2007). *GEO-5* also acknowledges in-kind support from 20 institutes in all six regions for the participation of the GEO Fellows (UNEP,

2012a) and *GEO-6* names 27 GEO Fellows and their supporting institutions (UNEP, 2019e). GEO CCs and other partners also contributed by compiling technical reports, supporting networks, providing accommodation and meals, covering overland travel costs and hosting meetings. A unique case of the hosting was when Shell International co-hosted the final *GEO-3* scenario meeting in October 2001 at the Shell Centre in London. With guidance from the renowned Shell Scenario Group, the final steps were taken to fine-tune and complete the four scenarios.

Figure 7.9.2 illustrates the combination of resource flows that have supported GEO processes and products. A range of resource bases – including governments, partner institutions and fund banks – have provided the mix of funding and in-kind contributions for GEO to operate.

**Figure 7.9.2. GEO resource flows**




*Resources for GEO were both budgetary and in-kind.*

Source of information: *GEO-1* to *GEO-6*

## *What does a GEO cost?*

In retrospect, and from available documents, it is challenging to accurately determine the costs attached to past GEO processes and reports. Budgets and expenditures have been allocated and recorded in different ways over time, in line with the fund management system of the day. Information has also been tailored to meet various third-party needs, further complicating comparisons between GEOs.

Table 7.9.2 gives the best available information on projected costs and funding sources for *GEOs-1* to *6*. These should be considered estimated figures, but they reveal that the amount and proportion of GEO costs met from the Environment Fund have dropped considerably over the years. However, *GEO-6* has been the first GEO to receive earmarked funding from the UN Regular Budget, which should contribute significantly to the future financial sustainability of UNEP's flagship report.[16] The Table also shows that there has been a shortfall for at least part of the process for all the GEOs – where it is possible to compare projected costs and secured funding.

**Table 7.9.2. Funding for *GEOs-1* to *6***

| | Estimated overall costs | Secured funding | | | Total funding | Funding shortfall | Shortfall |
|---|---|---|---|---|---|---|---|
| | | Environment Fund | UN Regular Budget | Additional donor funding | | | |
| | million US$ | | | | | | per cent of projected costs |
| ***GEO-1*** | ? | ? | 0 | ? | ? | ? | ? |
| ***GEO-2000*** | 5.10# | 2.94 | 0 | 2.16 | ? | ? | ? |
| ***GEO-3*** | 5.14 | 3.24 | 0 | 1.52 | 4.75 | 0.38 | 7 |
| ***GEO-4*** | 6.00 | ? | 0 | ? | ? | ? | ? |
| ***GEO-5*** | 7.58 | 1.54 | 0 | 4.43 | 5.97 | 1.61 | 21 |
| ***GEO-6* estimate A##** | 10.15 | ? | 0.69 | 2.20 | ? | 2.47 | 24 |
| ***GEO-6* estimate B##** | 13.60 | ? | ? | ? | ? | 2.69* | ? |
| ***GEO-6* estimate C##** | 4.92 | 0.58 | 0.89 | 2.08 | 3.55 | 1.37 | 28 |
| ***GEO-6* estimate D##** | 6.52 | 3.68 | | 2.83* | 6.52 | 0 | 0 |

Notes: Amounts are in nominal U.S. dollars, not adjusted for inflation. Amounts are to the nearest US$10,000

#: approximate

## There have been multiple cost estimates and notifications for *GEO-6*, four of which are included in this table.

*Continuation of notes to table 7.9.2:*

- Projected costs are those calculated during the planning stage of the process. As far as it is possible to ascertain, these figures cover activity costs such as meetings, content preparation, publishing and outreach, but do not include UNEP staff

[16] Following recognition and use of *GEO-5* at Rio+20 in 2012, and supported by the mention of GEO in the Rio+20 Outcome Document and the consequent UNGA resolution 67/213 (UNGA, 2013, p. 213), UNEP managed to secure UN Regular Budget funding for at least 20 percent of the total estimated cost of the global *GEO-6* during 2018-18. In 2018 funding from the Regular Budget totaled almost US$800,000, slightly more than the core funding provided from the Environment Fund (UNEP, 2018a).

costs and overheads or in-kind staff time contributions from partner institutes or individual experts, unless otherwise stated. They do not include additional donor funding for integrated environmental assessment activities/capacity-building at the regional level but are not directly associated with the global GEO, such as *Africa Environment Outlook-1*. Note that entries' *GEO-6*A' and '*GEO-6*B' are full project cost projections.

- *GEO-1*: No information available. Interestingly, a study by RIVM, after *GEO-1* was completed, reviewed UNEP's overall capabilities for monitoring and assessment and concluded that the annual cost to UNEP of implementing their recommended strategy would be US$25 million (Bakkes et al., 1998).
- *GEO-2000*: Source: UNEP (1997b)
- *GEO-3*: Table shows cost estimates and funding for 2000/2001. Source: Document in personal archive *GEO-3 activities with funding allocated in DEIA&EW Costed Workplan 2000-2001 and UNFIP*; Funds for translation and publishing of the full *GEO-3* report into the other five UN languages (Arabic, Chinese, French, Russian and Spanish) and for an abridged Czech version were obtained in 2002.
- *GEO-4*: Little information available. Source of projected activity costs is GC/UNEP (2009b)
- *GEO-5*: Source: Figures are interpolated as far as possible from Rowe et al. 2014 and do not include the programme support and additional staff costs estimated in the overall budget.
- *GEO-6*:
  - A: Source: UNEP (2018b). Budget for original *GEO-6* project approved in May 2013 (PIMS ID 01751). Total amount includes staff costs and overheads and planned extrabudgetary funding.
  - B: Source: UNEP (2022c). Budget for *GEO-6* project revised in 2016. Project costs include staff costs and overheads, extrabudgetary funding and additional products, including the six regional *GEO-6* reports published in 2016 (see the main text below for further explanation).

    * is the funding shortfall as of February 2018, reported by UNEP (2018b)
  - C: Source: UNEP (2017c). Table shows funding for global *GEO-6* activity costs in 2017-18 as calculated in November 2017. Extrabudgetary contributions for 2018 are not included in the totals.
  - D: Source: UNEP (2018a). Table shows funding secured for global *GEO-6* activity costs in 2016-18 as reported in December 2018. *Excludes in-kind contributions from member states for hosting meetings.

Whether initial cost estimates have been realistic is another matter. For example, the evaluation of the *GEO-3* process from the perspective of the CCs revealed that they considered expenditures inadequate. Despite the

CC budget being by far the largest single component of the *GEO-3* budget, more than 40 per cent of the 28 CCs that responded considered that inadequate funding had been the biggest weakness and threat to the process and their successful participation in it (UNEP, 2004d). And although the evaluation did not reveal whether the funding shortages had originated because costs were underestimated to begin with or because full funding wasn't secured, either reason would have been sufficient to seriously impede *GEO-3*'s delivery. As described by one interviewee involved with multiple GEOs, "there has never been enough money for modelling, there's never been enough funding generally for anything other than sort of voluntary contributions" (Peter Noel King interview).

When approved in May 2010, the *GEO-5* project was estimated to cost US$9.29 million, including programme support costs (UNEP overheads) and the hiring of two additional staff. Activity costs for the process and products were estimated at US$7.58 million. However, the project was unable to secure all the programmed funding and, in the end, only US$5.97 million were available – about 21 per cent lower than the original budget (Rowe et al., 2014). To add uncertainty to these statistics, the Science Division stated in a briefing note to the Committee of Permanent Representatives in 2018 that the final total cost of *GEO-5* had been US$10.70 million (UNEP, 2018a).

It has proven even more difficult to determine comparable funding data for *GEO-6* than for most of the first five global reports. The original *GEO-6* project document was approved in May 2013, with a planned completion date of December 2017 and a budget of US$10.155 million (UNEP, 2018b, p. 5). This was three months after member states made it clear that they expected another GEO, although no binding decision had been made by then. In June 2014, UNEA-1 officially requested a *GEO-6* by 2018, and the first IGMSC for *GEO-6* took place four months later. Surprisingly, the opening presentation by the Chief Scientist laying out the Secretariat's plan for *GEO-6* to the IGMSC included a set of regional *GEO-6*s – which had not appeared in the original project – a workplan for completion of the global *GEO-6* in 2016 and a 2014/16 *GEO-6* budget totalling US$7.6 million. In its final statement, the IGMSC agreed to six regional reports delivered by early 2016 but retained 2018 as the year to deliver the global *GEO-6* and its SPM. However, there is no record of funding discussions at the consultation (UNEP, 2014c).

Implementation of the *GEO-6* project started on 28 October 2014 (UNEP, 2018b), and the project amount in the document was subsequently revised

to include the set of regional reports, three associated products and a two-year extension to accommodate the change in global *GEO-6* delivery date to 2019 decided by UNEA-3. The approved budget for the revised project is reported on the UNEP open data platform as US$13.604 million and includes programme support and staff costs (UNEP, 2022e).

A later summary of the full funding and expenditures was provided to the Committee of Permanent Representatives in Nairobi in December 2018. While quoting the original approved budget for *GEO-6* for 2014–2018 as US$10.155 million, rather than the higher revised amount, it gave the *GEO-6*'s current actual estimated cost as US$10.238 million (UNEP, 2018a, p. 3). The latter figure included the six GEO regional assessments of 2016, three additional publications and staff costs.

Focusing on the funding of the global *GEO-6*, the Secretariat reported at UNEA-3 in late 2017 that the expected activity costs for 2017-2018 were just under US$5 million (UNEP, 2017c). A year later, a total expenditure of US$6.52 million – excluding in-kind contributions – was reported for 2016-2018. Of this, US$3.68 million, or 56 per cent, were derived from the Environment and Regular Budget funds and the other US$2.83 million, or 44 per cent, mobilized from extra-budgetary sources. If the *GEO-6* core staff costs incurred over the three years – some US$2.34 million according to the briefing note – are deducted from this total, the activity costs for the global *GEO-6* were in the range of US$4.18 million (UNEP, 2018a). All four *GEO-6* estimates are included in Table 7.9.2.

The Secretariat commented, "*GEO-6* is considered as very cost-effective, or done on a 'shoe-string' budget, when compared with the task in hand… the *GEO-6* was completed within budget, with the smallest amount of staff and resources in the history of GEO" (UNEP, 2018a, p. 3). Given the funding confusion surrounding *GEO-6*, this statement may have dubious validity. The actual final costs should be possible to verify once the *GEO-6* Terminal Evaluation becomes available. The regional *GEO-6* reports inevitably added a considerable cost burden and, with no consistency across the six and potentially weak scientific content, the *GEO-6* Mid-Term Evaluation concluded from survey responses that "their usefulness is uncertain, and their contribution to the global assessment has been minimal" (UNEP, 2018b, p. 46). This suggests that a lot of the regional input for the global *GEO-6* would have had to be assembled again from scratch, thereby duplicating costs.

However, despite the uncertainties around GEO funding, it does seem that

the GEOs have cost a lot less, in total and annually, than some other comparable environmental assessments:

- The overall budget for the Millennium Ecosystem Assessment carried out from 2001-2005 was approximately US$24 million (MEA, 2005)
- Thnts, which are funded through a trust fund, were calculated in 2006 to cost approximately US$5 million a year, or US$20 million per edition (UNEP, 2006b). Each edition, produced in a four-year cycle, comprises multiple volumes. More recent information gave the annual budget for 2018 as approximately US$8 million and the expenditure as US$5.7 million (IPCC, 2019b). Annual budgets for 2020 through 2023 range between US$5.7 million and US$ 9.1 million (IPCC, 2020).
- A more recent initiative, the IPBES, began in 2012. A start-up grant of US$8.2 million from Norway helped IPBES launch its first work programme, with a total price tag of US$40.5 million. The SPM and six chapters of its first global assessment were released in May 2019. While there are no funding figures on the IPBES website as of early 2022, a study in 2017 reported an eight per cent budget cut to US$8.7 million in 2017 and a 30 per cent cut to US$5 million planned for 2018 due to uncertain future donations (Stokstad, 2017). These amounts are still considerably larger than GEO's available funding.

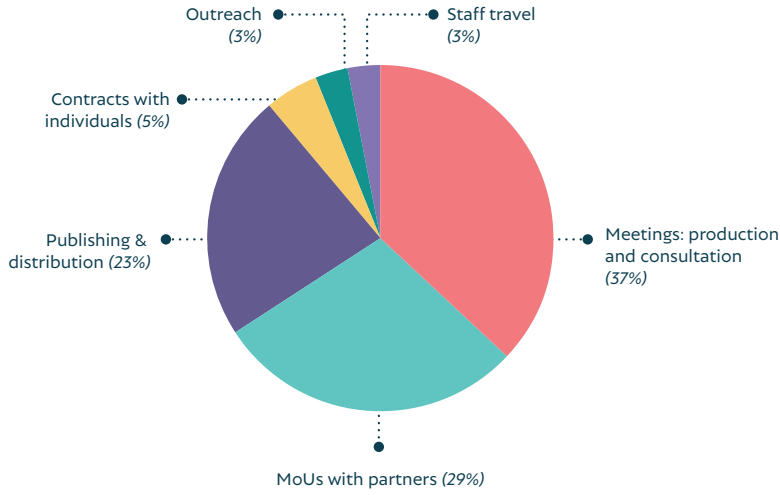
## *How is the GEO funding allocated?*

While any detailed breakdown of funding allocations for the first two GEOs seems to be lost, Figure 7.9.3 shows how funds were allocated to the diverse activities of the *GEO-3* and *GEO-4* processes. In both cases, the largest proportion of funds was used for meetings to develop report contents and consult with governments. Funding to support partner institutions – the Collaborating and Associated Centres – and publishing and distributing the reports were major expenditures. The biggest difference was the larger proportion allocated to outreach for *GEO-4*. Neither of these charts includes funds for UNEP staff salaries or overheads or separate funds earmarked for regional/national integrated environmental assessment capacity-building training workshops or allocations to develop the GEO Data Portal. These were primarily funded under a different component of the UNEP programme of work.

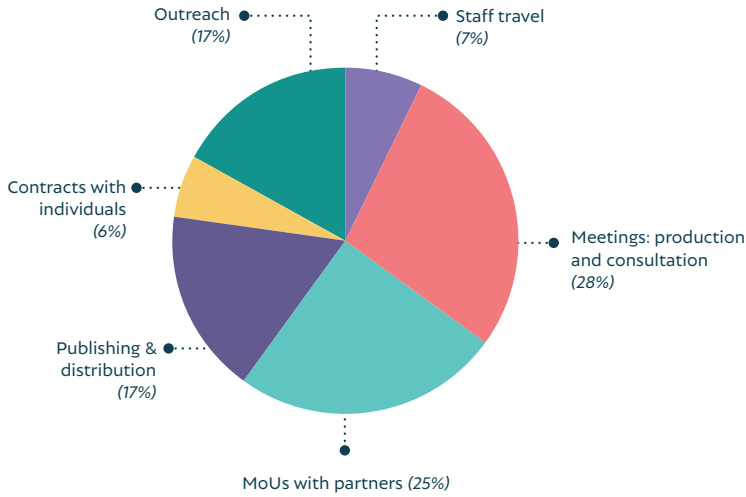
**Figure 7.9.3. Funding allocations for GEOs 3 and 4**

*The proportion of budget allocated to outreach varied to a great extent.*

GEO-3




GEO-4




Note: Costs for UNEP staff (except travel), capacity-building and the GEO Data Portal are not included in either of the above charts.

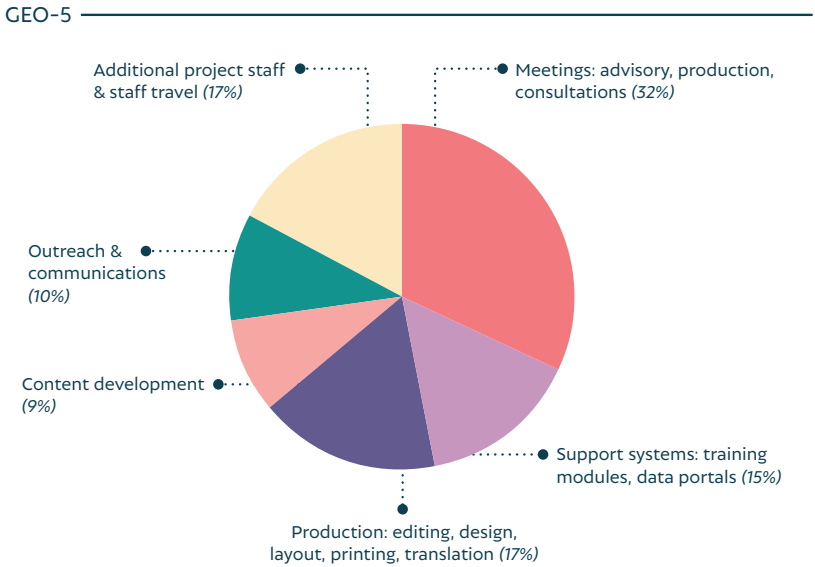
Source of data: (GC/UNEP, 2009b)

Chapter 3 outlined the transition during *GEO-4* in which the prime respon-

sibility for report content preparation was transferred from partner institutions, the CCs, to individual experts. While at least a third of funds for *GEOs-3* and *4* were allocated through Memorandums of Understanding with contributing partner institutions and individual contracts, by *GEO-5*, a much smaller proportion of the funding, less than 10 per cent, went directly to content development (Figure 7.9.4). And although successive GEOs at least partly compensated partner institutes or specialized contributors for their involvement, most individual participants received no specific payment for their time and inputs, so in effect, they, or their employer, made an in-kind contribution to the process. Unlike the two previous graphs, Figure 7.9.4 also shows significant proportions of the anticipated *GEO-5* funding allocated to provide for additional project staff and for developing training and data support systems.

**Figure 7.9.4. Funding allocations for *GEO-5***

*Considerably less funding was allocated to contributors than in earlier GEOs*




Source: Derived from the proposed budget drawn up for *GEO-5* during the planning stage in 2010.

## *Dealing with funding shortfalls*

Table 7.9.2 showed that several GEOs have experienced funding shortfalls. Once this situation is recognized, one early action is to try and generate more funds. When looming shortfalls were recognized for *GEOs-4* and *5*, attempts were made to mobilize additional resources from external donors for *GEO-4* outreach in April 2007 and for the overall *GEO-5* process in March 2010. However, if such measures don't fully deliver, this inevitably means that the project's implementation must be adjusted. "I think that GEO is…basically very poorly funded and so doing anything much beyond actually producing the reports with significant outreach activities between reports is, I think, simply beyond the level of resources available" (Peter Noel King interview).

The *GEO-5* Evaluation Report sheds light on the steps taken to deal with the 21 per cent shortfall of funding that affected *GEO-5* and maximize available resources (Rowe et al., 2014). In the end, over US$1.6 million were saved by reducing operational costs and the scope of certain project activities, by relying heavily on in-kind contributions, and by abandoning certain activities altogether. Budget cuts were made on the GEO Data Portal (Chapter 7.5), which was not maintained or updated with *GEO-5* project funding, and the Data and Indicators Working Group, which met only once and, due to its late setup, was considered redundant (Rowe et al., 2014). Cuts were also made to project operation costs that were primarily absorbed by the UNEP Division of Early Warning and Assessment and by not translating the main report into French or Arabic.

However, capacity building was the primary victim of *GEO-5's* budget reductions. In particular, capacity development for policy analysis and enhancing the use of the assessment at different scales and by different stakeholder groups was largely absent from *GEO-5*. Capacity building was delivered only through the Fellowship Programme, and it relied entirely on in-kind contributions (Chapter 7.4). This component was considered a success. Adding to the challenges of *GEO-5* implementation, the Evaluation Report noted that the receipt of project funds was frequently delayed due to internal administrative and other procedures, unpredictable and gradual resource mobilization and slow availability of funds from the UNEP Environment Fund and some donors (Rowe et al., 2014).

Starting in 2016, funding levels for projects such as the GEO fell by up to 50 per cent across UNEP due to the considerable reduction in member states' Environment Fund contributions (Figure 7.9.1). This meant that all activity

funds, such as for meetings or travel, were cut from the budget, and it became necessary to mobilize external resources for almost all aspects of the *GEO-6* project (UNEP, 2018b). The November 2017 ED's progress report (UNEP, 2017c) recorded receipt of just over US$2 million from extra-budgetary sources, with a remaining funding shortfall of US$1.37 million (Table 7.9.2). "The advisory bodies have monitored the funding situation of the project, which continues to show a gap of almost $1.4 million, despite generous contributions from the Governments of China, Italy, Norway and Singapore" (UNEP, 2017c, p. 3). In February 2018, a PowerPoint presentation to the Committee of Permanent Representatives drew attention to a funding gap of US$ 2.688 million, which needed to be filled to complete the process through 2018 and early 2019. Thirty per cent of this amount was needed to boost the workforce, and the rest was for other essential tasks, like meetings, publishing and outreach (UNEP, 2018c).

Over the following months, it seems that external donors continued to step up. By November 2018, a total of US$3.76 million extra-budgetary cash and in-kind contributions had been mobilized, covering the earlier funding gap and comprising 51 per cent of the total cost of the global *GEO-6* (UNEP, 2018a). The Secretariat notified the Committee of Permanent Representatives that "Financial resources are now secured to complete the *GEO-6* report, and to support the final SPM negotiation process in January 2019" (UNEP, 2018d, p. 7). However, it appears to contradict itself by adding that "Additional financial resources for communications and outreach, and for the translation and publication of the report in the six UN languages, have not yet been fully mobilized" (UNEP, 2018d, p. 7). The terminal report of the *GEO-6* project, which is still pending as this History of GEO is being finalized, should reveal the final funding situation. In the meantime, a new project (PIMS-02083) with the same name, Global and Regional Integrated Environmental Assessments, runs from February 2020 to December 2022. With an approved budget of US$7.05 million, it has enabled follow-up on many of the outstanding *GEO-6*-related activities, including multiple outreach events, other language versions of the global report and additional companion and derivative products (UNEP, 2022f).

## *Conclusions*

This section was intended to provide a clear and accurate description of the funding required and received by each of the six global GEOs produced since 1995. However, the search for this information proved an uphill task without a definitive conclusion. From available documentation, many of the figures presented above are, in the end, mostly unverified and possibly

unreliable. Despite these shortcomings, some clear conclusions can be drawn about funding support summarized below.

1. It costs millions of dollars to prepare a science-based global environmental assessment that users will consider credible, legitimate and relevant. Annual costs for a global GEO process seem to have fallen within a range of two to three million dollars, excluding the UNEP staff costs and overheads and in-kind contributions met by external partners and contributors.
2. By comparison, the GEOs have cost a lot less, in total and annually, than some comparable environmental assessments, including those of IPCC and IPBES.
3. The cost of producing a global GEO has increased over time. Contributing factors are likely to include: the increased complexity of the process, including more rigorous stipulations for participation, consultation and review; additional measures to meet increased requirements for scientific credibility; the growing volume of background sources to be considered; and increased length of the report contents.
4. There has never been enough core funding to cover costs, so additional and extra-budgetary funding has always been needed. There has also been a considerable reliance on in-kind contributions from institutions and individuals.
5. Securing adequate funding, especially for the later GEOs, has been problematic. In many cases, funding gaps have not been filled by the start of the process, and fundraising has had to continue in parallel with all the other tasks of report preparation.
6. Most global GEOs have experienced funding shortfalls, requiring their original plans to be modified and scaled back.
7. Compared to some other global assessments, most GEO processes have demonstrated poor funding accountability and transparency, at least to interested parties beyond the Secretariat. This may have reduced the trust and goodwill of donors and contributed to funding shortfalls.

Evaluations have time and again pointed to the need to secure adequate funding at the very start of the process. If GEO continues in the future, then perhaps, like many of UNEP's other major project areas, it would finally be the time for member states to establish a GEO Trust Fund and give the programme's flagship report a stronger foundation.

Chapter

# 8

# Outreach to Stakeholders and Users

## 8.1 Introduction

Earlier chapters have shown that multiple stakeholders expend enormous efforts in preparing a Global Environment Outlook (GEO) assessment. But that is not the end point, nor the whole story. Key stakeholders must be informed throughout the process. The assessment findings must reach and be understood by the target audience to make any real and positive contribution to environmental sustainability and human well-being. The process of getting the information to stakeholders and to users is commonly known as outreach. If outreach is neglected, then it is probable that the assessment will not achieve its full potential impact.

This requirement appears obvious, but considerable forethought and planning are needed to achieve it fully.

Reaching target groups, for example, can be done directly or through third parties; many partner institutions and individuals engaged in the GEO process have furthered outreach well beyond the capacity of the United Nations Environment Programme (UNEP). There are numerous opportunities for interaction with target groups, but they need to be identified well in advance. Ensuring product relevance requires identifying user needs and interests very early in the assessment process, addressing those needs through the assessment, and designing appropriate outputs. Ensuring that messages are understandable will influence the way in which the information is best presented. And ensuring accessibility requires effective distribution of and access to outputs through appropriate and multiple channels. Box 8.1.1 contains a list of best practices to achieve these outreach aims.

**Box 8.1.1: Ten Best Practices for Successful Assessment Outreach**

- Incorporate outreach as part of the overall assessment process and prepare an outreach strategy early in the process
- Include outreach messaging about the process as well as the products so stakeholders maintain their interest and build expectations
- Synchronize outreach activities with key stages of the assessment process such as planning, content development, and completion
- Identify appropriate opportunities such as events and meetings for outreach activities
- Ensure sufficient preparation time
- Earmark adequate resources, in terms of both people and funds
- Team up with effective spokespersons and with outreach and event partners
- Tailor products and distribution channels to specific user groups
- Identify and highlight the most relevant and consequential take-home messages for each user group
- Gather feedback and lessons learned so that future outreach can be improved

The following sections of Chapter 8 demonstrate the outreach measures undertaken to interact with stakeholders, users and target audiences of the global GEOs. The sections are enriched by the quite diverse opinions of the interviewee group, providing a reality check on the extent to which GEO outreach has achieved its aims and potential. Although there could be interesting comparisons made with the outreach approaches undertaken for other global assessments, this is beyond the scope of the current analysis.

## 8.2 Outreach to Governments

As far as GEO is concerned, outreach to the United Nations (UN) member states has always been high on the agenda. This is not surprising: they are the stakeholders who initially gave UNEP its assessment mandate, agreed the new assessment approach that transformed into the GEO, provided a large proportion of the funds supporting the process, and consider themselves to be the primary target audience. Earlier chapters in this book describe how government involvement in GEO intensified from one GEO to the next, which can be explained partly by increased outreach.

Outreach channels used to inform governments about GEO include:

- Documents for the Committee of Permanent Representatives and the Governing Council /United Nations Environment Assembly (GC/UNEA) that keep governments regularly updated
- Presentations and discussions on GEO during meetings of the above bodies
- Regional consultations with governments on GEO drafts, held since *GEO-1* (UNEP, 1997c)
- Intergovernmental consultations at the beginning and end of GEO processes, held since *GEO-4* (UNEP, 2007b)
- High-level advisory panels with government representation, since *GEO-4*
- One-on-one meetings with national delegations at the request of individual governments
- Products released such as full GEO reports, Summaries for Policy and Decision Makers, alternative language versions, websites and newsletters
- Special events and launches

These deliberate interactions with governments have succeeded in many ways:

- GC/UNEA decisions and resolutions on past and future GEOs, ensuring the continuation of the series
- GEO messages are being passed on by GC/UNEA to high-level meetings like the United Nations General Assembly and the World Summit on Sustainable Development (WSSD), so reaching a wider audience and gaining visibility

- Increased government confidence and satisfaction with end products, having had the opportunity to:
    - provide guidance and policy insight on the next GEO
    - comment on drafts
    - negotiate and endorse GEO Summaries for Policy and Decision Makers

  Draft documents are an important vehicle for reaching officials – often providing them with a greater incentive for reading the content than when it is locked into a final version
- Strong verbal and financial support from certain member states
- The realization by many governments that a similar approach could be used in their region or country to keep the environment under review, leading to a proliferation of reliable subglobal integrated assessments

But the obvious question is, has there been a discernible effect on decision-making and, ultimately, on the environment as a result of GEO? "Sometimes it reaches the right people, sometimes it doesn't. It has to be relatable to the decision maker, and that's a really really difficult ask for the global report" (David Stanners interview). While Chapters 9 and 10 will look in detail at the influence of GEO, it is opportune here to look at GEO's use by government representatives. The *Global Environment Outlook: User Profile and Impact Study* (UNEP, 2004b), focused on *GEOs 1* and *2000* (UNEP, 1999g), sheds some early light on this issue. Table 8.2.1 summarizes the usefulness ratings that government representatives accorded to *GEO-2000* for various purposes. The opportunity was also taken to gain some lessons learned from *GEO-2000* by asking Senior Advisers to Ministers of the Environment to suggest how GEO reports could be improved for future use. More graphics and illustrations, more information on specific and emerging issues, more data tables with national-level data, more detailed regional and subregional coverage, and more specific action-oriented recommendations all received strong support (UNEP, 2004b).

**Table 8.2.1. The percentage of 67 Ministers of Environment, their Senior Advisors, and Permanent Representatives to UNEP that found *GEO-2000* useful for various purposes**

| | Useful | Very Useful | Total (useful or very useful) |
|---|---|---|---|
| | % | | |
| Providing an overview of the global environmental situation | 19 | 79 | 98 |
| Identifying major emerging issues | 39 | 54 | 93 |
| Providing an overview of the regional environmental situation | 36 | 55 | 91 |
| Providing policy guidance at the regional level | 54 | 30 | 84 |
| Putting national issues in a broader perspective | 43 | 42 | 85 |
| Providing policy guidance at the national level | 43 | 31 | 74 |

Note: After publication, 550 hard copies of *GEO-2000* were distributed to national environment ministries and UNEP Permanent Representatives based in Nairobi. An impact study was subsequently undertaken by Universalia, an independent consulting firm in Canada. A total of 296 questionnaires were sent out to Ministers of Environment, Senior Environmental Advisors and Permanent Representatives to UNEP. Twenty-three per cent of recipients responded.

Relevance to target audiences is an indicator of successful outreach. The findings in Table 8.2.1 indicate that government officials considered GEO more relevant at global and regional levels than for national applications. From a more recent perspective, interviewees for this book provided a range of opinions on GEO's relevance to governments. One important criterion is whether GEO findings are considered directly relevant to the country concerned. "If you give GEO to a government official in any country, the first thing they will do is to see where their country is mentioned and if it is mentioned in a positive or a negative way" (Waleed Khalil Zubari interview). "Whichever country's minister receives a report such as GEO, they're not interested in the full content. They're interested in what it says about the country. So if it is positive... they're happy, but if it's not, they complain" (Clever Mafuta interview). A former UNEP staff member working in the Asia-Pacific Regional Office considers that "often the GEO findings were just too high level and not specific enough." She recalls a meeting in Singapore with Senior Officials on the Environment for the Association of Southeast Asian Nations. "I delivered the findings

from *GEO-4* … and I was given a grilling – 'well, what does that mean for our countries, what about our specific situations?'" She experienced a similar reaction when *GEO-5* was launched in India (Anna Stabrawa interview). Commenting on the situation in West Asia, a former Division of Early Warning and Assessment Regional Coordinator noted that "While this report will never go to the country level to be a bit valuable to them… it gets to the regional policy forum and…. it is useful for regional entities who really look at the environment" (Adel Farid Abdel-Kader interview).

From Europe, there were mixed messages. One interviewee from the European Environment Agency stated that GEO had "not had any impact on EU [European Union] environmental policy because that space is totally occupied by knowledge and assessments done by Europeans" (David Stanners interview). An alternative situation was described by an interviewee from the environment agency in Switzerland: "I think GEO really reached the target to influence the dialogue and the definition and implementation of our national environment policies…our ministry and agency for the environment is looking at the situation in Switzerland but also comparing it on the European, pan-European and global level" (Nicolas Perritaz interview). Using the GEO to gain insight for collaboration on global issues was also specified for Sweden. In The Netherlands, the desk officer to the Minister would keep a copy of GEO, along with other assessments and favourite articles, as source material for future speeches, budget negotiations and parliamentary questions (Jan Bakkes, personal communication, 24 May 2020). In general, however, many have felt that it was more relevant to developing regions "where they do not enjoy this richness of environmental assessment and knowledge happening at the country level." (David Stanners interview).

One consensus apparent among interviewees was the importance of GEO reaching beyond environment ministries, "It's important to bring in people from other ministries…." (Helen Mountford interview). "The report should, of course, go to more than just the environmental ministries. And it has to be presented in such a way that it brings up the interest of the other ministries" (Ninni Lundblad interview). The secret is to reach beyond the Ministries of Environment to the ministries of planning, economy, natural resources…industry, whatever" (Graciela Metternicht interview). Some more specific cases were cited by an interviewee connected to government: "*GEO 4* had the biofuel discussion…That was an example where we could use the GEO process and feed information directly into the office of the Prime Minister because that became a hot issue here." And "the GEO products …always reached the Ministry of Foreign Affairs and the government

assistance agency. [They were] the only ones that have really been asking 'when will we have the next GEO?'"

Finally, concern was expressed by some that "those who really should read the report…all those Ministers of Environment, they often may not see it, and they're not enough involved" (Tore J. Brevik interview). "If you go outside of a small circle who attend regional meetings, global meetings or interact with UNEP directly on issues like GEO, then lots of people don't know what GEO is" (Adel Farid Abdel-Kader interview).

The delivery format was considered crucial. "It is very unlikely that GEO in its traditional format is going to reach ministers. A minister will barely have the time to read the beginning of the very long Executive Summary, no less the 600 pages backing it" (Joseph Alcamo interview). "Policymakers need much more concrete and targeted information" (Ruben Mnatsakanian interview) – "easily readable material…made available directly to them in a very, very minimal format" (Ninni Lundblad interview). In other words, a high quality "summary for policymakers, decision makers. I think it was necessary and that information reaches ministers and even higher in some countries' cases" (Kakuko Yoshida interview). Appropriate language versions will be an important factor here, or at least the availability of interpreters, to get messages across.

## 8.3 Outreach within UNEP

The GEO Team responsible for managing the GEO process and delivering the GEO outputs has traditionally been a small group of six to nine staff at UNEP headquarters in Nairobi, with one or two posted staff in each of the six UNEP Regional Offices.[1] Up until *GEO-5* (UNEP, 2012a) these staff members were all part of the Division of Early Warning and Assessment, the division with prime responsibility for environmental assessment, data and early warning. By *GEO-6* (UNEP, 2019e), all posted staff in this division had been absorbed into their regional or subregional offices, collectively grouped as the 'Regional Presence' in the UNEP organigram.

Chapter 7 highlighted that, beyond the GEO Team, many other UNEP staff from all UNEP divisions, posted offices, and UNEP-linked Convention

[1] Co-located in Nairobi for Africa and located in Bangkok for Asia-Pacific, in Geneva for Europe, in Mexico City and subsequently Panama for Latin America and the Caribbean, in Washington for North America and in Bahrain for West Asia.

Secretariats contributed to GEO in one capacity or another. The same was true for relevant entities that were part of or closely affiliated with UNEP.[2] But, with notable exceptions, the real challenge has come in persuading the organization as a whole to take ownership and to use the report to their advantage.

*GEO-1* received huge interest and support from Executive Director (ED) Elizabeth Dowdeswell from its start. She followed the process, personally chose the cover for the report, and took great pride in launching *GEO-1* on 27 January 1997, the first day of GC-19. In her update on the outcomes of the Governing Council to staff, the ED acknowledged that it had been a very tough session[3] but cited the launch of GEO as a major accomplishment.

Her GEO legacy passed to the following ED Klaus Töpfer later that year. Not surprisingly, to start with, he did not consider it his project and paid little attention to preparations for the *GEO-2000*. He did, however, agree to launch the report in London on 15 September 1999, and, on the preceding Friday afternoon in Nairobi, he requested a GEO briefing which changed everything. Inspired and enthused, he altered his travel plans to pass through London on the following Monday and requested that media interviews be arranged. He read *GEO-2000* on the overnight flight on Sunday, arrived at the venue in London just before 8 A.M. and continued through an entire morning of interviews for radio, television (TV) and newspapers. He seemed to know *GEO-2000* from cover to cover as he responded to a wide range of questions.

From that time on, Dr. Töpfer became one of GEO's strongest advocates within the organization. He frequently drew on GEO for high-level speeches within the UN and beyond. He personally proposed a Delphi Survey questionnaire process involving senior UNEP staff and outside experts to help formulate the recommendations for *GEO-3* (UNEP, 2002e). He arranged for additional junior staff to assist with the process and chaired a UNEP Senior Management Group meeting on *GEO-3* Policy Conclusions and Recommendations for Action in Nairobi in November 2001. He clearly recognized the added value of involving staff from across the organization in the GEO process and was proactive in making it happen.

[2] Examples include the Global Resource Information Database (GRID) Centres, especially those in Arendal, Geneva and Sioux Falls, and the UNEP World Conservation Monitoring Centre in Cambridge, UK.

[3] GC-19 was actually temporarily adjourned at the end of its two-week session when member states failed to agree on the reform of UNEP's governance structure; the issue was resolved when the session was resumed in April 1997.

However, despite these efforts, and the designation of GEO focal points in all other divisions during the *GEO-3* process, distributing ownership of GEO to the rest of UNEP has remained a slow process. A self-assessment, commissioned by UNEP and conducted between 2006 and 2007 to capture the lessons from the preparation of the fourth GEO, recognized this as a continuing shortcoming and recommended: "better coordination, engagement and cross-collaboration with key UNEP divisions" (IUCN and UNEP, 2008, p. 13). The situation persisted through *GEO-5* according to the *GEO-5* Terminal Evaluation that noted: "Participation of other UNEP Divisions in UNEP was…minimal due to the lack of planning such collaborations and funding constraints" (Rowe et al., 2014, p. 78). *GEO-6* may perhaps have turned the situation around. The briefing note provided in November 2018 to the UNEP Committee of Permanent Representatives estimates that 41 per cent of Secretariat staff time on *GEO-6* was provided in-kind by non-core team UNEP staff. Certainly, the majority of UNEP staff designated as Chapter Coordinators were from outside the Science Division[4] (UNEP, 2018a).

Using GEO findings to advise UNEP's work programme has been another issue. After receiving the first GEO report, governments recognized that the findings and recommendations could help guide UNEP's management actions and Programme of Work, in addition to their own. They urged the ED to do this in GC Decision 19/3 of 1997. This was repeated in Decision 20/1 after the launch of *GEO-2000*, and several times since, as noted in Annex I.

For many years there was little evidence of other divisions using GEO findings, but this request by member states may finally have been heeded. For instance, the UNEP Medium Term Strategy for 2014–2017 says, "In determining its focus for the period 2014–2017, UNEP employed what was termed a 'foresight process' and the findings of the fifth report in its Global Environment Outlook series (*GEO-5*) to identify global challenges that the world is likely to witness during this period." The *UNEP Programme of Work and Budget 2018-19,* prepared for UNEA-2 in 2016, states, "The medium-term strategy for the period 2018–2021 also takes into account regional priorities and emerging issues identified through global and regional forums; the Global Environment Outlook (GEO) process and other assessments; the UNEP environmental foresight process; and consultations with major groups and stakeholders" (UNEP, 2016h, pp. 3–4)

[4] Between *GEO-5* and *GEO-6* the Division of Early Warning and Assessment was renamed as the Science Division.

## 8.4 Outreach to the rest of the UN

As described in Chapter 3, other UN agencies have provided considerable in-kind support to content preparation in their specialized areas throughout the history of GEO. This was recognized as a considerable asset by a former Ministry of Environment official who remarked, "it has always been very important to showcase that UNEP has coordinated with FAO [Food and Agriculture Organization of the United Nations] with everything associated with fisheries and marine resources, and also with forestry and agriculture...those cases have been very helpful in building a dialogue with the ministries of agriculture."

As with all GEO participants, the UN contributors traditionally received a hard copy of the GEO report once it was published.[5] But the UN distribution extended beyond this inner circle. For example, 40 copies of *GEO-3* were sent to relevant convention secretariats, 50 copies to UN Depository Libraries worldwide, and 75 copies to UN Information Centres. Hardcover copies of the *GEO-4* report were distributed to all 31 members of the UN Chief Executives Board.[6]

## 8.5 Outreach to the general public and other audiences

The general public has never been considered the primary audience for GEO. But from *GEO-1* onwards, it was realized that GEO could be an important tool for raising public interest and awareness about environmental issues, the state and trends of the environment, and how well problems were being dealt with around the world. Several interviewees viewed this as an opportunity:

- "GEO is about everything, so there should be some aspects that are interesting for the public" (Nicolai Dronin interview).
- "It was always a question that we asked: 'who are you writing it for?'... And I'm not sure we ever got a satisfactory answer. It was more like 'for everybody' "(Jane Barr interview).

[5] Now that far fewer hard copies of GEO reports are printed, it is likely that many participants no longer receive one but are able to access it on the UNEP website.

[6] The Chief Executives Board brings together the executive heads of 31 specialized organizations to deliver as one at the global, regional and country levels. It is the prime instrument for strengthening the coordination role of UN inter-governmental bodies on social, economic and related matters. See www.unsystem.org.

- "I think everybody is the intended audience really because these issues are important and relevant to everybody, obviously to varying degrees" (Anna Stabrawa interview).

The big challenge was to get these key messages across to them. The media proved themselves champions in this respect. As commented by interviewees: "Let's be frank – the general public really goes by whatever they read in newspapers" (Ashbindu Singh interview). "If the media doesn't write about it, it hasn't happened" (Tore J. Brevik interview).

Engagement with the media was initiated by circulating press releases, holding press conferences and media briefings and, most especially, through high-profile media launches. From the early days of GEO, UNEP was fortunate to have a highly experienced communication and public information arm with good connections to national UN Information Centres and public media around the world. In addition, some of the organization for major launches was outsourced to local media events management experts who could follow up on arrangements on a day-to-day basis.

On 27 January 1997, the day that the ED launched *GEO-1* in Nairobi, announcements on GEO were made by UN spokespersons to international media representatives in both New York and Geneva. Eleven events then took place in the regions to raise awareness of the new report and to highlight regional perspectives and findings. Organized by UNEP Regional Offices, often in collaboration with local UN Information Centres, a number of the regional launch events were attended not only by journalists and broadcasters. Audiences also included representatives of regional organizations; high-level government officials; members of the academic community; and individuals, institutions and non-governmental organizations actively engaged in environmental management, planning and policy development.

*GEO-1* received wide media coverage following these events – broadcasts on the British Broadcasting Corporation (BBC) World Service, Voice of America, and China International Radio alone had a potential audience of over two billion people. GEO's key messages also went out through international news networks such as Reuters to the general public via local radio and television stations. They appeared in national and international newspapers in languages ranging from Arabic to Thai. A further indication of interest in *GEO-1* was provided by Internet sites. During the first two weeks of operation, one of the GEO mirror sites at GRID-Sioux Falls recorded over 16,000 requests originating from 27 different countries.

The launch of *GEO-2000* in 1999 probably had an even bigger impact. While there was still a launch in Nairobi and other regional locations,[7] it was decided to hold the global media launch in central London, where the greatest concentration of environment-interested media was believed to be. The London launch was organized jointly by two London-based environmental enterprises, the United Nations Environment and Development-UK Committee and Television Trust for the Environment.

Over 100 people attended the launch, including around 25 media representatives, half of whom were foreign correspondents. To facilitate media coverage, a Video News Release prepared in advance by the Television for the Environment and available in different language versions was distributed for TV use. Press kits and a press release, also in different language versions, were made widely available. These materials, as well as live and recorded interviews with the ED and the Head of the GEO Team before and after the launch itself, provided input for extensive media coverage of *GEO-2000*.

The timing of the launch on 15 September 1999 proved auspicious, as it coincided with a major hurricane, Floyd, on the east coast of the USA. Several media capitalized on this event to emphasize some of the key messages about climate change in *GEO-2000*. For example, the introductory footage to the BBC Newsnight programme that same night showed storm surges and winds pounding the coast of Florida before segueing into a debate on the findings of *GEO-2000*. The headline in the Guardian newspaper of 17 September 1999 read "Who created Floyd? Paying the price for environmental abuse," and went on to say:

> Two million Americans have been on the move in the last few days in one of the biggest evacuations in American history. As they sat in their traffic jams, they would have done well to read the …*GEO-2000* report …They could also have pondered…that such disruptions will be an increasingly frequent feature of their children's lives …Brutal though it may be to say so, Hurricane Floyd is a necessary warning to the country which contributes more than any other to global warming …Thanks to *GEO-2000* and its predecessors, we will not be able to plead ignorance or lack of know-how to our grandchildren (Guardian, 1999).

As the Director of Communications and Public Information at UNEP e-mailed two days after the launch, "The media reaction to the launching of our report has been enormous." It had featured in at least 15 UK and international TV

[7] Abu Dhabi, Bahrain, Bangkok, Bonn, Dhaka, Harare, Lima, Port of Spain, Rio de Janeiro, and Santiago in addition to Nairobi.

programmes, seven international and seven UK radio programmes, and numerous newspapers. Several media outlets had their own distribution channels with a consequent multiplier effect. For example, one of the UK radio outlets further distributed its material to 230 UK independent networks. British Satellite News, which sent a camera crew to the launch, used a network of communication satellites to distribute news to broadcasters throughout Eastern and Western Europe, the Commonwealth of Independent States countries, the Middle East, Asia, the Pacific Rim, the Americas, the Caribbean, and Africa.

Working with media does present some challenges. Obviously, with the media being news-focused,

> the presence of GEO in the media is very cyclical, governed by when the new report comes out. The media have a very short attention span…and they just focus on the big item things…It goes to a peak leading up to a launch and a week or two after the launch, and then it's forgotten. I think we have to accept that media focuses only on the immediate and the now, then they move on (Munyaradzi Chenje interview).

"Once in a while they know of it, then it disappears from their radar screen for very long" (Adel Farid Abdel-Kader interview). In addition, "the media work on short deadlines" and "for somebody to dissect and tease out key messages [from a full GEO report] is extremely difficult" (Michael Keating interview). This is where, in addition to the launch events, the press releases, the Video News Releases and other summary documents come into their own. The same interviewee remarked that "the press releases came to be very bureaucratic, but this is just the style of UN writing…some of their shorter pieces were probably the most useful."

Even so, it can be difficult for journalists to link GEO reporting with the interests of their national audience. "If you are trying to write about the problems in your country…you can't find consistent information about your country in the GEO report…journalists could hardly link problems in their respective countries even with the GEO chapter dealing with their region" (Ruben Mnatsakanian interview). The regional office in Latin America and the Caribbean addressed this issue through a workshop.

> We invited journalists from different countries, and we spent three days explaining to them how to use the GEO. I think that was really really good because these people then would publish an article in the national newspaper. That would give you that massive outreach that I think you could not achieve to the general public through any other means (Graciela Metternicht interview).

One former government official highlighted how their environment ministry always tried to use the launching of the GEO book as a national media opportunity.

> Over these past 20 to 25 years, the importance of having things in media has become almost overwhelming…to get a minister interested in a given topic, he or she has to be convinced that he or she will have a positive media spin on it… That's why they are ministers and not bureaucrats …In a way, it is contradictory to good science to look for this, but that's the way it plays out these days (Anonymous interviewee).

Perhaps against the odds, launch events and associated media coverage did not entirely result in ephemeral coverage of GEO. One of the subsequent spin-offs, for example, was when the BBC World Service accepted a proposal from an independent radio producer to provide a six-part series based on *GEO-2000* for the BBC programme 'Our Planet.' These were broadcast the following year. Another longer-term result was the permission sought by the UK Open University in 2000 to print 24,000 copies of a shortened version of the *GEO-2000* Synthesis section for its course called *Technology for a Sustainable Future*.

With English as the primary language for the compilation of global GEOs, other language versions of these reports had to go through the additional, time-consuming, and costly translation process before they were printed and ready for distribution. Inevitably, this delayed their publication. However, each translation initiated at least one further report launch when it was ready, resulting in additional media coverage and awareness-raising. The Spanish version of *GEO-2000*, for example, was launched in Madrid on World Environment Day, 5 June 2000. *GEO-2000* in Arabic was launched in Bahrain on 26 June 2000, during the opening of the new premises for UNEP's Regional Office for West Asia, and the French *GEO-2000* was launched in Paris on 28 June 2000 at the Knowledge Fair of the OECD.

Since *GEO-1*, in addition to being able to purchase hard copies of the book, the general public has had free Internet access to all GEO reports and many other associated products. Mirror websites in Japan, Kenya, Mexico, Norway, Switzerland and the USA were set up to provide access in the earlier days. While it is not possible to determine the number of people who learned about GEO through the media, some of those will probably have accessed more information online.

> I think that the Internet has made a difference. The GEO reports are available for use by anyone across the world…so in terms of the new forms of media, I think GEO is very much there. Now, it's a matter of UNEP and its

> partners being sure that its utility on the media, on the web, goes beyond a launch period but is constantly being flagged for various issues or meetings, wherever its relevant (Munyaradzi Chenje interview).

*GEO-3* was launched 30 years after the 1972 Stockholm Conference and the birth of UNEP and a few months before the 2002 WSSD in Johannesburg. London was again chosen for the global launch. Some 170 individuals attended the launch on 22 May, which targeted the media and representatives from the UK government, the South African government for the WSSD connection, the academic and education communities, non-governmental organizations, and the private sector. The UK Secretary of State for Environment, Food and Rural Affairs was a keynote speaker, together with the ED. From London, the ED flew straight to Brussels, where he carried out a second European launch that afternoon in the administrative centre of the European Union. Reflecting the launch presentations, 25 media interviews, press kits and video footage presented by UNEP, the report again received extensive newspaper and broadcast coverage worldwide. The video material, for example, was known to have been used by broadcasters in Australia, Brazil, Canada, Germany, Italy, Japan and South Africa, as well as by global news networks Associated Press Television News and BBC World Service.

Over the years, the media have found quite a lot to write about in GEO reports. They have usually picked up on a range of issues for each article and included some success stories. But as with so many other topics that attract readers, the headlines have tended to highlight doom and gloom (Box 8.5.1).

However, not everyone has accepted the GEO findings without question. An example of this was a scathing four-page article describing *GEO-2000* as a collection of opinions containing many errors and lacking any sense of proportion. It claimed that the report dramatically and unscrupulously oversold its message by falsely identifying issues like soil erosion, overfishing and coral reef degradation as global emergencies (Lomborg and Larsen, 2000). The 'sceptical environmentalist' Bjørn Lomborg subsequently attended the London launch of *GEO-3*. Meeting him afterwards, the ED invited Mr. Lomborg, who was the Director of the Environmental Assessment Institute in Copenhagen, to join him in a public debate during the upcoming WSSD in Johannesburg. This did not happen, although the Environmental Assessment Institute did release an evaluation of the *GEO-3* report later in the year. UNEP's response to the evaluation stated: "It is clear and regrettable that the EAI [Environmental Assessment Institute] did not read the *GEO-3* report thoroughly during its evaluation. Had it done so it

would have found that a large number of the issues and perceived shortcomings which it raises in the evaluation are unsubstantiated and unjustified and that they seriously misrepresent UNEP's work" (UNEP, 2002j).

Additional launches of *GEO-3* were held in several parts of the world, one of the most notable being a political launch by the ED to delegates of the fourth Preparatory Committee for the WSSD. This launch took place in Nusa Dua, Bali, during an official dinner on 6 June 2002. All guests received a hard copy of the report in English, and the Chinese version of *GEO-3*, the first of the alternative language versions, was presented by the head of the Chinese delegation to the ED on the same occasion.[8]

### Box 8.5.1: *GEO 1-4* in the Printed Media

On *GEO-1*

- "World turning blind eye to catastrophe" (Vidal, 1997, The Guardian Weekly, 02/02/1997)

On *GEO-2000*

- "Global warming will trigger series of disasters, UN warns" (Nuttall, 1999, p. 16, The Times, 16/09/1999)
- "The dilemma that confronts the world: water shortages, global warming and nitrogen pollution threaten planet's future....." (Brown, 1999, p. 3, The Guardian, 16/09/1999)

On *GEO-3*

- "Threat to 11,000 species on Earth: Planet 'is at a crossroads'...." (Daily Mail, 2002, p. 38, 23/05/2002)
- "Future of the Planet rests on next 30 years, UN warns" (Connor, 2002, p. 13, The Independent, 23/05/2002)

On *GEO-4*

- "The Earth Audit: The scale of the challenge is huge. We've got to act now" (The Times, 2007, p. 1,6,7,16, 29/10/2007)
- "Environment woes threaten survival of humans, says UN" (Beament, 2007, p. 12, The Irish Times, 26/10/2007)
- "Planet stretched to breaking point, UN says" (International Herald Tribune, 2007, p. 1, 26/10/2007)

[8] While it was very well received by UNEP and publicly demonstrated strong Chinese support for the publication, this was actually a mock book, since the insides of the Chinese version hadn't yet been printed!

- "Damage threatens growth, study finds" (Financial Times, 2007, p. 12, 26/10/2007)
- "Earth is near point of no return, says UN report (The Daily Telegraph, 2007, p. 16, 26/10/2007)
- "UN warns it's now or never to save planet" (The Weekend Post, 2007, p. 30, 27/10/2007)

## 8.6 Strengthening the outreach strategy

Outreach became a more formalized and visible process from *GEO-4* onwards. In February 2005, the Global Intergovernmental and Multi-stakeholder Consultation on *GEO-4* had recommended, based on proposals made by the Secretariat, "developing and undertaking a monitoring and outreach strategy that is relevant to all regions and stakeholders" (UNEP, 2005f, para. 12(j)). An Outreach Working Group, comprised of 18 specialists from marketing and communication, science, education and technology, was formed early in the process. It held three meetings to "develop and implement a communication strategy to publicize the findings of *GEO-4* and engage stakeholders to use those findings in policy processes" (UNEP, 2007b, p. 501).

The terms of reference for the Outreach Working Group (Box 8.6.1) demonstrate that the group's mandate went considerably beyond just organizing the launch of *GEO-4*. First, they identified a comprehensive group of policymakers as the primary target audience[9] and a broad-ranging group of secondary audiences.[10] In essence, these target audiences included almost everyone. They then developed a strategy and implementation plan that would be relevant and influential for each target group, using persuasive messages reflecting the values of each audience and their effective engagement during and after the production phase. An interviewee who had been closely involved with three GEO launches and was also a member of the *GEO-4* Outreach Working Group considered that, compared

[9] UNEP GC/Global Ministerial Environment Forum, UNEP Committee of Permanent Representatives, actors in select intergovernmental governance processes, the Secretariats of Multilateral Environmental Agreements and policy advisors in relevant government ministries, including ministries of environment and foreign affairs.

[10] UN agencies and UN Sustainable Development processes, other government ministries and agencies, intergovernmental organizations, non-governmental organizations, civil society, the scientific community, the media, the private sector and the general public.

with earlier GEOs, "the communication had been stepped up…there was an attempt to think through who those target audiences were, whether they were the NGOs who would use the material or whether they were other relevant stakeholders. I think the communication group…did quite an effective job in suggesting who should be approached and suggestions of how" (Felix Dodds interview). However, the outreach envisaged by the Working Group did not materialize as planned; it could not be fully implemented nor brought to fruition due to inadequate resources.

**Box 8.6.1: Terms of Reference for the *GEO-4* Outreach Working Group**

a) Developing an audience-driven communication strategy, including a strategy for capacity building at the subglobal level;
b) Developing and using improved monitoring and evaluation tools;
c) Considering accessibility of the GEO information, including in terms of format and languages;
d) 'Branding' of the GEO logo and name, franchising, promotion and distribution;
e) Promoting e-learning through links to youth programmes and university courses and a GEO kit;
f) Working with the media; and
g) GEO Forum (launch)

Source: (UNEP, 2005e, para. 68)

The *Review of the Initial Impact of the GEO-4 Report* (IUCN and UNEP, 2009), conducted ten months after the launch of *GEO-4*, sheds light on what happened. With regard to reaching its primary target audience, the Review considered that GEO had "engaged policymakers in numbers larger than ever before in production and outreach processes, although they remained primarily from the environment sector" (IUCN and UNEP, 2009, p. 48). It also found that policymakers were generally positive about the accessibility of the *GEO-4* report, in large part due to availability of the concise Summary for Decision Makers in all six official UN languages on the website and the wide distribution of complimentary copies. Between October 2007 and March 2008, the full English version of the report was downloaded more than 1 million times. In March 2008 alone, there were 80,000 downloads of the English version, and the French and Spanish versions of the report were downloaded more than 14,000 and 20,000 times, respectively.

Regarding outreach through launch events, this went according to plan. Commencing with a launch in London on 25 October 2007, a series of global and regional launch activities took place in more than 40 cities worldwide, including in the eight One UN pilot countries[11] and at UN headquarters. They generated significant media interest, with TV documentaries, interviews on UN and other radio stations, and articles on the front pages of prominent newspapers. However, the level of media interest dropped quickly after the launch.

But the overall conclusion of the Review was that *GEO-4*, as with previous GEOs, was unlikely to have penetrated important secondary audiences - the private sector, development sector, powerful government ministries and specialized media. With the early end of the outreach strategy implementation, opportunities to reach the academic sector were not optimized. Communication and dissemination strategies were not adequate to reach the audiences in many developing countries due in part to poor Internet access. Lack of incentives may have deterred engagement by the private sector. Suboptimal use of new media and mobile communications may have hampered the reach to civil society and youth. The Review concluded, "The lack of cohesive and concerted action within UNEP to use and promote the use of GEO weakens its impact as well as its potential to support the [Medium Term Strategy] and UNEP's role in the UN system and more broadly" (IUCN and UNEP, 2009, p. 55).

Despite these findings, a summary of *GEO-4* outreach undertaken in the first six months after the report's launch in October 2007 does cite a variety of measures to extend the outreach of the report beyond traditional target groups.[12] Examples include:

- copies of the main report and Summary for Decision Makers distributed at the 4th International Conference on Environmental Education in Ahmedabad, India, November 2007
- a GEO-based presentation to the Forum on Sustainability and the Role of Corporations and the Private Sector, in New Delhi, December 2007

[11] In 2006 a High-Level Panel on UN System-Wide Coherence in the Areas of Development, Humanitarian Assistance and the Environment recommended that the UN system should "Deliver as One" at country level. Eight countries subsequently piloted the "Delivering as One" approach: Albania, Cape Verde, Mozambique, Pakistan, Rwanda, Tanzania, Uruguay and Viet Nam. (See www.un.org>deliveringasone).

[12] Memorandum dated 9 April 2008 from the Head of the GEO Section to the Director of the Division of Early Warning and Assessment entitled "GEO-4 outreach progress and successes."

- a speech based on *GEO-4* findings made by the ED to the 2008 World Economic Forum
- copies of the Summary for Decision Makers distributed during the World Business Council for Sustainable Development Liaison Delegates Meeting in Montreux, March 2008
- the complete e-version of *GEO-4* provided to the Gutenberg Project for inclusion on its website – the first and largest single collection of free electronic books
- data files provided to the Committee on Earth Observation Satellites for inclusion in their handbook.

*GEO-5* followed the example of *GEO-4* in developing an outreach strategy early on in the process. The Global Intergovernmental and Multi-stakeholder Consultation on the Fifth Global Environment Outlook held in March 2010 recommended that the target-driven strategy should "determine how best to reach target audiences, including by developing intermediate products" and that it should "make use of a range of multimedia tools and innovative approaches…to communicate the findings…and maximize accessibility of GEO-5 information, including in terms of format and languages" (UNEP, 2010c, para. 23).

The launch was scheduled for early June 2012, so there was no time to lose for producing intermediate outputs. These included policy briefs to inform a wide range of events in the intervening months and plans to engage stakeholders beyond the lead-up to the June Rio+20 Summit. A 20-page *Outreach Strategy* was drawn up, setting out a very comprehensive plan for maximizing the impact of *GEO-5* (UNEP, 2011b).

Target audiences were grouped into two broad categories. The End Users included UNEP member states, UN agencies including the United Nations Commission on Sustainable Development and its preparatory committees, Multilateral Environmental Agreements and UNEP's Major Groups and Stakeholders.[13] Major Groups and Stakeholders were also categorized as Broadcasters, along with GEO partners and authors and the media. The Strategy broke these target groups into even more detailed categories –so there was an up-front determination to include what could be considered the secondary audiences that *GEO-4* had failed to reach.

[13] These groups include Business and industry, Children and youth, Farmers, Indigenous Peoples and their communities, Local Authorities, Non-governmental organizations, The scientific and technological community, Women, Workers and Trade Unions (UNEP, 2021d).

For each target group, the Strategy outlined their needs and the messages and possible formats to communicate them. In addition to the main *GEO-5* products, a range of specialized products for early messaging to the Rio+20 target audience[14] and a set of post-launch products specialized to different target audiences was tabled. There was also a list of outreach opportunities for early messaging of *GEO-5* during key meetings: it identified 30 such meetings taking place between the end of April 2011 and the Rio+20 Conference itself in early June 2012. *GEO-5* had the most ambitious outreach plan of all the GEOs so far.

Again, one remarkable omission in the comprehensive *GEO-5* outreach strategy was the almost total absence of any substantive plans to extend outreach to the academic and higher education communities. Indeed, this perpetuated a common trend among all the earlier GEOs. Perhaps with so many academic and research institutions engaged as partners in GEO, it was assumed that they didn't need to be considered as target audiences in their own right – and that GEO information would automatically trickle through to their associated institutions. Universities, their staff and students were the invisible user group as far as outreach planning was concerned.

Despite this, GEO was recognized as a relevant source of information for university courses by academic institutes working on GEO – and many beyond (Chapter 9). Interviewees from all regions of the world cited its use in universities, often naming specific institutions; several considered this the biggest and most important user group of all. So, although academia seems to have been a glaring omission in the formal outreach strategy, it has nevertheless become and remained a key user.

Outreach activities were developed and overseen by an interdivisional outreach group comprised of 41 individuals. A sum of US$ 1 million was budgeted for the outreach of *GEO-5,* but because of funding shortfalls, the full set of planned activities could not be achieved. Nevertheless, the Terminal Evaluation concluded that, with Rio+20 at the core of the strategic outreach agenda, "GEO-5 did an exemplary job completing and launching the assessment in time for a very 'ripe' opportunity within a very tight timeframe" (Rowe et al., 2014, p. 48). The full *GEO-5* report was successfully launched in 13 cities worldwide, mostly before the global launch on World Environment Day, 6 June 2012, some two weeks before the start of Rio+20. But governments were already familiar with its contents, having

[14] Two side products were considered particularly useful in this respect: *Keeping Track of our changing Environment: From Rio to Rio+20* and *Measuring Progress: Environmental Goals & Gaps* (Annex IV).

the opportunity to comment on draft versions of the report as early as June 2011 and participate in the negotiation and endorsement of the Summary for Policy Makers in January 2012, well in advance of the Summit.

The Terminal Evaluation also considered that "the *GEO-5* website – available in 6 UN languages and Portuguese – provided excellent visibility and effectively raised the project's profile. Targeting the 2012 World Environment Day and the Rio+20 Conference…provided media exposure and general global interest" (Rowe et al., 2014, p. 50). Data presented in Annex 7 of the Terminal Evaluation show that the *GEO-5* English version was downloaded 2,011,167 times between June 2012 and June 2014, with the greatest number of downloads recorded during and right after the launch of the report. In the months following the launches, close to 5,000 references to the *GEO-5* assessment were made in the media. This worldwide attention reflects that translation of the *GEO-5* report into Spanish, Chinese and Russian opened up access to the report globally. Web downloads after their launches are recorded as 816,000 for the Chinese version (September 2012 to June 2014), 1,650,000 for the Spanish version (May 2013 to June 2014), and 41,000 for the Russian version (November 2013 to June 2014). Unfortunately, *GEO-5* was never translated into French or Arabic due to a lack of funds.

This last point significantly influences outreach, as summarized by one interviewee.

> If you need a message to reach all the people…you need to have that in their own language. We are Arabic, so unless the material came to be translated, it's difficult to have a lot of audiences that are using it. It was a fault that the *GEO-5* wasn't translated, so people…return to *GEO-3* and *GEO-4* and not to *5* because it's not translated. I think the translation is very important in the world (Asma Ali Abahussain interview).

And she added that if it is translated, there is no excuse for not reading the report.

The formal evaluations of successive GEOs contain useful insights on how far outreach has met expectations. Many interviewees shared their personal experiences and observations of GEOs' outreach performance on a more intuitive level. A number of these have already been quoted in this chapter. Some broader opinions from interviewees on previous shortcomings are presented in Box 8.6.2.

### Box 8.6.2: GEO Outreach: Some opinions from interviewees on shortcomings from the past

- Lagging behind the times:

  "GEO is no longer fit-for-purpose because it is not a great communication tool. There are elements of the process that are so antiquated that it's working against itself. The world changed a little bit in the last 20 years."

- Dealing with 'the brick':

  "The main GEO report…is almost like an encyclopedia. As a result, it is very difficult for most people to get into…."

- Failing at the final hurdle:

  "UNEP could get a much higher leverage out of GEO…it has an impact, but it is far below the effort."

  "We, the corporate UNEP… didn't have the proper understanding of going that last critical, key step to get the messages out and to get them out in the proper way."

  "It is a beautiful piece of work, but there is little or no follow-through and very limited resources to carry those messages to people who actually can do something about it."

- Inadequate funds:

  "It's been a question of resources. I simply think that we haven't had the resources to do the outreach that was needed."

  "It's very sad, all the resources put into making GEO, and you don't have the little additional resources to create a good communications strategy."

- UNEP overstretched:

  "Compared to some other [global] reports, GEO had a small fraction of an effort dedicated to communication…and their communication office had to work on 15 different projects at the same time."

  "UNEP is trying to cover too many different things, so there are many many institutional problems that help to understand why the outreach is pathetically weak."

  "UNEP is so weak as an institution and so feeble in terms of broadcasting messages across the world that even when it leads a very impressive process involving hundreds of scientists from most countries around the world in the five-year GEO report, it cannot begin making

an impact in the environmental field or on governments because it just doesn't have a strong enough standing as a global institution or big enough budget, or all of the above."

Source: Extracted from interviews with Nicolai Dronin, Idunn Eidheim, Jason Jabbour, Michael Keating, Peter Noel King, Ruben Mnatsakanian and Frits Schlingemann

The first products from the *GEO-6* process were the six *GEO-6* regional assessments (Chapters 5.4 and 6.2). These were launched in mid-2016 in venues and events around the world. For example, the *GEO-6 Regional Assessment for North America* (UNEP, 2016d) was launched in Ottawa and Washington DC; the Pan-European *GEO-6* report (UNEP and UNECE, 2016) was launched in Batumi, Georgia.

Compared to efforts to launch previous GEO reports – global or regional – the efforts to launch the *GEO-6: Regional Assessment for the Pan-European Region* were positively parsimonious. Box 8.6.3 contains a summary of the event based on Conference documents and insights from a European Environment Agency delegation member who attended the Conference and has a long-term involvement in GEO. The *GEO-6* Pan-European assessment report seems to have had little immediate impact on the Conference participants due to the short and low-key presentation and the fact that those present were immersed in the business of the Conference. Furthermore, it seems there was little if any follow-up to the Batumi launch, except that a Russian version of the report subsequently became available a year and a half after the English version appeared.

### Box 8.6.3: The pan-European *GEO-6* Launch

The launch event, if it can even be considered an event, took place in the grand context of the 8th European Ministerial Conference on Environment for Europe held in Batumi, Georgia, from 8-10 June 2016. A ten-minute time slot was allotted in the agenda on the first day of the Conference for UNEP to present the *GEO-6* pan-European report. A sole UNEP staff member used no more than a half-dozen PowerPoint slides to make a technical presentation. Few links were made to UNEP's two main partners in the region, the European Environment Agency and the United Nations Economic Commission for Europe, and there was no opportunity for a political response. "I think the presentation of GEO in Batumi was very poor. It was extremely simplistic and inappropriate for the setting…I was embarrassed." (David Stanners interview).

In a brief introduction to the presentation, the Conference Chair provided no context, so the long-running and global significance of the Pan-European *GEO-6* report was not understood by a large majority of those present. There were a few questions as follow-up to the brief overview provided by UNEP, but the uniqueness of the report was entirely overlooked, and it was merely a minor agenda item in the three-day Conference.

A six-page conference document contained a summary of the key report findings and policy messages. The full report was made available in a limited number of copies on a table outside the conference room, but with no special or separate profiling – it was to be found among a large number of other printed documents for Conference participants. "So, I think UNEP is missing a chance to up its game here. If it doesn't find its niche on a Pan-European level like this, I think the reports it produces are just going to be ignored" (David Stanners interview).

Other Sources: (UNECE, 2016a, 2016b, 2016c, 2016d).

The global *GEO-6* got underway after the regional assessments were completed. Various forms of outreach for global *GEO-6* were ongoing throughout the process, including a monthly newsletter, *GEO Matters*, available on the UNEP website. However, as with *GEO-5*, inadequate funding for outreach remained a challenge. The Mid-Term Evaluation of *GEO-6* (UNEP, 2018b) highlighted that an estimated funding shortfall of US$ 330,000 remained as of early 2018 for global outreach, communications and launch events. An additional US$200,000 would be needed for translations of the report. Notwithstanding these shortfalls, the outreach to UN member states reached a peak in early 2019, starting with the negotiation of the Summary for Policy Makers held in Nairobi in late January and culminating with the launch of the global report and the negotiated Summary for Policy Makers on 13 March 2019 during UNEA-4 and subsequent debates during the Assembly.

Since then, notable efforts have been made to raise awareness of the GEO messages to a wider audience. In addition to the complete *GEO-6*, a range of products linked to the report have been available on UNEP's website, including a press release, videos, graphics, infographics and webinars (UNEP, 2019e). Other channels increasingly used to reach GEO audiences include articles and interviews in scientific journals and specialized magazines. For example, a summary of *GEO-6* findings highlighting key links between the health of the planet and human health was published in a Lancet medical journal at the same time as the *GEO-6* launch (Gupta et al., 2019).

Unlike previous GEOs, there is no record of additional media launches in other locations around the world. However, a number of presentations and side events focusing on *GEO-6* findings were included in a range of meetings and symposiums in the latter part of 2019 (UNEP, 2019c). They targeted specific groups of stakeholders in intergovernmental organizations, including:

- the European Commission, Council and Parliament
- the International Energy Agency
- the OECD
- the United Nations Economic Commission for Europe/Aarhus Convention
- UN Information Centre
- UN Foundation
- national environmental bodies (United States Environmental Protection Agency)
- Washington-based environmental groups
- French Ministry of Foreign Affairs
- science forums (Earth Systems Governance Conference; Pecora 21 Remote Sensing Symposium) and
- the private sector (Degroof Petercam asset management)

Since the launch of the global report, several derivative products have been prepared for specific user groups. For the first time in the history of GEO, the academic community has been explicitly targeted with a standalone product. The *GEO-6 Technical Summary* was launched in December 2020. The Co-Chairs' Message states:

> In this Technical Summary of *GEO-6*, we have distilled the science and data… and synthesized the information to make it more accessible to policymakers, students and scientists, and, we hope, more useful both for teaching and learning at the university level…We hope that the Technical Summary is useful for academics and their students in universities… (UNEP, 2020f, p. viii)

The first alternative language edition of *GEO-6*, Chinese, was launched in Beijing in December 2020 (UNEP, 2021b). The Russian version followed in January 2022 (ITAR-TASS News Agency, 2022) and the Arabic version was available by April 2022. The first *GEO for Business* brief and the *GEO-6 for Youth* were launched online in February 2021, and work started on *GEO-6 for Cities* in October 2019. The overall outreach for *GEO-6* will be formally assessed as part of the terminal evaluation of the project (UNEP, 2018b).

## 8.7 Conclusion

Since *GEO-1*, outreach aspirations have evolved and expanded in parallel with many other components of GEO. Many of the individual measures have clearly achieved their objective in reaching different target audiences by linking them into the GEO process, increasing their interest in and knowledge about environmental matters, and underpinning some of the outcomes from process and product. It is also clear that GEO outreach has probably never reached its full potential. In the early years, these shortcomings included an overly narrow perspective of what outreach should entail and the very short interval between successive GEOs, which limited further outreach after report completion. In later years, while the scope of planned outreach was broadened considerably, available funding has been a major limiting factor, curtailing what has actually been carried out.

Chapter 8 has provided an overview of the six global GEOs' outreach plans, processes, and actions. It falls to the interviewees to comment on what they consider to be future outreach challenges and opportunities (Box 8.7.1). The applicability and uptake of alternative outreach approaches will depend to a certain extent on GEO's future positioning and process design.

### Box 8.7.1: GEO Outreach: Some interviewee opinions for future consideration

**Outreach Challenges**

- To be simple enough so that somebody on the tram can read GEO
- To time the GEO products to important, upcoming events
- To have punchy, new findings that haven't been made before
- To be more provocative giving out messages
- To publish alternative language versions sooner.

**Opportunities for Improving Outreach**

- Highlight that GEO is the only regular and collaborative state of the world's environment and outlook report. It's the only one providing the whole picture, so that's its niche.
- Recognize that there are different audiences in different regions, and GEO has a very different role to play in each.

- Interpret the full report in smaller pieces for different audiences and in a language that they can understand; the translation into alternative languages is a critical part of this.
- Tailor substantive new information to the audiences you are communicating with. Have very targeted products for each of these audiences and help them use the information coming from these products.
- Engage with the relevant groups that can use GEO as source material. Don't just present the big report but find a way to package this information and engage with them in events, meetings, gatherings, whatever.
- Concentrate on three or four important findings that will challenge people. Focus attention on these topics and then look at the follow-up mechanisms to address them.
- Continue to publish a paper copy of the Summary for Policy Makers. There is no doubt that it is still needed, provided it is salient for the target audience.
- Have a much stronger focus on higher education and getting the GEO process, findings, and other material into university curricula because students will be the decision makers of the future.
- Make greater use of social media and other channels of communication to reach a broader audience, including the wider public.
- Maintain the outreach process between GEOs.

Source: Interviews with Jane Barr, Tore J. Brevik, Felix Dodds, Idunn Eidheim, Michael Keating, Peter Noel King, Clever Mafuta, Kakuko Yoshida, Jacques-André Ndione, Nicolas Perritaz, Leena Srivastava, Anna Stabrawa, David Stanners and Veerle Vandeweerd.

Chapter

9

# Global Perceptions and Influence of GEO

## 9.1 Introduction

This chapter explores how the Global Environment Outlook (GEO) is perceived: its successes, difficulties and reasons for various participants to get involved. It is based on the preceding chapters, a wealth of evaluation reports, interviews with GEO-affiliated individuals and insights from the authors of this History.

## *Assessing GEO's influence is a challenge*

In this chapter especially, GEO is meant in a broad sense. It refers to the GEO process within the United Nations Environment Programme (UNEP) and the United Nations (UN). This process involves the people who produce it, use it, and act as stakeholders in various domains beyond the actual reports, which range from global outlooks to regional or specific editions and important sectoral and technical reports.

Assessing the success of a long-term and evolving process and series of products such as GEO is not a straightforward task. There can be no single definition of what a success or a failure of such an undertaking would be; therefore, any evaluation needs to uncover criteria against which the end result would be measured.

If expectations for GEO matched its ambitions, both were high from the beginning. As with many other environmental initiatives, GEO ultimately aimed to benefit the future of the environment on which we depend. But the breadth of GEO was unusually ambitious: covering planetary life support systems as well as the local and regional environment and development realities, options and benefits for current and future generations, and the broadest possible range of environmental issues. It would be futile to attempt a forensic examination tracking GEO reporting as leading directly or indirectly to biophysical changes in the environment. Such an attempt would lose its way along multiple evaluation pathways since there are no 'GEO-free' control conditions, and GEO processes operate in an increasingly crowded global environmental assessment landscape.

Writing after *GEO-2000*, one of the authors of this History reviewed the then already extensive literature on the possibilities of assessing the influence of the series (Pintér, 2002). He highlighted attributes of communication that remain pertinent to GEO today (Box 9.1.1). At that time, it was felt that only five years of GEO reporting was too short to perceive its influence, as the trends demonstrate effects over decadal scales. However, 30 years after the start of the GEO process, the present point in time may reveal a better evidence base.

Pintér (2002) also highlighted key terminology introduced by Deshpande (1981) and Weiss (1977) in the late 1970s/early 1980s to understand the effect of research on policymaking processes. Weiss's (1977) key terms include 'knowledge creep' and 'slowly evolving issue domains.' A good example is the atmospheric domain expanding to incorporate climate change, which expanded far beyond atmospheric issues. Deshpande (1981) pointed to the additional importance of an action perspective.

In other words, an important mechanism through which reports like GEO exert their influence is by affecting discourses in society. More recently, Riousset et al. (2017) distinguished three types of discourses. First, they note coordinative discourses needed for interministerial alliances to initiate reforms in sectoral policies. As one interviewee commented: "...environment ministries in most countries do not have the ability and the capacity to put in place the policies that are needed to protect the environment" (Helen Mountford interview). Building and maintaining effective alliances through coordination is key, and global environmental assessments need to reach beyond ministries of the environment to successfully facilitate the emergence of new environmental policy discourses.

Second, global environmental assessments may alter communication discourses, for example, communication between interest groups and government or through outreach to the general public. Angela Cropper, later deputy Executive Director of the UNEP, suggested in 2007 that the collective impact of global environment-related assessments at that time, including GEO, would be "How to reduce or eliminate the political risk of taking tough action" (Cropper, 2007).

Third, global environmental assessments may help to shape scientific discourses on research priorities, new data, new models or issue frames.

**Box 9.1.1: Attributes of communication pertinent to assessing the influence of GEO**

With a view to assessing the influence of the first two GEOs, Pintér (2002) refers to critiques of a linear and mechanistic transmission model of information and decision-making (Chandler, 1994; Thorngate, 1995). The critiques include:

- Information cannot be used without prior knowledge and the capacity to respond.
- Communication is not about information but meaning. Meaning is actively constructed, not passively extracted from books or other sources provided by whatever source. Meaning is also influenced by the differing purposes of people and their power relationships. People without power and capacity may not have the agency to react even when a message is perceived as relevant and timely. A message may represent many alternative meanings, so meaning is contained primarily in the interpretation.

- The choice of medium matters because of social conventions and associated individual preferences.

Pintér (2002, p. 15) inferred that for assessing the influence of GEO, "we need to look beyond information and its transmission and pay much more attention to context, process, history and other factors surrounding producers, recipients and their interaction. The task is even more difficult in the case of assessments whose thematic scope and audiences are broad, as different segments of the population may construct different meanings around the information and thus react in different ways."

Source: (Pintér, 2002)

Thus, the concepts and the framing offered by GEO are important, contributing to the confidence of environment-development officials and non-governmental organizations. The various interactions around GEO – stakeholder consultations, progress briefings, presentations, intergovernmental discussions and even negotiations over the Summary for Policy Makers – undoubtedly provided them with fresh language, new examples and a strengthened sense of being part of a worldwide movement. Regarding language specifically, it has been suggested that one reason for governments to participate in summary negotiations is a desire to control – initiate, limit, witness – the emergence of any new key terms that can be referred to in any subsequent negotiations (Paul Lucas, personal communication, 31 January 2020).

After six iterations over the last quarter of a century, GEO remains an evolving initiative within similarly evolving socio-political and technological circumstances. Since the beginning of GEO, there have been significant changes in externalities that directly affected the GEO process. These externalities include information and communication technologies that facilitate collaboration, education and general awareness of global environmental problems; collecting and sharing environmental and other data; and the increasing output of environmental science. However, this chapter does not aim to differentiate among various editions of GEO; rather, it views the influence of GEO as a continuous and still ongoing process.

A primary source of information for this chapter has been 40 semi-structured interviews conducted with individuals involved in at least several global GEOs: UNEP staff in the Nairobi headquarters and six regional offices; representatives of collaborating centres, partner institutions and GEO contributors from all UNEP regions; and a few government representatives and

media experts (Annex VI). Other sources include GEO evaluation reports, scientific articles and the experiences and observations of this History's authors.

The remainder of this chapter considers perceptions and influences of GEO on discourse and agenda setting; policymaking at global, regional, national and local levels; capacity-building; enhancing education and research; and awareness-raising.

## 9.2 GEO's global role

### *GEO contributing to the assessment landscape*

Prior to the appearance of *GEO-1*, there was no such thing as a comprehensive, forward-looking assessment series on environment and development. In the decades before GEO, comprehensive coverage of environmental trends was provided by the body of inputs to the 1972 Stockholm Conference that established UNEP (United Nations, 1973, p. 75) and the 1992 Rio Conference (United Nations, 1993). Decadal reports since 1972 and annual reports since 1974 followed up on the state of the global environment (Holdgate et al., 1982; Tolba et al., 1992) (Box 1.2).

By the end of the 1980s, the information landscape featured many mature data series, but all of them were retrospective in nature. Many of these were produced by official statistical services in member countries of the OECD and throughout Europe, in which a form of the Driving forces - Pressures - State - Impacts - Responses (DPSIR) approach was common.

By the early 1990s, two periodic modern assessments were operational, both of them global and thematic – one on stratospheric ozone by the World Meteorological Organization (WMO) and UNEP (WMO et al., 1985), and another on climate change by the Intergovernmental Panel on Climate Change (IPCC) (IPCC, 1992). Another modern reporting system, including a model-based component and capacity development, informed European East-West policies on Long-Range Transboundary Air Pollution. The Global Environmental Monitoring System of UNEP periodically published thematic monitoring reports, including global coverage on air and water, occasionally with an outlook component (UNEP et al., 1991; WHO and UNEP, 1992). Global development institutions, notably the United Nations Development Programme and the World Bank, regularly produced indicator-based reports comprising selected data series on pollution and natural resources (UNDP, 1996; World Bank, 1997).

None of these resembled the eventual GEO in its combinations of thematic and regional coverage, environment and development perspectives, forward-looking aspects and collaborative processes. At the time, the environment assessments most closely comparable to GEO in terms of content were *Limits to Growth* by the Club of Rome, published already 20 years earlier (Meadows et al., 1972), and the biennial World Resources Report series from the World Resources Institute (WRI and IIED, 1986). The latter decided to join the effort that would lead to GEO, favouring it over its own series, and it remained a partner institute through to *GEO-5*.

> So, we agreed to help...From my perspective, the World Resources Report, although it continued too, became less and less effective. The reason for that was not GEO but that the world had somewhat woken up to the environmental issues, and they were not as newsworthy anymore... So, in a funny way, there was a handoff between the two reports (Allen L. Hammond interview).

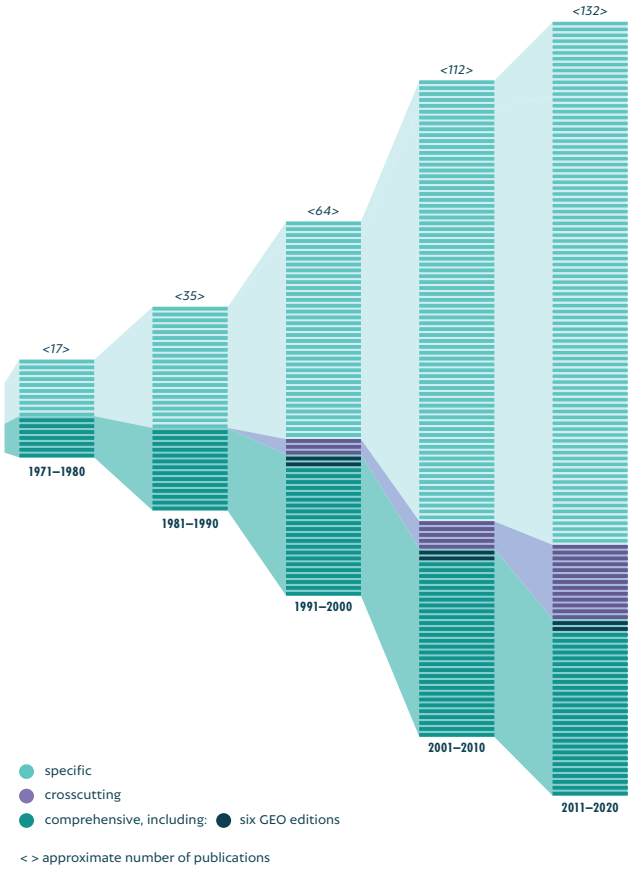
Since GEO began, integrated environment assessment has become more prevalent (Jabbour and Flachsland, 2017; Maas et al., 2020). Over this period, three gradual changes have taken place with the combined effect of more and sometimes overlapping assessments on environment and development. First, various thematic assessment series began to address important associated issues. For example, the Food and Agricultural Organization started to address the world's genetic resources from a food and agriculture perspective (FAO, 2007). As some thematic assessments developed along this line, nexus topics became reported on, for example, the nexus of freshwater, land and agriculture (IUFRO, 2012; IWMI, 2007; UNWWAP, 2014). Recently, more assessments with an explicit cross-cutting objective have begun to appear. In addition to their explicit aim to be cross-cutting, these assessments apply an even broader scope. Good examples are the 2020 assessment in relation to coastal zones (GESAMP, 2020) and various assessments concerning global resource use (IRP, 2019).

Second, assessment series on environment and development began to appear in greater variety. This is especially so in the case of specialist, sector-oriented assessments. For example, 2020 saw at least three global assessments on energy production and use and the energy transition (British Petroleum, 2020; DNV, 2020; IEA, 2020). While somewhat different from assessments like GEO, especially on collaboration aspects, these sector-oriented assessments became an element in the information landscape. Multiple assessments began to appear for certain themes, each applying its specific lens. For example, three outlook reports on land-related issues were published over a short period (IPBES, 2018; IPCC, 2019a; UNCCD, 2017).

Even comprehensive assessments on environment and development started to appear in parallel, each with their own perspective (e.g. (OECD, 2008; UNEP, 2007b; WBCSD, 2010)).

Third, as the *issue domain*[1] of environment and development became mainstream and expanded, so did the overall scope of its assessments, most prominently with the eventual advent of the Sustainable Development Goals (UNDESA, 2019a).

**Figure 9.2.1. Global assessments on environment and development, 1971–2020**




*The development of GEO has been part of a 50-year increase in global assessments on environment and development*

Notes: The numbers are approximations. Only assessments that are collaborative or have at least a clear assessment process have been included. Single assessments delivered through multiple publications are counted singly.

Sources: (Jabbour and Flachsland, 2017; UNEP, 2019e) and research for this book

[1] See Chapter 2 on the notion of 'issue domains and their development over time'.

Figure 9.2.1 illustrates the effect of these changes on the number of global assessments. Assessments on specific themes (e.g. climate, oceans, chemicals) have always been there but have become prevalent, especially after 2000. More comprehensive assessments started to appear in parallel. The category of cross-cutting assessments, for example on resource use, has grown markedly during the last ten years. In terms of the total, the combined effect of these changes has been a sustained, 50-year long increase in the number of policy-oriented assessments on environment and development. Every ten years, the number of global assessment reports has roughly doubled, eventually stabilizing during the last ten years. The development of GEO was part of this.

In this increasingly well-populated landscape, GEO reports and GEO processes often exerted influence via intermediary writing. An interesting example is GEO assessment findings and insights from the collaborative process feeding into reports collated from multiple sources. These synthesis reports come in many forms and are not always for publication, such as intelligence briefings, summaries for individual governments and summits, regional and planetary overviews, or scoping for investment priorities and exposure to risks. Particularly well documented and accessible are occasional global synthesis reports (Table 9.2.1). These were based, each time around, on a handful of key assessment reports on the environment. In addition to being a channel for GEO exerting influence, they provide an impression of how GEO has been perceived in the global assessment community and for what aspects GEO assessments, in particular, tend to be consulted by experts, next to other, more focused reports and processes.

For example, in 2008, one of these syntheses observed that while all outlooks spoke about technological solutions to current problems, the inconvenient and somewhat underemphasized reality is that much more needs to be done to realize the promises of technology across the world. The synthesis report urged its audience of European governments to consider this in their policies towards sustainable development (Kok et al., 2008, p. 62).

In all of the five syntheses that have officially been published (Table 9.2.1), GEO stood out as the comprehensive assessment among the set that the reports were based on. This illustrates GEO's role. Complementing the in-depth thematic outlooks, GEO proved a broad-based source for insights and examples about the relationship between environmental change and human well-being. In addition, GEO in these syntheses was an important source of insights on synergies and trade-offs between thematic policies, such as in the case of biomass energy. Moreover, in the more recent syntheses, GEO was typically referred to for insights on the need and potential

for policy coherence transcending jurisdictions and issue domains. Good examples are education or the human diet. Interestingly, the most recent synthesis report (UNEP, 2021e) also had to draw on GEO for freshwater issues – an example of an issue without an effective home in the UN.

**Table 9.2.1. Syntheses of key findings of global environmental assessments including GEO**

| | Title and reference | Purpose of the synthesis | Number of assessments covered | Specific contribution derived from GEO |
|---|---|---|---|---|
| 1998 | *Protecting Our Planet Securing Our Future. Linkages among Global Environmental Issues and Human Needs* (Watson et al., 1998) | Broadening the agenda on global environmental change beyond climate | 12 | Channel for associating the UN with this synthesis<br>Broadening theme-specific assessments to a development perspective |
| 2008 | *Lessons from Global Environmental Assessments* (Kok et al., 2008) | Informing government of The Netherlands and bodies of the European Union on upcoming international development and environment priorities | 4 | Analysis of how changes in the environment affect human well-being<br>Contrasting scenarios<br>Extensive regional analysis next to global<br>Most comprehensive thematic scope of the assessments considered |
| 2009 | *Environment for Development - Policy Lessons from Global Environmental Assessments. Report for UNEP* (Kok et al., 2009) | Informing UNEP Governing Council on added value of a next edition of GEO | 8 | |
| 2020 | *Insights from global environmental assessments. Lessons for the Netherlands* (Lucas et al., 2020) | Informing government of The Netherlands on evolving global context for national transition agendas | 5 | Relation to prosperity, population health and well-being<br>Wide-ranging assessment of the implementation of commitments<br>Identification of pathways to achieving goals and of synergy and conflicts between these |

| | | | | |
|---|---|---|---|---|
| 2021 | *Making Peace with Nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies* (UNEP, 2021e) | Synthesizing best knowledge on global challenges. Recommending how the accumulated scientific evidence can be turned into actions. | many[2] | Many cross-cutting analyses; discussion of broad emerging concepts such as circular economy; stepping stone for planetary-level statements about urgency<br>Coverage of issues that have no effective home in the UN system, such as freshwater issues<br>Linkage to development, mostly in the Sustainable Development Goals chapter |

Finally, to make global environment assessments better and more effective, a small category of overview work has drawn on the experiences of practitioners and summarized lessons for the benefit of those commissioning and leading future assessments. This is separate from GEO-related capacity development material primarily intended for new practitioners, discussed in Chapter 7.4, and from UNEP's evaluation reports for GEO.

The work in this vein includes that of the Global Environmental Assessment project at Harvard University (Cash et al., 2002; Mitchell et al., 2006), which started long before GEO in the early 1980s, and related later writing (Eckley, 2001; Leviton and Hughes, 1981; Pintér, 2002). As well this includes The Integrated Assessment Society (Rothman et al., 2009); the Future of Global Environmental Assessment Making project (Kowarsch et al., 2014; MCC, 2021); and the PBL Netherlands Environment Assessment Agency (Maas et al., 2020, 2021). For example, Rothman et al. (2009) suggest future assessments to embrace uncertainties and explain their significance rather than a defensive approach. Maas et al. (2021) provide suggestions on how future assessments can do a better job on empowerment, including empowerment of special groups.

## *Setting the scene for international level policymaking*

The first GEO was a major milestone in two ways. First, society had arrived at a point where sufficient data were available to provide a comprehensively detailed, evidence-based view of the state of the environment of

[2] Including recent reports from IPCC, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and International Resources Panel; *GEO-6*; and assessment reports prepared for multilateral environmental agreements.

the planet. Secondly, in large parts of the world, environmental concerns were characterized by public outcries, especially due to degradation from industrial pollution after World War II and the changes in the public mood of the 1970s. As one former Executive Director of UNEP put it: "Back then, the field of environment was much more driven by emotions than other fields of life and GEO was successful in bringing emotions in clear context with facts and figures" (Klaus Töpfer interview).

At that point, when sufficient data were able to provide evidence-based guidance on global and regional environmental agendas, GEO analysis gave UNEP the credentials to become a rallying point for environmental science and policy. This occurred at the same time UNEP also became a means of consensus building, knowledge consolidation and capacity development in the field of multidimensional environmental governance.

This kind of facilitation between science and policy was necessary to speed the uptake of newly available knowledge and capacity development in developing regions. According to Veerle Vandeweerd, the first project leader of GEO, from the beginning, it was meant to provide a bird's-eye view of the nexus of environment and development problems to inform not only international policymakers but also UNEP itself and its governing bodies (Veerle Vandeweerd interview). Multiple governing body decisions expressing their appreciation following release of the global reports confirm GEO's success in regularly updating the Governing Council (GC) and later, the United Nations Environment Assembly (UNEA). (Annex I).

With the global economic and some social assessment processes well established (IMF, 1993; OECD, 1967; UNDP, 1990) and the call of the 1987 Brundtland report (United Nations, 1987) to account for all three pillars of development, GEO has filled a gap. To this day, it remains the only comprehensive, integrative and forward-looking stand-alone assessment of the environment at the global level.

In the early days, the founders of GEO realized that GEO's messages had to be repeated often to inform, educate, and raise awareness (Veerle Vandeweerd interview). Therefore, subsequent editions of GEO have been commissioned with ramped-up efforts in data collection, methodologies, regional involvement and scientific collaboration. Regular GEO reports continually reminded leaders and interest groups of the problematic environmental context of economic and social development. Even though governments continued with the conventional development pace despite numerous warnings, "they could not shrug them off; creating that evidence base in the end was the most important thing" (Allen L. Hammond

interview). It validated the existence of a problem, often manifested differently in different regions, and it empowered those in the forefront of evidence building.

> That data framework did provide a sort of reference space that said that these are real topics and we have to deal with them. In my view, this was the real value of doing those reports. You had an excuse every few years to put the data in front of people and point out that things weren't getting a lot better. That certainly helped Secretariats of the Environment feel like they had evidence to support their mission (Allen L. Hammond interview).

> These reports are part of the landscape, and we are creating a common understanding of this landscape about what is going on so that people are never surprised anymore, [and] within which the political discourse takes place. This common understanding is an extremely important macro-framing of global environmental issues, which confines or directs political and policy discourse, but it doesn't necessarily direct it specifically on individual issues because that's not the point of it (David Stanners interview).

Most environmental problems that humanity tackles are complex, interlinked and related to a need for collective action. While GEO has not been a pioneer in advocating complex problem-solving and systems thinking at a global level, it has, from one perspective, been a pioneer in applying these insights worldwide, with good detail and in a collaborative way, to environment and development. As the evidence of environmental problems mounted, economic and societal management structures encouraged decision makers to approach issues in silos. Then they encouraged the siloed issues to compete for their consideration and funding. The GEO approach of examining the silos alongside each other brought clearer perspectives. GEO helped its participants evolve a capacity to recognize linkages between silos and focus on shared vulnerabilities to feedbacks. GEO has cultivated the tendency to integrate formerly competing fields into interdisciplinary fields such as Earth System Science and Sustainability Science. Educating and encouraging GEO audiences on these matters was one of the most important roles GEO has played, even if this is poorly appreciated today.

But a report being broad in scope may also fall into the trap of being too abstract if it does not switch systematically between the general and the specific, between planetary and regional perspectives, and between different levels of development. For example, deforestation has a completely different connotation in regions that were largely clear-cut centuries ago

and regions that have much of the world's remaining forest to manage. Likewise, forest resource management has completely different meanings in regions with abundant forest resources and those regions where the precious little forest that still exists is of critical importance to dryland management.

Thus, GEO has sometimes been criticized for being too broad to be of any tangible use. But arguably, its strength, even though sometimes underappreciated, is precisely this: connecting the dots in the grand scheme of things and elaborating on the interlinkages, synergies and trade-offs. In contrast, thematic reports on climate or resource use, for example, would receive more attention and be more effective in guiding specific societal change due to an inherent inclination towards specialized, linear problem-solving.

One perception encountered in the interviews for this book takes this further. This views GEO as somewhat disappointing in assisting decision-making on multilateral environmental governance. Interviewees provided only one example of new or improved multilateral environmental collaboration directly as a result of GEO, namely the Black Carbon Assessment (UNEP and WMO, 2011). *GEO-4*, building on previous work, was a useful stepping stone towards the stand-alone Black Carbon Assessment and three prominent and widely-cited academic papers (Bond et al., 2013; Shindell et al., 2012; Shindell et al., 2009). This, in turn, may well have contributed to the concerted voice that led towards the establishment of the Clean Air and Climate Coalition (CCAC, 2021). More cases of this sort may exist. But if so, they will probably remain undocumented because the evaluation studies of GEO have paid little attention to Secretariats of multilateral environmental agreements (MEAs). Thus, little is known about how useful GEO has been for them, even though these Secretariats are one of the key audiences of GEO (IUCN and UNEP, 2009; Rowe et al., 2014).

Related to this, several well-intended decisions taken along the way have contributed to a gradual mellowing of the GEO tone. Controversies related to country-specific analysis, to policy recommendations – policy-relevant, but not policy-prescriptive – and to a certain degree of government involvement in the drafting process have contributed to GEO being less able to point towards regional or international environmental problems or policy gaps. While advancement on legitimacy[3] has been greatly improved, with governments increasing their ownership of the process since *GEO-4*, some aspects of credibility and saliency may have been lost. This loss may

[3] For the saliency-credibility-legitimacy framework, see Mitchell et al. (2006).

also be attributed to an attempt to address too many audiences at once and thus gravitating towards the lowest common denominator (IUCN and UNEP, 2009). This perceived loss of GEO's credibility in recent editions was noted by a few of the interviewees as follows.

> The beast without teeth of sort. And in this case, you cannot really trace a problem; you cannot really focus on international relations…You do not blame; you are just talking about problems in general…in such a situation, you can still say something about general process, general trends, about general things, but it does really lack this very specific and very clear and direct action-oriented part (Ruben Mnatsakanian interview).

> …now we have a lot of intergovernmental consultation. Basically that has led to the watering down of the scientific assessment. So, it really lost its independence as an assessment, and it is a little bit the lowest common dominator kind of assessment now, which I think is a shame. So, for a UN body that prides itself on its scientific whatever, I think we lost that edge because we made it overly governmental. I think that involving governments is not a bad thing, but it is very good, especially if they can get ownership but I think we went too far, not just giving them ownership but also authorship. I think that is absolutely the wrong way to go if we have to maintain a credible scientific contribution on the state of the environment (Kaveh Zahedi interview).

After a quarter of a century of GEO effort, the global environmental assessment landscape is now a more crowded one, and GEO forms part of a solid global environmental choir with messages that amplify and reinforce each other. Meanwhile, the world has globalized further, and the need for environmental policy has become even more multilevel, requiring coordination and alliances among levels of government and between governments and other actors. These are eventually made specific in MEAs, research and development agendas, and national laws.

Probably the strongest endorsement of GEO and UNEP came at the UN Conference on Sustainable Development (Rio+20) in June 2012, the largest UN environment conference ever held (Box 9.2.1). Contributing to global level deliberations at Rio+20 and subsequent Sustainable Development Goals discussions was the highest priority for *GEO-5* and a major opportunity to make an impact. The *GEO-5* terminal evaluation assessed its effectiveness. The timing was critical, as was raising awareness of key findings. "Use of science knowledge is enhanced if it is provided at times when there is an opening for new information or ways of approaching issues – these are the ripe moments when new knowledge is likely to be welcomed by

decision makers and incorporated into their decision-making processes" (Rowe et al., 2014, p. 48).

The *GEO-5* report was launched on World Environment Day just two weeks before the start of Rio+20, but governments were familiar with its contents well before this date, having been able to review the report from June 2011 and negotiate and endorse the Summary for Policy Makers in January 2012. In addition, two side products that encapsulated relevant findings – *Keeping Track of our Changing Environment: From Rio to Rio+20 (1992-2012)* (UNEP, 2011c) and *Measuring Progress: Environmental Goals and Gaps* (UNEP, 2012b) – were widely distributed in preparatory meetings leading up to the Summit. Further visibility was provided during conference discussions through key *GEO-5* proponents' active participation, including members of the High-Level Intergovernmental Advisory Panel and the UNEP Senior Management Team.

### Box 9.2.1: Rio+20 outcomes for GEO and UNEP

The Rio+20 conference adopted an outcome document, *The Future We Want,* on 22 June 2012 (United Nations, 2012). The same document was endorsed by the United Nations General Assembly (UNGA) on 27 July 2012 (UNGA, 2012). Among other things, the outcome document stated:

- "We are committed to strengthening the role of the United Nations Environment Programme as the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment....we invite the UNGA, at its sixty-seventh session, to adopt a resolution strengthening and upgrading UNEP in the following manner....." (UNGA, 2012 paragraph 88)
- "Promote a strong science-policy interface, building on existing international instruments, assessments, panels and information networks, including the GEO, as one of the processes aimed at bringing together information and assessment to support informed decision-making;" (UNGA, 2012 paragraph 88d)
- "We stress the need for the continuation of a regular review of the state of the Earth's changing environment and its impact on human well-being and, in this regard, we welcome such initiatives as the GEO process aimed at bringing together environmental information and assessments and building national and regional capacity to support informed decision-making." (UNGA, 2012 paragraph 90)

On 21 December 2012, the 67th session of UNGA adopted resolution 67/213 on strengthening and upgrading UNEP and establishing universal membership, allowing for full participation of all 193 UN member states (UNGA, 2013) (Chapter 1). The resolution also called for UNEP to receive secure, stable and increased financial resources from the UN regular budget.

This proved positive for GEO. "Supported by the mention of GEO in the Rio+20 outcome document and the consecutive UNGA Resolution 67/213, UNEP has... managed to secure UN Regular Budget funding for roughly 20 per cent of the total estimated cost of future GEOs" (Rowe et al., 2014, p. 3).

The terminal evaluation of *GEO-5* (Rowe et al., 2014) pointed out, again, that it is nearly impossible to establish a cause and effect relationship in such global decision-making processes as Rio+20. However, it does admit that *GEO-5* was influential in this particular case:

> *GEO-5* was well received and the status of both the GEO and UNEP was advanced. More importantly, the status of the environment was enhanced in these sustainable development deliberations. While the evaluation was not able to trace a direct line between *GEO-5* and the decisions, there is a strong and wide-spread perception by *GEO-5* stakeholders and plentiful supporting information that provide confidence that *GEO-5* did contribute positively to the discussions and decisions (Rowe et al., 2014, p. 3).

GEO has been a leader in framing regional and global linkages between environment and development. It did so by showing in some detail the magnitude of issues, differentiation of context, particular development context, and availability of options. On some fronts, GEO's influence was more significant than others. Given the vast multitude of cases in the six global editions, a sampling can demonstrate some characteristics of the influences (Box 9.2.2).

### Box 9.2.2: Contextualizing regional and global environmental problems: GEO's varied record

- Regional differences in policy options and policy contexts, such as in ecosystems management or water supply and sanitation: Probably the largest influence in this sense came from *GEO-6*, almost exclusively its parts on 'policy' (part B) and on 'pathways' (part C) (UNEP, 2019e, pp. 273–459 and 463–593).

- Identifying root causes: The *GEO-2000* scenario study coordinated by The Arab Center for the Studies of Arid Zones and Dry Lands, Syria, showed that moderate alternative policies and technologies, such as water recycling, desalinization, more efficient water use in agriculture and moderation of consumption, would only slightly delay the advent of lasting water shortages and saltwater intrusion, especially in the Mashriq.[4] The study squarely and logically identified the region's fast population growth as the root cause to be addressed if water problems were to be avoided (UNEP, 1999g, pp. 356–359). Notwithstanding the clarity of the analysis, it was met with deafening silence.

- Scale and complexity of global nutrient cycles, especially nitrogen compounds: The manifestations of the problem are very different in different parts of the world, yet connected. On this concrete issue, GEO was on cue, in particular *GEO-2000* (UNEP, 1999g, p. xx) followed up by the *GEO Year Book 2003* (UNEP, 2003c).

- Natural disasters, post-conflict environmental damage and resilience: GEO's approach was elaborated at the time of *GEO-4* (Kok and Jäger, 2009; UNEP, 2003a; Wonink et al., 2005). Typically these themes were addressed in time-bound, more quickly produced, special assessments entirely separate from the GEO reports at all scales.[5] *GEO-4* changed this, for example, with a section on Sierra Leone-Liberia-Guinea refugees (UNEP, 2007b, p. 19) and in particular the whole of part D on Human Dimensions of Environmental Change (UNEP, 2007b, pp. 301–396).

- The 'supertanker' nature of global environmental change, and hence the foresight needed in governance (Gewin, 2002): together with a wealth of information on MEAs, *GEO-2000* assembled and published evidence showing that some of the best known classical, single-issue agreements typically have not initiated trend reversal in environmental pressures such as emissions. Instead, once a trend reversal was imminent or had begun, the agreements served to consolidate and protect it (UNEP, 1999g, p. 262). This, in turn, illustrates why global governance of issues for which a trend reversal is not yet in sight is radically different from most classical issues in environmental governance.

[4] For details of GEO's regional groupings see Chapter 7.5

[5] The reports on these themes were led and produced by the Post-Conflict and Disaster Management Branch of UNEP. They were typically local in scale and at most covered a subnational area, occasionally one that overlapped more than a single country (e.g. the Tisza River basin in Central Europe due to the collapse of a wastewater retaining dam).

- Low key presentation of important themes: Notwithstanding good analysis,[6] marine ecology and use of marine resources seem to be an example of GEO being a bit understated and not sufficiently heard. An example of GEO analysis can be found in *GEO-4* (UNEP, 2007b, pp. 112–146). Of course, this was before the 2016 media outcry on plastic in the oceans. Perhaps GEO has not been the most effective platform in this case and, more generally, for not-yet broadly acknowledged issues.

On balance, GEO has certainly helped raise the visibility of the environment for international policymaking circles and has successfully enriched the baseline against which international and national efforts to reduce environmental deterioration are measured. Throughout the six global editions, it has continued to reiterate to the global community of policymakers the limited and too-slow progress that has been achieved towards global environmental goals.

For example, the UN Secretary General's report, *We the Peoples: the Role of the United Nations in the 21st Century*, to the Millennium Assembly (Annan, 2000) was informed by *GEO-2000* (UNEP, 2004b). *GEO-3* provided valuable insights for Birdlife International (BirdLife International, 2004). *GEO-4* was used to shape the strategic work direction of the World Wildlife Fund (IUCN and UNEP, 2009). And the *GEO-6* regional reports informed the Global Sustainable Development Report (UNDESA, 2019a).

GEO has been instrumental in promoting an evidence-based approach in regional, national and local environmental policymaking across the globe. Regular and publicly accessible State of the Environment (SoE) reports at the subglobal level have played an important role in this. Within the model established by GEO, they draw the environmental baseline, point to solutions and evaluate the sufficiency of existing or potential policies, creating a policy cycle. GEO has inspired many developing countries to launch regular SoE reporting (Chapters 6 and 10). The most valued components of GEO have been its participatory process, its framework that helped examine cause and effect relationships, its outlook component, and its placement of the environment in the social and economic development context. As David Stanners put it, referring to GEO:

[6] For example, analysis of worldwide overfishing was published by UNEP in its Early Warning Bulletin No. 4 (UNEP, 2004c)

> the most beneficial is the status it has given to SoE reporting globally and the importance of such reporting at national level too, keeping the environment under review. I think this is your 'Coca-Cola.' I would not agree you would become redundant in this task. You need to stick with it as nobody else is competing with you on that, and no other body is as well-positioned as UNEP is to do this. While UNEP should focus on the global level, you may also have roles at the regional and national levels also depending on the specific demands and circumstances. You should not focus on 'doing it for them,' but instead providing technical help and expertise and networking support (David Stanners interview).

The GEO influence has encouraged countries to share environmental data publicly. Although GEOs were not built directly from national environmental data flows, many of their spin-off reports on regional, national and local scales have been directly based on national and local environmental data:

> Governments had no other choice but join or perish, I would say. We opened data from other sources, and we showed them, and they started to share their data. To the point that we published the first GEO for Latin America and the Caribbean, it was the first report in the entire history of GEO and the GEO series that came with an annexed compact disc with all the data and the indicators to produce the regional environmental assessment. The data compilation and production of the CD was done by one of the Latin America and the Caribbean region's collaborating centres in the GEO process[7]. That was fantastic.
>
> This [the GEO process and the collaboration with UNEP] would also help the national ministries and secretariats of the environment to position themselves in the national political agendas, considering that in those days, the 1990s, these institutions were rather new and weak, politically speaking (R. Norberto Fernandez interview).

GEO has also helped to reinvigorate regional environmental ministerial forums. After the initial global GEO report's success, some regional forums requested that regional GEO reports be prepared to reveal more regional specifics (Chapters 6 and 10). These regional GEO reports quickly became agenda- setters in these meetings and helped communicate regional priorities and concerns in international development summits. For instance, over the years in the Latin America and the Caribbean region, issues highlighted in national to regional GEOs – either as a current priority or as an emerging one requiring attention – were included in informative documents for ministerial meetings. Statistics that have been compiled by a GEO process

[7] The Development Observatory of the University of Costa Rica

or used in resulting reports' main messages had a high chance of being quoted repeatedly in the press and by high-level policy-makers, thus influencing public opinion on a particular environmental priority issue (Kakuko Yoshida, personal communication, 18 November 2018).

The development assistance community has also gained valuable insights from the family of GEO reports. According to this History's interviewees, governmental agencies for development and cooperation in various Western European countries and various entities within the UN have used the GEO and GEO products in their work. Lastly, over many occasions and venues for networking, GEO has helped to build understanding between countries on politically tense regional environmental issues, such as water resources in the Nile basin:

> I remember we sat with the sub–Saharan Africa [group] for example…we understood things about the urgent development needs of sub-Saharan countries and they understood our historical rights and water needs, as trading water as an economic commodity is, from our North African and from Egypt's perspective, a taboo…we began to understand each other (Ahmed Abdelrehim interview).

## 9.3 A worldwide context informing national-level policymaking and vice versa

The global GEO was designed to influence all geographical scales without directly addressing national and local environmental decision-making processes (UNGA, 1972). Only *GEO-5* received marching orders from the GC/UNEP to prioritize the global view to serve the Rio+20 summit (GC/UNEP, 2009c). While interviewees for the subsequent evaluation reports, and for this book, agreed that GEO did indeed reach the ministers and senior officials in the ministries of the environment, many have expressed a disappointment that GEO has not been more immediately useful in enacting new or stricter laws of environmental protection. On the one hand, the global GEO report was sometimes perceived, relative to this expectation, to be too broad in terms of thematic scope and too far removed from the specifics of regional, national and local reality. On the other hand, few countries wanted GEO to be policy prescriptive, and it was their own responsibility to make binding policy decisions.

> Often the GEO findings were just too high level and not specific enough. I particularly remember this from the launch of *GEO-5* when I was in the Asia-Pacific region, and we would go and do the launch events, etc. We had a launch in India and were asked, "so, what do these findings mean for India?" That was the question the government staff and journalists, and everybody wants to know 'what do the findings mean for our country?' That was always one of the biggest challenges that we had that often we didn't have enough specific information to be able to provide to the intended audience (Anna Stabrawa interview).

According to the interviews and evaluation reports, GEOs' contents have been useful for the initial phases of policymaking cycles: framing the problem, validating the importance and extent of the problem, drawing on best practices, looking for policy examples, informing on emerging environmental issues, and setting the landscape for regional collaboration, strategic planning documents and national performance on MEAs. These usage patterns reflect the GEO approach towards dealing with policy responses – policy options instead of policy recommendations. As a source providing inspiration and macro-framing for national environmental policymaking, the global GEO arguably has reached its potential. The rest of the battle always has to be fought in national settings of policy formulation with stakeholders, ministerial cabinets, political parties and parliaments. Some interviewees found that it was naive to expect the GEO to have such an influence – a perfect and simple world, where science warnings on a global scale are immediately taken into account and acted upon on the national level, leaving all complex politics aside.

In this vein, the resemblance of *GEO-6* to a 700-page environment policy manual fits a purpose. Many interviewees told the authors of this History that GEO is often used as an encyclopedia-like reference book. In this way, it provides a solid and accessible scientific backing to ministries of environment to act on environmental issues and places national decision-making within a broader regional and global context:

> It was really a go-to reference for many…Not only in terms of the information that it contained, but also in terms of validating and strengthening their own positions at the cabinet table. So they could say, "Listen, we are not just making this up, it is a regional issue which has been validated at the regional level, so you should pay attention to deforestation or whatever it might be." So, I think it was definitely useful reference material for those ministries of environment, and I know many who had it literally sitting on the shelves and did refer to it (Kaveh Zahedi interview).

One aspect has always been of interest to governments – the context in which the country name would be mentioned or implied in the global GEO report. Throughout all GEO processes, there have been several controversies over mentioning country names in certain contexts, both positive and negative; for example, in passages discussing the fate of specific policy initiatives in the past. National representatives would be upset to see their country in a negative context; alternatively, too much emphasis on a good performance of a particular country could be seen as favouritism. With the increasing participation of governments in the GEO process, many of the controversies have been dealt with in the drafting stage. However, there have been cases of walkouts during public launches of the report. UNEP grew to be very cautious of mentioning country names in GEO, and some have expressed a regret that one of the most effective tools to spark interest and provoke debate has never been fully employed.

> I'll give you one example that triggers the countries - the Environmental Performance Index and the Ecological Footprint. The countries are aware of it and more concerned of it than GEO...As at the country level, they take the Environmental Performance Index seriously, they take the Ecological Footprint seriously because of the ranking.... "Oh no, why are we so ranked backward there? Why are we at the tail? Why are we at the back so much?" And they start to question the methodology, start to question why they are there. And the first thing they think of is the methodology, not that there is something wrong in their countries. But meanwhile, it gets them to think seriously (Adel Farid Abdel-Kader interview).

However, UNEP and GEO never had such a strong mandate, let alone the resources, to pinpoint national environmental performance in the style of the Human Development Report (HDR) series. It is important to note that editorial independence of the HDR was secured by an official mandate from the UNGA (UNGA, 1995) and that it is a report *to* the UN, not *by* the UN. In the early 2000s, UNEP had been developing an index to evaluate the environmental performance of countries – a Human Environment Index – but it never saw the light of day.

Against this background, the policies parts of *GEO-5* and *GEO-6* constitute a remarkable achievement. *GEO-6,* in particular, provides a comprehensive analysis of policy options as applied, telling what happened in real life in specific countries. Apparently, it is possible for GEO to publish specific material of this sort without being vetoed or facing walkouts. The resulting part of GEO resembles, indeed, a manual.

Another notable controversy became apparent with the term 'policy recommendations.' This relates to different perceptions of how GEO should

speak to policymakers. These became controversial in the process of drafting the *GEO-4* report. Even in *GEO-3,* there had already been notable changes in the language and terms in this regard (Chapter 5) and 'policy recommendations' turned into 'policy options,' indicating a subtle change. This eventually led to the rule that GEO should be policy-relevant, not policy-prescriptive. In practice, this was followed by a change in the language and tone of GEO's conclusions, making them less prescriptive and specific. There is no basis to claim this substitution of terms and softening of language has had any tangible effects. Still, it certainly compromised the only UN institution with an environmental mandate to communicate the urgency of the matter and propose solutions with national, regional and international specificity.

The bottom line is that interacting with the users of worldwide assessments and outlooks on the degree of national specificity in findings and conclusions will always be a balancing act. In the case of GEO, the result seems to be that country-specific implications were keenly noticed whenever mentioned. In some cases, the attention led to action by governments and UNEP to soften or remove overly specific instances – part of a process the authors have labelled 'the IPCC-ization of GEO' (Chapter 3.3). This is in line with a perception of GEO being in place primarily to serve national governments.

However, even though the global GEO refrains from explicit recommendations for national-level environmental policymaking in a given country, the trickling down of GEO ideas and the approach used in one of the regions has opened up an impact pathway. The region of Latin America and the Caribbean quickly realized that the global GEO could serve as an impetus for regional and national inquiries into the state of the environment, its dynamics and policy responses: in other words, subglobal GEOs. This multi-scale notion of GEO spread to other regions and to the city level (Chapter 6 and Chapter 10). It is a safe assumption that a good number of these local and regional GEO-inspired assessments were intended to serve as steps leading to broad-based modernization of environmental policy. However, it is beyond the scope of this book to trace and analyse local and regional policy-related follow-up, particularly in light of the multitude of GEO-inspired assessments that have been carried out.

In at least two large countries, China and Canada, initiatives for a national GEO-like outlook were taken but were never realized due to the complexities of national governance. In the Chinese context, a feasibility study for a series of China Environment and Development Outlooks was developed

but never implemented due to leadership changes. However, China has continued to produce national SoE reports annually. In Canada, a proposal for a national environment outlook, based on the examples of GEO and reports of the OECD, proved incompatible with the balance between federal and provincial levels. In the countries where domestic knowledge organizations helped to initiate the early global GEOs – primarily the Netherlands, then Sweden – national reporting continues to evolve, essentially as it would have done without GEO.

Occasionally, testimonies do emerge of a global GEO being used explicitly in national decision-making discussions. One instance relates to Norway's biofuel strategy in the late 2000s. An excerpt from GEO on biofuels was presented to the prime minister's office to inform policymaking. Even in this instance, it must be assumed that *GEO-4* had been under consideration with at least three other environment assessments (IAASTD, 2009; IPCC, 2007a; OECD, 2008) (Box 3.5.1), as they all addressed biofuel choices.

Regarding environmental ministries and similar government entities, to this day, GEO remains known only to a small circle of top-level officials exposed to regional and global environmental policy matters. But among them, the GEO process is admired. It seems that appreciation and relevance of GEO have been a function of involvement in its process (IUCN and UNEP, 2009) (Adel Farid Abdel-Kader interview). Many delegates of the UNEA have been only one-time participants in the event due to electoral cycles and frequent staff changes at the senior level in many countries. The authors of this History found only a few current government representatives who have a reasonably long perspective on GEO, more than a single five-year cycle, and most of them are from Europe or North America.

> My lack of instructions was typical. Most capitals, after their initial enthusiasm when GEO started, had lost active interest in GEO and in UNEP as a whole. Often, the supporting individuals of the first hour had moved on. Thus, the diplomatic representatives in Nairobi were more or less left to operate on their own judgment. Which I did (Martijn Dadema interview).

While this section has focused on the influence of GEO perceived as a traditional UN report, produced with the support of governments and read primarily by government people, its active audience has been wider (Chapter 8). The private sector should not be overlooked, even if its interaction with GEO has been limited compared with governments. As far as reaching the private sector through written reports, the latter tend to be specially designed by intermediaries such as the World Business Council for Sustainable Development and the Global Reporting Initiative, who do

read GEO materials and reach out to its authors (GRI, 2020; WBCSD, 2010, 2014). UNEP, in addition, occasionally produces business-oriented companion publications to GEO (Chapter 7.8). But meanwhile, in comparison with other global assessments and in light of repeated critiques in evaluation reports, the number of experts from the business community who have participated in the process has been remarkably small throughout the history of GEO.

## 9.4 Capacity development: the importance of process, ownership and learning by doing

Capacity development activities emerged as a response to the deep appreciation of the global GEO report and the desire to apply the GEO principles in regional, national and local contexts. GEO essentially is the result of learning-by-doing, even for the core team and the first collaborating centres of the mid-1990s: this has been GEO's mantra since the early days. Once GEO-related work approaches became more settled, demand rose to have these written down, and a new line of GEO products emerged: manuals, resource books and platforms to connect practitioners (Chapter 7.4 and Annex IV).

Overall, there have been two capacity development activities: learning-by-doing GEOs and producing capacity development materials and training events delivered by UNEP or partner organizations.

Learning-by-doing is an integrated type of capacity development, and many GEO contributors have confirmed that being part of such an endeavour has been an immense learning opportunity. As the GEO approach solidified through different iterations, a community has formed around it that operated under common principles, terms, methods and process steps. Each GEO iteration has had its share of newcomers (Chapter 3), but with the UNEP core team leading the way, newcomers were able to quickly assimilate and apply the various GEO process particularities and elements for many years. Researchers and practitioners from developing countries stood to gain the most from the learning-by-doing capacity development style. To enhance mutual learning and beneficial effects, a South-South network of GEO collaborating centres was maintained by UNEP between mid-2006 and the end of 2009 (Barbour, 2010).

Learning-by-doing was especially strong until *GEO-4* under the collaborating centre-led process. But IPCC-ization has brought in a larger ratio

of newcomers in each cycle, introducing a certain level of chaos in every reinvention of the wheel (Chapter 3; Annex II; for numbers, see Table 3.2.1 and Figure 3.2.2).

The primary influence of GEO-related capacity development activities has been to help public servants and policymakers to fulfill their legislative obligations on SoE reporting. As a result, many additional countries in Latin America and the Caribbean, West Asia, Asia and the Pacific and Africa issued their first SoE reports (Chapter 6 and Chapter 10). The GEO approach, which goes beyond SoE reporting, also became a de facto standard in SoE reporting. It encouraged a wide thematic coverage, DPSIR structure and systematic coverage of policy responses. Some SoE report series began to actually feature serious outlook components, even though that was not always apparent from their titles (see Chapter 6 and Annex IV). Many countries are now able to continue regular SoE reporting on their own, while some continue to need financial and technical assistance to produce them.

Many interviewees referred to networks of professionals formed around UNEP's capacity development initiatives or national and local GEO reports and which have persisted beyond the limited time frame of projects and carried on working on various environmental initiatives. Through GEO experience and GEO-related knowledge-sharing, colleagues in developing regions learned to participate more effectively in international environment and development forums, MEAs, and other global environmental assessment processes. The knowledge exchange happening in GEO processes would often echo in other international processes, with several contributors spread through a few global initiatives.

> The main thing really, it was the capacity-building elements and bringing different parts of the world to the same level of understanding of the issues. And the space for those coming from the regions to further articulate the issues as they know them in their own context to find their own solutions. And the strength of GEO was really the process as a whole and the involvement of so many, and the building of capacity and the decentralization of the process through the regional offices and the collaborating centres in different regions. I think that was central to GEO being successful (Munyaradzi Chenje interview).

Many interviewees spoke about the positive personal impact of being part of the GEO process in many ways. GEO experience has helped advance their careers in academia, international organizations and other areas. In Latin America, a few GEO contributors have been propelled into the position of minister of environment of their countries (Chapter 10). A number

of individuals became sought-after international environmental consultants. Many interviewees have also mentioned the initiative of GEO fellows: young professionals at an early stage in their careers being exposed to the complex intergovernmental process of a global environmental assessment and providing them with an opportunity to meet experienced scientists and practitioners. Over the years, especially during the first iterations driven by the collaborating centres, GEO built an international community beyond professional interests, as illustrated by the many positive responses to share personal views on GEO for this book.

> GEO built capacity for me...I was able to then launch myself as an independent consultant, and that is what I do. I do state of the environment reporting. That is practically all I do, and I am a director of a small non-governmental organization...that claims to be experts in that. Where did I get that expertise? It was from GEO. And all those meetings I went to, and I saw other people doing what I did and validating that this is something important to be doing. To step back and look at what is going on in the global environment and report on it. I was very proud and still am to have been part of GEO and to have had that in my life, frankly (Jane Barr interview).

> When we set up the African Environmental Information Network (AEIN), I became the focal point, and it allowed me to improve my capacity regarding environmental issues. I was mainly focusing on climate issues because it was my scientific background. But it gave me the opportunity to widen my professional relationships and to widen also my knowledge regarding environment and how also we conduct the process of writing an SoE report. I coordinated the 2nd and 3rd versions of Senegal's SoE reports and was a reviewer in *AEO-2* and author in *AEO-3*. Also, my institution has become a collaborating centre, and we also support all the countries on this issue. And I think one of the best cases was supporting Morocco for its first SoE report...Thus, *Centre de Suivi Ecologique* has become a collaborating centre that supports all of the countries in West Africa, like Morocco, with UNEP to drive the process of SoE reporting. I was involved with *GEO-4* and *GEO-5* as a reviewer, and in *GEO-6*, before becoming Review Editor, I co-coordinated with Clever Mafuta the regional assessment for Africa. It means that I have improved my own scientific background and my own scientific abilities to drive this process (Jacques Ndione interview).

One of the most important take-aways from interviews for this book has been the overwhelming majority of people stressing the importance of the GEO process as a distinct entity from the product, the GEO report. The GEO process evolved organically in learning-by-doing the global GEO report and then later by responding to demand from the regions. The process

helped GEO to create ownership among participants through to the regional, national and local levels, and it has been inseparably linked with the outreach strategy in connecting with its most important stakeholders and audiences. Joseph Alcamo, involved with early work for GEO and later UNEP's Chief Scientist, recollected: "The process has been clearly effective and even more effective, I think, than the end product - about putting together the final document and distributing it and trying to get the message out with the final document." (Joseph Alcamo interview). Jennifer Katerere underlined: "The GEO actually provides quite a nice sense of a family of decision makers, not decision-making inputs." (Jennifer Katerere interview).

Collaborating centres have been at the centre of the capacity development activities: many of them as long-term partners in the learning-by-doing global GEO process; many as receivers of capacity development activities; and eventually some as UNEP partners in delivering capacity development activities (Chapter 7.4). The collaborating centres were, or have turned into, centres of excellence supporting GEO processes. In some cases, they themselves even sponsored capacity development activities or related methodology workshops and secondments if capacity development was beyond their institutional mandate. Overall, collaborating centres reported many positive aspects of being involved in GEO apart from improved capacities of staff: improved reputation, an expanded list of services offered, additional staff hired, additional funding attracted, and improved satisfaction of staff and clients (UNEP, 2004b).

Collaboration proved to be the operative characteristic of the network (Chapter 3). As they got to know others, centres in the same region and other parts of the world saw their networks expand and diversify, leading to shared perspectives, a broader knowledge of regional/global diversity and a better understanding of their own issues and policies. This has led to collaborating centres working together on projects beyond global GEOs and beyond UNEP, including other integrated environmental assessments (IEAs) at the subglobal level and thematic assessments. For example, the *GEO-4* evaluation report found half of the surveyed participants confirmed that participation in GEO has led to other partnerships and collaborations (IUCN and UNEP, 2009). Other spin-offs include science-policy advisory roles and responsibilities for academic and institutional training. This has happened at both institutional and individual levels. No region has exemplified this better than Latin America and the Caribbean, where the established regional collaborating centres' network has been impressively influential in making GEO happen (Chapter 6.4).

The other capacity development activities, mainly training events and outputs in the form of training manuals, were common during the *GEO-2000*, *GEO-3* and *GEO-4* cycles. Even at the height of capacity development activities, these efforts were insufficient (UNEP, 2004d). The situation began to shift with *GEO-5*. First of all, extra capacity development activities and outputs came to a halt (Rowe et al., 2014). Several factors contributed to this decline. The IPCC-ization brought changes that reduced or abolished the role of collaborating centres (Chapter 3), and there was a subsequent loss in momentum in training for IEA. Also, staff changes in the GEO Secretariat and budget shortfalls contributed further to the discontinuity of capacity development processes. Many interviewees reported that capacities, connections and networks built over the years were lost and, consequently, engagement with regional stakeholders, regional bottom-up initiatives and regional outreach faded.

> GEO, and its early success, was in large part thanks to the network of collaborating centres that we put together...when we, in a way, took the process away from the collaborating centres and marginalized them, I think that that weakened GEO, it weakened ownership of GEO and it weakened to a large extent the outreach of GEO (Kaveh Zahedi interview).

Despite subsequent initiatives that produced guides and similar materials (Chapter 7.4), a lack of accompanying capacity development efforts at the time of *GEO-5* and *GEO-6* may have led to a decreased use of the global GEO report at the subglobal levels of decision-making (content-related use) and SoE reporting or other environmental assessment activities (process-related use). The *GEO-5* evaluation report stated that "Shortfall in capacities limits use" as it emphasized the unsatisfactory performance of capacity development during *GEO-5* and called for obligatory budget allocations for capacity development in future GEO iterations (Rowe et al., 2014, p. 56). The IPCC-ization of the GEO (Chapter 3) brought a strengthened emphasis on scientific credibility through individual authors. But without accompanying capacity development efforts, this has resulted in an even larger gap between regions with a strong science base and the rest of the world with lower science capacity. This is underlined by the former head of the first GEO collaborating centre in India:

> We seem to be heading to a place where we want more and more perfection on the science, and in the process we are leaving a lot of people behind. So, if I can give an example, IEAs, in terms of being able to do that, I think the capacities still remain in the hands of a few people, a few institutions and organizations (Leena Srivastava interview).

Early, more frequent iterations of GEO functioned as an adaptive learning system: continually evolving, building on previous experiences and responding to demand from users at various levels and regions of decision-making. This was possible with the core team of collaborating centres and UNEP staff leading the way. Capacities to continue carrying out GEO processes in the same evolutionary manner have been curbed with the collaborating centres losing their status as the key partners in the process, high turnover of staff at UNEP, and lack of financial and human resources. Lack of transition management for the core facilitating team in UNEP's Division of Early Warning and Assessment, the current Science Division, has compromised institutional memory.

> ...the advantage of GEO (is that) it was a process and not a project, and that was very important from the outset. Normally when you deal with a project, once you finish with a project, you throw it, you clear your brain, you actually wipe your brain of everything and what remains is only experience to do the next one. But the process was a good thing that you could continue evolving and making corrections for your steps and moves, and you learn (Waleed Khalil Zubari interview).

## 9.5 GEO, youth and the education community

The education community has emerged as an unintended audience of the GEO report. This may be one of the strongest influences the GEO family of products continues to have: raising environmental awareness through education and equipping the new generation with the necessary vocabulary and analytical tools for a challenging future.

> We should have had a much stronger focus on getting the GEO process into higher education and the findings into university curricula because those students are going to be the decision makers of the future so a) if it has been a foundation for their education, then that tends to stick; and b) they are the ones who are going to deal with the issues in the future as those become more and more complex (Anna Stabrawa interview).

The global GEO report has often been referred to as an environmental encyclopedia or an environmental reference book by our interviewees, and therefore it perfectly lends itself to educational purposes. It has been particularly useful for general and introductory courses in the higher education sector. The GEO Resource Book (UNEP and IISD, 2007) is another important educational manual providing useful insights into environmental

assessment processes essential for environmental policy and management courses. In 2019, building on the 2007 *IEA Training Manual* (UNEP and IISD, 2007), UNEP initiated work on a set of educational materials on how to design and produce integrated environment assessments aimed at the undergraduate level. This has remained unfinished.

### Box 9.5.1: Chinese research and higher education institutions unite in teaching a course on GEO

A recent example of a higher education course developed on the basis of *GEO-6* is a two-credit course put together by UNEP and several Chinese institutions: Peking University, Tongji University, Tsinghua University, the Chinese Energy Research Institute and the Chinese Academy of Sciences. The instructor of the course, entitled *Global Environment Outlook*, is Professor Huang Yi from the College of Environmental Sciences and Engineering, Peking University. The course started running in 2019, and its main language of instruction is English. The course is aimed at undergraduate and graduate students interested in global and Chinese environmental problems. The lectures are given by Chinese scientists who participated in the regional and global *GEO-6* assessments. The coursework involves 12 lectures, two seminars, two group reports and two presentations. The main study materials include the global *GEO-6* report, the *GEO-6* Regional Assessment for Asia and the Pacific and UNEP's annual *Frontiers* publication.

Source: Jinhua Zhang interview

Many of these courses came into being as a personal initiative of the individuals based at the GEO collaborating centres engaged in higher education activities. Some courses are led by former UNEP staff. Interviews and evaluation reports (IUCN and UNEP, 2009; UNEP, 2004b) enabled the compilation of Figure 9.5.1 with a map and non-exhaustive list of universities around the world where the GEO global report, as well as some associated materials, have been used in delivering courses (the list is in no particular order).

**Figure 9.5.1. Universities where global GEO reports and associated material have been used in delivering courses**


1. Arabian Gulf University, Bahrain
2. The Higher Institute for Graduate Studies in Alexandria, Egypt
3. Moscow State University, Russia
4. Central European University, Vienna
5. University of Kassel, Germany
6. Lund University, Sweden
7. Charles University, Czech Republic
8. University of Plymouth, UK
9. University of Dundee, UK
10. London Guildhall University, UK
11. University of Oslo, Norway
12. University of Groningen, Netherlands
13. The Open University, UK
14. University of Kansas, USA
15. Pennsylvania State University, USA
16. University of Maryland, USA
17. Boston University, USA
18. Massachusetts Institute of Technology, USA
19. Carleton University, Canada
20. University of Costa Rica, Costa Rica
21. Autonomous University of Campeche, Mexico
22. University of the Pacific, Peru
23. University of Buenos Aires, Argentina
24. University of Andres Bello, Chile
25. Australian National University, Australia
26. University of Nairobi, Kenya
27. University of Buea, Cameroon
28. University of Zimbabwe, Zimbabwe
29. Council for Scientific and Industrial Research, Ghana
30. Peking University, China
31. Tongji University, China
32. TERI School of Advanced Studies, India

Source: Interviews and (IUCN and UNEP, 2009; UNEP, 2004b)

Note: This is a non-exhaustive mapping based on interviews conducted for this book (IUCN and UNEP, 2009; UNEP, 2004b).

Another GEO spin-off, *Pachamama: Our Earth - Our Future* (UNEP and PCI, 1999), was prepared by youth for youth (Chapter 7.8) and started a series of GEO for Youth. A youth-focused non-governmental organization, Peace Child International, led the initiative with its international network of youth organizations. With *GEO-2000* information as a starting point, over 490 youth groups and individuals from 52 countries around the world submitted case studies, stories, poems, drawings, photos, games and cartoons from which a group of 23 young editors compiled Pachamama. The contributors' enthusiasm was so high that, according to the editors, "The hardest part was deciding which to include, for we could have made ten books!" (UNEP and PCI, 1999, p. 8). Launched at the first World Youth Conference in Hawaii, USA, in October 1999, the UNEP Youth Advisory Council followed up with 21 additional regional launches by January 2000.

The *Pachamama* project was funded by the United Nations Foundation for International Partnerships, and its visibility benefited considerably from collaboration with UNICEF and UNESCO. The book was translated into more language versions than any other GEO product. With 35,000 copies of the book printed, large numbers were sold in addition to the 7,500 copies distributed for free by the three UN partners. Compact disc and website versions became widely available in 2000, and a Teacher's Guide was completed in 2002 (UNEP, 2002h) to support the book's use among the late primary-early secondary education community. *Pachamama* also inspired youths in Latin America and the Caribbean to produce multiple regional and national versions of GEO for Youth (PNUMA and GJ-MERCOSUR, 2003; UNEP, 2001d), and the UNEP office in the region produced a process and capacity building manual on GEO for Youth in Latin America and the Caribbean (PNUMA, 2004). Soon the initiative spread into other regions with GEO for Youth editions published for South Asia (UNEP, 2002i), Africa (UNEP, 2005a, 2019d) and Asia and the Pacific (UNEP, 2019b). A fuller list of GEO for youth reports can be found in Annex IV.

By 2004 it was concluded that Pachamama was being increasingly adopted for use in schools, had reached youth around the globe, and increased their understanding of the world's environmental challenges (UNEP, 2004b). However, UNEP did not maximize this to full advantage. A consultancy on the GEO for Youth project (Fien, 2001) found a high level of interaction with children and youth groups, but not with environmental and education ministries in member states or with environmental education networks. Most activities focused on outputs and lacked a strategy for ensuring that these translated into environmental education outcomes and influence, so UNEP's potential multiplier and leverage effects in this area were not

achieved. In hindsight, this could reflect similar situations with other GEO activities: placing great effort and emphasis on product delivery but failing to gain maximum influence through adequate and targeted follow-up.

## 9.6 GEO and the research community

The GEO series is a bridge between science and policy. Traffic on this bridge moves almost exclusively in one direction, from science towards policy. Scientific insights on environment and development are summarized, contextualized and assessed to inform a policy audience. Very little traffic moves the other way, in the sense that GEO's findings and its process seem to have little influence on the science agenda. This section highlights a few examples of GEO's effect on scientific research that have been documented and also briefly covers key factors and trends.

What GEO influences on the scientific research community are known? As referred to earlier in this chapter, scientific discourse is the appropriate framework to discuss GEO's influence on the scientific research community. Well represented among GEO's collaborating centres, up to and including *GEO-4*, were organizations that themselves had been set up to fulfil a bridging role between science and policy, domestically, regionally or globally (UNEP, 1997e). An often-used analogy for that role, bridging the gap, refers to the need to improve communication between science and policy – in both directions, ideally (IEPA, 2004).

In the first half of the 1990s, the inception phase of GEO saw an outpouring of scientific offers, reflected in Annex IV and Chapter 7.8, as well as the energetic discourse concerning methods among the new collaborating centers. Early GEOs became a rallying point and permitted individual groups to connect to a larger whole.

> ...we collected people from all the former Soviet Republics, experts at the top level...We organized meetings twice in different places...we produced a technical report for GEO...we used this mandate to keep all links between our institutions...There was no other occasion to get people together and do something useful for GEO (Nicolai Dronin interview).

Apparently, the time was ripe when the GEO initiative was taken.

> ...the Global Scenario Group became the Scenario Working Group for *GEO-1*. So, we oriented the work of the Global Scenario Group to be in the service of GEO. At the same time, GEO was helping our work, so there was a lot

> of back and forth…I think there was a mutual learning process going on at that point. So, while the Global Scenario Group brought a pre-existing resource to the GEO, it is also true that the Global Scenario Group would not have gone as far and fast as it did without benefitting from GEO's structure and context. So, I think there was a very strong synergy and process of co-creation that influenced both the few GEOs and the subsequent work of the Global Scenario Group, as well as its successor project, the still-active Great Transition Initiative… (Paul D. Raskin interview).

Evidence from this early phase of GEO affecting scientific research is only available if somebody found the time to document the discourse. One known example is modelling the future risk of a key type of land degradation as a function of scenario assumptions and the ensuing repercussions on food production. To test this, estimations for historical and present water-induced soil erosion were modelled for large case areas in Argentina, Uruguay and Kenya and compared with actually observed degradation and yield impacts from the records of the International Soil Reference Information Centre (Batjes, 1996a, 1996b; Mantel and van Engelen, 1997a, 1997b). Initially, this did not convince UNEP that the modelling would be sufficiently credible as a component of the outlook component of GEO. These techniques[8] were only used much later to inform broader assessments in the framework of vulnerability or land degradation neutrality (UNCCD, 2017, pp. 310–318; UNEP, 2007b, p. 318).

Another important example from this period relates to earth observation. Members of GEO's Data Working Group secured, among many other things, full access for UNEP to NASA earth observation data from 1994 onwards. Whether this would count as a research result is open to question. But access to earth observation data was critical for GEO, with imagery providing a powerful extra communications channel. Among the main GEO editions, *GEO-3* offers examples of satellite imagery as evidence of the changing environment (UNEP, 2002e, p. x). Comprehensive access to earth observation information, and imagery in particular, had been a recognized need right from GEO's inception. On this front, too, GEO successfully rode a wave.

The phase of GEO's first three editions saw the development of ambitious models, geospatial data sets and aggregate indicators specifically to serve environment outlooks. The recognized challenge was to compare complex environment-development issues over time, between regions and

[8] Current work in this vein, not especially linked to GEO, is organized via the Soil Modelling Consortium: https://www.soil-modeling.org/

between scenarios in a meaningful yet simple way, for example, freshwater shortages. Reporting country annual totals of water availability and use is in many cases not meaningful – imagine countries where water is available in the North but needed in the South or situations where total availability might look sufficient, but it is concentrated in two months of the year.

The solution was a new modelling framework – the WaterGap model – based on the world's 6000 drainage basins, not countries (Alcamo et al., 2003; Döll, 2021; Döll et al., 2003). Developing this required a significant investment of time and money. Another example is terrestrial biodiversity and the successive editions of the GLOBIO model – the Global Biodiversity Model for Policy Support (Alkemade et al., 2009; Nellemann et al., 2001; PBL, 2021; Schipper et al., 2020). Here, a method needed to be developed to compare rich, complex biodiversity information between situations: over time, between regions, between alternative scenarios. In this case, the solution was high-resolution spatial modelling, coupled with extreme aggregation of biodiversity information into one indicator of naturalness.

Results of both WaterGap and GLOBIO have been used for GEO since *GEO-3*. Resource allocations for developing and maintaining these systems were motivated by GEO's needs and those of other environment-related outlooks that had by then appeared or were envisaged. Typically, what triggered these developments was the analytical teams' dissatisfaction with available tools and methods, rather than UNEP making suggestions for improvement.

During this phase in the late 1990s and early 2000s, forward-looking studies in the style of GEO became a much more normal thing to commission. It would go too far to claim that this happened because of GEO. After all, GEO was predated by the Club of Rome, Inter Futures, Rand Corporation, Shell research and even pre-IPCC climate work under the joint aegis of UNEP and WMO. But undoubtedly, the GEO series and IPCC assessment reports were early in the popularization of broad-based outlooks. This brought more frequent collaboration between analytical teams with a biophysical background and economic modellers. That collaboration helped some economic teams to overcome their traditional fear of scenario building and analysis with a time-horizon as required for environment and development outlooks, namely beyond one or two decades.

The most recent decade of GEO, the 2010s, saw research whose programming was co-inspired by GEO through the project *The Future of Global Environmental Assessment Making* (FOGEAM) (MCC, 2021). It sparked several journal publications (Kowarsch and Jabbour, 2017a, 2017b). Arguably, this

included systematic research into the impact pathways of global environment assessments and outlooks by Riousset et al. (2017).

Another recent achievement co-inspired by GEO has been the development of a set of worldwide scenarios, jointly produced by six experienced teams in six countries, as a basis for any outlook on environment and development. This initiative to develop so-called shared socioeconomic pathways responds to the experience in the climate assessment community that its scenarios had often been built upon for other assessments as well, including GEO (van Vuuren et al., 2012). Whether the Shared Socioeconomic Pathways are the output of scientific research or something else – applied research, probably – they are certainly a step towards more efficient and comparable production of GEO-like outlooks. In addition, their development fits a pattern in which large outlook teams no longer develop their own scenarios from scratch but build on what already exists (O'Neill et al., 2017).

Over the years, aside from advocating greater measurement, monitoring and access to data, global editions of GEO have been remarkably non-specific about gaps in scientific understanding of the environment in relation to development. This is surprising, as many science funders with sustainable development in mind are trying to spend resources more wisely and are genuinely open to better knowledge informing their programming. For example, in the European Union, science funders initiated the project Vision RD4SD expressly for this reason and even carried it out themselves (European Commission, 2013)[9].

GEO's silence or near-silence on specific knowledge gaps cannot be explained by a lack of awareness in the system. All GEO writing teams have stumbled into some kind of gaps, data or research-related. The collaborating centres of the first decade and a half were in an excellent position to note knowledge gaps and act on them. For example, the Netherlands' RIVM, the eldest of the collaborating centres, documented knowledge gaps that emerged during the compilation of *GEO-1* for consideration by the European Commission in its framework programme for Research and Development, one of the most significant money streams in the European Union (van Vuuren, 1998).

[9] Vision and Principles for Harnessing Research and Development for Sustainable Development (Vision RD4SD). The project ran from 2010 to 2013, just ahead of decision-making for a new cycle of European Union science funding. Its purpose was to identify promising approaches towards science funding that make sense from a perspective of sustainable development; it analyzed national cases and produced monographs.

Three factors have probably limited GEO's direct influence on scientific research. Firstly, a strict focus on national and international environmental administrations as GEO's target audience did not provide environment ministers – and interest groups, for that matter – with specific arguments to influence science funding and modernize the institutional organization of science.

Secondly, the stop-and-go character of the GEO process could not accommodate a systematic feed-in of research ideas. Research programming, whether within GEO's collaborating centres when that system existed or in other institutions, has cycles taking many years. New ideas can be inserted only at certain times and only through the proper channels. Even for the collaborating centre network, providing a modicum of continuity during the first decade and a half, the difference between these rhythms severely limited opportunities to influence scientific research programming towards filling identified gaps. Interestingly, IPCC has found a formula to address this by encouraging its regularly contributing institutes to work together in science mode, between editions, through the Integrated Assessment Modelling Consortium (IAMC, 2021).

Finally, most basic of all constraints, the idea of commissioning original research for the benefit of GEO or co-applying for research funding seems alien. From the perspective of a UN organization, this is only natural in the absence of an explicit request by the governing body. In the case of GEO, only the very first contract, to RIVM, for developing its methodology could be said to have commissioned a sizeable research activity. But, unlike IPCC, there is no formal reason why UNEP/GEO could not commission original research.

As one source puts the latter point:

> What's the goal not to do primary research? It depends on the particular definition of what is primary research. Global environmental assessments are scientific products of high quality, but now it seems they are not being recognized as such, and the contributors do not always get an academic credit for being involved in global environmental assessment processes. This undermines incentives for good researchers to be part of such processes. Good researchers in developing countries are often so overcommitted working on multiple global environmental assessment processes, and they also have to work on their academic publications and academic career. But if there is a trade-off between research and the global environmental assessment making, this is really not helpful. And, also content-wise global environmental assessments are not just reviews of literature. That is

> not why we established these huge, expensive and extensive processes. It is because we want something more, this element of synthesis, assessment, participation and deliberation, which are additional layers beyond a typical literature review (Martin Kowarsch, personal communication, 13 April 2021).

A clear trend during *GEO-5* and *GEO-6* is that GEO itself is becoming more scientific, at least in the way it is presented. Individual authors replaced a network of collaborating centres. Judgements of confidence levels were assigned to key findings. Associated documentation appeared in journals rather than technical reports. And the dimensions of the main report equalled that of a classical academic volume. On the one hand, this trend could improve the possibility that GEO experiences influence science programming, depending on the authors involved. On the other hand, recruiting a herd of individual authors for each edition without the semi-continuity of a network of collaborating centres has made GEO's stop-and-go character even more pronounced.

Across the board, interviewees for this book acknowledge that GEO has been an immense learning and networking opportunity for the collaborating centres, especially those in developing regions, allowing their teams to work hand-in-hand with leading practitioners. The acquired knowledge, methods, frameworks and tools have been applied in regional research and consulting contexts.

On the question of whether the global GEO has been of use to the research community itself, the general opinion among our interviewees has been that its potential for the scientific community has not been fulfilled. Some interviewees think the feedback loop between academia and GEO could have been tighter, as it is for the IPCC. Apart from pointing towards key actions for a sustainable future, GEO and its participating partner institutions could have easily coordinated among themselves on plans and implementation of future research agendas, joint application for grants and the like.

## 9.7 GEO and the mass media

The general public has been a secondary audience of GEO from the beginning. Nevertheless, there have been many and varied efforts right from the start to ensure that GEO information has reached the general public via the mass media. Thus, earlier GEOs, especially *GEO-2000*, *GEO-3* and *GEO-4*, were able to obtain significant mass media coverage through the

years in many parts of the world, and the media used the global GEO as an authoritative source of environmental information (Chapter 8).

A chronic lack of funding curbed outreach plans in the case of *GEOs-4*, *-5* and *-6* (IUCN and UNEP, 2009; Rowe et al., 2014; UNEP, 2018b). While *GEO-4* and *GEO-5* performed reasonably well in terms of mass media outreach, *GEO-6* went almost unnoticed, to the extent that some of our interviewees, important stakeholders of GEO, were not aware of the *GEO-6* regional reports that had already been published in 2016.

However, the GEO process and product have never been easy to explain to journalists. The GEO report, eventually known informally as 'the brick' due to its increasing thickness from one edition to the next, made it ever-more incompatible with typical bite-size messaging in mass media reports. Despite tailor-made press releases, GEO's broad thematic and geographical scope, generalized analysis, scientific uncertainty and complexity, and avoidance of policy recommendations have made it difficult to turn the contents of GEO into a series of compelling stories in mass media outlets.

With the rise of the internet and social media, the need to reach out more effectively to this secondary audience has grown significantly. But this has not happened. With an increasing timespan between the global reports and a somewhat antiquated outreach strategy, GEO has become gradually less visible in the ever-more crowded global environmental assessment landscape. The void between GEO editions would need to be filled, and the GEO itself offers plenty of content with which to do so. But, as Clever Mafuta describes the situation: "...we take it as a once-off thing and then, happy with the findings, we give ourselves a pat on the back, and that's it. And we wait for the next GEO" (Clever Mafuta interview).

The total and instant information at our fingertips enabled by the reach of the Internet may lead to the question of whether a bulky GEO is really necessary. However, all experts interviewed agreed that the need to keep the environment under review in a systematic and regular way is no less important now than it was 25 years ago when the GEO started. The vastness and instant availability of the Internet may create a false illusion of omnipresent data and knowledge just waiting there to be found. However, to have a comprehensive view of the state of the environment, one needs time series of data, benchmarks, expert interpretation and analysis, quantification of options, and the spotting of synergies and trade-offs. Then one needs to have the resources to draw media attention to the findings and their meaning. All of this only comes with a significant effort and cost. The scope of GEO does not easily render into short formats, but a bulky

report can be the basis of many shorter and more targeted outputs that will find its users more readily and entice the more interested ones to consult the bulky report.

Last but not least, recent years have witnessed the ever-increasing phenomenon of deliberately distributed false information. A regular, comprehensive and authoritative SoE report on a global scale is needed to successfully tackle the rise of disinformation in the environmental domain. UNEP could consider adapting and rethinking GEO's outreach strategy in this light to seize this opportunity, especially the question of formats and its online support systems.

> ...in our time which is more and more going to a post-factum, a fake news time, it is very necessary to have a very clear and reliable voice in the world...The more other sources of information are now critically viewed to be biased, to be fake, to have specific interests, the more is it necessary to have a credible, unquestioned, independent, scientifically-based, but also evidence-backed paper, publication in the hand. It was in those days, maybe 20 years before, or 10 years before, a little bit different...For there is even more need, more urgency to have those reliable publications – these very very well analysed facts and consequences of facts – than it ever was (Klaus Töpfer interview).

## 9.8 GEO's influence on UNEP itself

> Developing and producing GEO was exciting. I am still proud of GEO as a means of monitoring in a holistic and systemic way. As such, GEO constitutes the Document of Record (Elizabeth Dowdeswell interview).

There were three main reasons why the GEO initiative emerged, and at least two of them aimed to transform how UNEP works. This brings to light what Veerle Vandeweerd, the first project leader of GEO, first encountered: "One of the reasons why we started GEO was to address the fact that within UNEP, at that time, every single division and every single region had its own [group for doing assessments]." First, UNEP's Assessment Division attempted to consolidate in GEO the different environmental assessment processes in different UNEP divisions, integrate knowledge on the state of the environment, and provide a coherent framework for assessments. Second, the GEO was conceived to become the scientific basis for setting the action course of the entire organization through the Governing Council (GC) and later the United Nations Environment Assembly (UNEA).

> It was a very important tool to gather even our thoughts together as an organization in terms of what are the priorities? What should we be working on? What is happening with the environment? Are we making it better or not? So, in a way, it helped us to almost establish a baseline of what was happening to the environment that we could build on what we should be doing in reaction to it in order to support countries and regions (Kaveh Zahedi interview).

And thirdly, GEO aimed to become a global bridge between environmental science and environmental policy, a report that single-handedly represented UNEP in the UN family and beyond.

As outlined in Chapter 8.3, convincing the rest of UNEP to take ownership of GEO and use it to their advantage has been an ongoing challenge. The predominant perception among interviewees was that, by the time of *GEO-6*, it had fallen out of favour within the organization, and there may have been many reasons for this. It became seen as an expensive, sprawling process that gains visibility only once every few years and has a limited overall influence. Around the time of *GEOs-5* and *-6*, turnover of key personnel at UNEP headquarters and regional offices left considerable gaps in institutional memory. A comprehensive archive of GEO processes has not been maintained and, with frequent changes in the related information systems, many documents have become scattered or lost.

Meanwhile, other UNEP divisions set up or continued their own assessment processes. Specific UNEP programmes saw inspired attempts to apply GEO-like assessment methods. In some subject areas, GEO methods apparently did not fit -- for example, chemicals – while in other areas they did, with changes – for example, gender and environment (UNEP, 2013c, 2016f, 2019i). On balance, the evolution of UNEP's portfolio of assessments may have decreased or at least diluted the overall visibility of GEO.

Despite repeated requests by its successive oversight bodies, GEO has played little role in setting the strategic agenda of UNEP, although its agenda-setting role has somewhat increased lately (see Annex I and Chapter 8.3). GEO itself has not been widely used by other UNEP divisions either. GEO has become less visible in the regions due to reduced funding for capacity development and environmental assessment activities, which may have resulted in specific policy-level influences at the national or local scale (Chapter 10.5). Capacity development was "likely to be a key vehicle through which awareness of GEO is raised in between production processes" (GC/UNEP, 2009a, p. 11). Despite that, the overwhelming majority of interviewees agreed that GEO was a good approach to respond to UNEP's mandate to keep the environment under review.

Within the broader UN context, UNEP has always been a relatively weak, if not obscure, member of the UN family. Its status as a programme – not a fully independent, specialized agency – has meant that its authority, funding, and profile have remained at the lower end of the scale among UN system entities. Furthermore, with headquarters in Nairobi, Kenya, far from the centres of gravity of international politics and policy, its visibility was further compromised. A few interviewees noted that before GEO, many questioned the purpose of UNEP and if it should continue. Many interviewees confirmed that GEO indeed became the flagship report of the organization and helped to position UNEP as a global player in various international policy development forums, bringing a new perspective on international policy affairs: an environmental one. The second UNEP Executive Director overseeing GEO commented: "With GEO, it was possible to give UNEP, far away in Nairobi, a very clear profile and a strong voice in the overall family of the UN" (Klaus Töpfer interview).

Every GEO evaluation report has stressed the importance of adequate operational funds and staffing for the next iteration (Attere, 2000; IUCN and UNEP, 2009; Rowe et al., 2014; UNEP, 2018b). Expectations and demands have outpaced the growth of available resources for GEO (Chapter 7.9). This is especially true of expectations for stakeholder participation, quality assurance, necessary infrastructure for GEO such as databases, requests for spin-off products, capacity development and outreach. Several donor countries, and even the occasional enterprise, have consistently co-funded GEO, sometimes through specific contributions in addition to their general Environment Fund contributions. In theory, this could have created a legitimacy gap, but that seems not to have happened – probably due to GEO's collaborative process, in-kind contributions from developing countries, and the appreciation of the of the GC, and later UNEA.

The opinions of interviewees diverge greatly on the cost-effectiveness of the GEO. Some think that the mandate to keep the state of the global environment under review could have been done with more modest budgets. Others acknowledge the chronically overstretched Secretariat and a number of in-kind contributions by many collaborating centres and other GEO contributors and consider that UNEP's flagship report deserves adequate and reliable funding. In that sense, the GEO process, including its family of spin-offs, can be perceived as struggling to survive and, at the same time, temporarily successful. As well, GEO has run on an extraordinary amount of goodwill, with uncounted and uncountable voluntary hours never seen on the budget sheets, for all aspects of the process. One staunch supporter, reflecting on *GEOs-5* and *6*, stated that "One of the

most grossly underestimated and underappreciated variables in all of [GEO] is this goodwill function...without that, you do not have GEO and...we have squandered that a little bit."

Reflecting on the first four GEO editions, David Stanners, formerly from the EEA, commented:

> The whole GEO process has been an amazing heroic effort. This has been above and beyond every time, and while this is something that could be applauded, it is also something that could be criticized because it means the work is off the work programme. GEO is not being integrated properly within an institutional work programme if you have to work nights and weekends and do things for free. So while at the time you want to break new ground, you need people to do that, that is not the basis of something which should be consistent and systematic. You need to integrate the development and execution of GEO properly into the budget and work plans (David Stanners interview).

## 9.9 Conclusion

Since the mid-1990s, the GEO report and its associated process have been UNEP's primary fulfillment of its mandate to keep the global environment under review. Despite GEO going through some turbulent times, a subsequent edition and continuation of the process has been requested by the GC and later by the UNEA following the release of each new edition. GEO's main contribution, an innovation when it began, has been to provide a coherent, integrated and authoritative global picture, including an explicit outlook on the future. It promotes a systematic approach without being too rigid. The six global GEOs to date present a remarkable record not only on the state of the changing global environment but also of the evolving mindset and policy needs regarding environment and development.

The concluding statements of this chapter summarize the perceptions and influence of GEO that the research for this book has uncovered, with a focus on the global level. The next chapter will provide a similar analysis and conclusions at other geographical scales.

The GEO report series has reached its key audiences – ministers of the environment, the GC, and later the UNEA and high-level policymakers – and evidence suggests it has been useful and relevant.

The report series has helped frame environment and development issues in the international policymaking context. It has been influential in the global environment and development summits. The most significant endorsement for GEO and UNEP was received at the Rio+20 summit that paved the way for the Sustainable Development Goals. GEO and its products have been helpful in shaping development aid programmes globally.

While its intended audience has always been environmental decision-making bodies at the international level, GEO could have been a strong guiding document to UNEP internally, but here it did not perform even close to its full potential. GEOs' ability to speak to the audiences of the MEAs and spark new bilateral or multilateral environment collaborations has remained weak.

GEO has been a very effective instrument to spread evidence-based approaches in regional, national and local environmental policymaking across the globe. It has helped to modernize many SoE reporting processes worldwide. These processes have helped open up environmental data flows, create networks of environmental practitioners, conduct debate on environmental policy goals on multiple governance levels and inject specific environmental policy options in decision-making discourses.

GEO – through reports as well as the process – has been specifically influential in framing regional and global linkages between environment and development. It has done so by showing in some detail the magnitude of issues, differentiation of context (particularly the development context) and availability of options.

Two types of capacity development activities have been associated with the GEO initiative. The first was learning by doing the GEO. The second has resulted from regional, national and local demand to emulate the GEO approach and has been part of the UNEP work programme in collaboration with various partner organizations. These capacity building activities have especially been helpful to the developing regions of the world where the demand for SoE reporting and IEA activities was on the rise.

The largest initially unforeseen audiences emerged among the education community and youth, sometimes with special GEO editions. Interest in the research domain was explicit in the early years of GEO when it was the venue for new research and network building and, perhaps naturally in view of changes to GEO, much less so in later years.

The early GEOs resonated more with the mass media, while later GEOs seem to have been unable to capitalize on new forms of outreach and failed when competing with other global environmental assessments.

Finally, GEO is almost universally praised for providing the big picture while illuminating the wide range of realities across the globe. But expectations on the level of specificity with which GEO can, and should, speak of individual countries vary widely. In view of this, environment assessments in the next decade can benefit from taking a very clear position on at least two points, guiding expectations.

First, for national and international decision-making, assessments such as GEO provide context, which is the maximum they can do. Second, at this point in time, there seems to be a push to make all assessments on environment and development intergovernmental, whether they are linked to multilateral agreements or not. This, in turn, seems to imply that each assessment would require government approval procedures for every major step of the process. An intergovernmental nature of assessments, especially the variant that requires unanimous approval, seems to be increasingly seen as a precondition for an assessment to have influence. But in that case, avoiding any veto or noteworthy unease in defining scope, nominating/approving scientific contributors and reviewing scientific conclusions and summaries, there is a trade-off with saliency and credibility. Importantly, it would be naïve to expect the inclusion of innovative and specific suggestions that are sensitive to any UN member state. Such suggestions are unlikely to survive, especially in line-by-line approval of summaries.

Chapter

# 10

# Regional Perceptions and Influence of GEO

## 10.1 Introduction

The Global Environment Outlook (GEO) report has been received differently across the world's regions, resonating more in some regions than in others. Perceptions of how relevant and novel the GEO report was depended on the status of environmental governance. Such conditions include the severity of environmental problems, environmental awareness, scientific advancement, development of the environmental legislation base, public service capacities, the existence of practitioners' networks and the presence or lack of state of the environment (SoE) reporting initiatives.

In the 1990s, parts of the world already had all these components in place, and some environmental pressures had started to decrease. With SoE reporting already widely in place in more developed regions on the local, national and regional scales, there was little GEO could add. Nevertheless, it did help to better explain the global situation and to shape global development goals and policies.

According to the first GEO team leader, the lower-income regions were intended to be the key recipients of this global environment reporting initiative: "GEO was not directed in the first place to Europe and North America. These regions had, at that time, far more resources, knowledge and expertise to produce integrated and holistic environmental assessments than UNEP had. At the same time, the mandate of UNEP was still mainly oriented towards the developing countries…though in my mind, we needed a global picture, but GEO was primarily produced for the developing countries" (Veerle Vandeweerd interview).

Regional analyses presented below come in addition to the history in Chapter 6 of GEO's subglobal proliferation. From this, it must be concluded that GEO resonated most in regions and countries with underdeveloped capacities at the state level and underdeveloped policy networks, with increasing severity of environmental damages and growing environmental awareness, but with a relatively well-developed scientific base. In response to these regional needs, the GEO family of products opened many opportunities for influence beyond high-level discourse focused on environmental governance.

> Aside from the reports themselves, the big plus from GEO was the capacity building [for integrated assessment on environment and development]. On both counts, GEO generated a lot of enthusiasm, especially from developing countries. I heard much positive feedback, including from ministers – much more than I had expected. Especially representatives from African countries with thinly equipped environment ministries appreciated GEO. It helped to not only realize that there is environmental havoc but also realize what are the ways to do something about it. In contrast, in developed countries, GEO was picked up not so much by policy but by interface organizations and universities (Martijn Dadema interview).

## 10.2 GEO in Africa: enabling the regional environmental agenda

> There was a significant development in terms of building capacity, in terms of building involvement of different players at different levels to meet different needs and objectives. It was a huge success; there's no doubt about it (Munyaradzi Chenje interview).

GEO has left a clear mark on Africa's environmental assessment process and related governance. However, adoption of the GEO approach has varied greatly. Even before publication of the first Africa Environment Outlook (AEO) in 2002, some African countries and subregions had been trailblazers in SoE reporting, especially in the sub-Saharan region. Some were working on the topic before the first GEO was published in 1997. The countries and subregions that led on this before the arrival of GEO also appear to have benefited the most from GEO. Thus the question of capacities and resources is especially relevant in this regard. This section focuses on sub-Saharan Africa, with a more detailed discussion of GEO's influence in North Africa taken up in the West Asia Chapter 10.6.

Many African countries have legislative or constitutional requirements to regularly report on the state and trends of their environment, but only two sub-Saharan countries were regularly undertaking this reporting in the 1990s: South Africa and Uganda (GC/UNEP, 2008). Both countries were pioneers in SoE reporting, with their first reports published in 1992 and 1994, respectively. They were produced while GEO authors were circulating preparatory studies for GEO in draft form, but the launch of *GEO-1* was still some time away.

Both South Africa and Uganda extended their environmental reporting activity to the level of provinces. In the case of South Africa, the reporting extended to the level of cities and, importantly, even to ecosystems. Both countries ensured the continuity of this activity over time, with occasional linkages made to UNEP or the GEO/AEO processes for technical support. Some other sub-Saharan countries also issued their first SoE reports in the 1990s, but then did not repeat them: Zambia (1990), Mauritius (1991), Madagascar (1992), Gambia (1997), Lesotho (1997), Malawi (1998), Namibia (1998), Niger (1998) and Zimbabwe (1998) (GC/UNEP, 2008; MESDM, 2011).

At the subregional level, Southern Africa was relatively advanced in information provision for environmental policy. In the 1990s, the Southern African Development Community (SADC) developed several framework policies: agriculture and natural resources, wildlife, forestry, shared

watercourses, energy, trade, wetlands, environmental information systems, biodiversity and air pollution (Simukanga et al., 2003; UNEP and AMCEN, 2002).

The first SoE report on the Southern Africa subregion was published in 1994 as a result of the cooperation between the Southern African Research and Documentation Centre (SARDC), the International Union for Conservation of Nature and the Southern African Development Community (SARDC et al., 1994). The environmental assessment work led by the Research and Documentation Centre reflects the ambitious, pioneering spirit of the early 1990s in terms of innovating environmental information for policy. For example, the 1994 report featured a final chapter on environmental scenarios and involved a multi-stakeholder deliberation process. Water had been identified as a critical issue, and thus a follow-up sectoral SoE report on water was issued in 1996 (SARDC et al., 1996). A watershed-based SoE report on the Zambezi River basin was published in 2000 (SADC et al., 2000), and a separate guide on SoE reporting in the Southern African subregion in 2001, with recommendations for future initiatives to continue with the Driving forces - Pressures - State - Impacts - Responses (DPSIR) framework and environmental scenarios (SADC et al., 2001).

The SARDC work was highlighted in technical reporting on SoE methods in preparation for GEO (Rump, 1996). At that time, key writing on methodology for GEO and drafts of *GEO-1* were circulating too. In addition, probably important though not well documented, were professional contacts among the fast-expanding community of practitioners of geographical information systems. Thus, Southern Africa featured, if not cross-fertilization, at least a remarkable co-evolution of modern environmental assessment practices involving GEO, knowledge organizations, and, possibly practitioners in the emerging field of Geographic Information Systems technology.

On the continental level, several events predating GEO had led to the establishment of a legal and institutional foundation for modern governance in the region concerning evidence-based monitoring of the state of the environment. The Lagos Plan of Action for the Economic Development of Africa 1980–2000 contained a section on the environment that called for "a national coordination machinery to monitor environmental problems for action...in each African country" and referred to the need for "collection and dissemination of environmental data to monitor the state of the environment in Africa" (OAU, 1980, p. 75). The first African Ministerial Conference on the Environment (AMCEN) was organized in 1985 by UNEP,

the United Nations Economic Commission for Africa, and the Organization of African Unity, and it continues to be the leading environmental coordinating body on the continent (UNEP, 2019k; UNEP and AMCEN, 2002). Through its Regional Office for Africa, UNEP has served as the Secretariat of AMCEN since its inception. The need for environmental coordination for the entire African continent had been elaborated in the Abuja Treaty establishing the African Economic Community (OAU, 1991).

However, it was not until the 2000s that the continent started to systematically implement many previous resolutions regarding modern information provision for environmental policy. The first regional integrated environmental assessment report for all of Africa, the AEO was requested by AMCEN in 2000 at its 8th session in Abuja, Nigeria. By that time, the first two global GEO reports had been published in 1997 and 1999, and the AMCEN request for an AEO summarily refers to GEO as an example to be followed and adapted (Chapter 6.1). The development of the AEO was supported by established UNEP partnerships with the GEO collaborating centres in the region.

When published in 2002, the AEO report was seen as an important milestone: "a testimony of Africa's capacity to undertake specialized scientific work for itself and not rely on northern-based institutions to analyse, articulate and make recommendations on Africa's own issues. AEO is the basis for the African renaissance in environmental terms" (UNEP and AMCEN, 2002, p. xiv). Consequently, in 2002, the 9th session of AMCEN in Kampala, Uganda, endorsed the AEO as a requisite environmental monitoring instrument and suggested extending the integrated environmental assessment approach to the subregional and national levels (UNEP, 2002f). Since then, several AMCEN sessions have stressed the importance of regular SoE reporting on multiple governance levels, the application of the GEO approach to SoE reporting, and the need for associated capacity building (UNEP, 2020i).

AEOs have helped to inform the AMCEN sessions, becoming "one of the main components of the programme of work of AMCEN" (UNEP, 2008), steering the environmental agenda of the continent, and helping to formulate common positions on international environmental negotiations and informed reporting for global development summits. Three editions have been produced (UNEP, 2006a, 2013a; UNEP and AMCEN, 2002).

After *AEO-1*, the influence of GEO can be traced more explicitly. Countries with pre-existing SoE reports – South Africa, Uganda, Zambia and Zim-

babwe – adopted the GEO approach for subsequent activities (DEATSA, 2006; ECZ, 2008b; MOENRM, 2010; NEMA and UNDP, 2016). In this spirit, South Sudan, Rwanda, Senegal and Ethiopia issued their first SoE reports (FEPAE and UNEP, 2007; MEPNS and CSE, 2005; MOESS and UNEP, 2018; REMA, 2015) (Annex IV). In particular, pioneers of the 1990s South Africa and Uganda reports developed full-fledged environment assessments, building on and modifying the GEO methodology for their specific situations.

Interest in the GEO-Cities initiative was low in Africa, although some cities and provinces in South Africa and Zambia embraced this initiative eagerly (ECZ, 2008a; EMFCJ, 2003; KMC and ECZ, 2010; LCC and ECZ, 2008) (Annex IV). In addition, some stand-alone cases were completed, including reports for Dakar, Dar es Salaam, Kigali and Nairobi (DEVPO and UNEP, 2011; IAGU, 2007; REMA, 2013; UNEP, UN-Habitat, et al., 2009) (Annex IV).

There is evidence that GEO spin-offs in Africa have helped inform international and national policymaking. The *AEO-1* helped to shape the New Partnership for Africa's Development Environment Action Plan (UNEP, 2010b). As well, national GEO reports informed the sustainable development strategies in Ethiopia, South Africa and Uganda (UNEP, 2007e).

GEO's greatest influence on environmental assessment and its support of environmental governance in Africa was the 2002 AMCEN decision to initiate the African Environment Information Network (UNEP, 2002f). This network was set up with several goals: to support environmental assessment activities that include SoE reports, to strengthen capacities, and to build a harmonized environmental data repository for the whole continent. Their template was similar to Europe's Environment Information and Observation Network, which was established to support assessment work, research and policymaking (UNEP and GRID-Arendal, 2013). A number of this book's interviewees mentioned that environmental data in Africa are usually scattered across different institutions at the national level and are not comparable across the subregions of Africa. This is a significant challenge for such pan-African endeavours as the AEO and a number of other international policy and research initiatives around the globe.

Thirteen African countries participated in the pilot phase of the Africa Environment Information Network in 2004-2006, while during its second phase, the participation expanded to 34 African countries (UNEP, 2008). It contributed to the establishment of national environmental information networks and supported the AEO and GEO processes, numerous SoE reports and other environmental assessments. "Most importantly, it has

assisted countries in building their capacity to carry out integrated environmental assessments and reporting and, in so doing, has supported the integration of environmental dimensions into decision- and policymaking at national levels" (UNEP and GRID-Arendal, 2013, p. 7). The progress of this continental network has slowed for several reasons, among them a lack of long-term planning, limited funding and changes in the mandates of national focal points and associated institutions.

In 2013, the network initiative was revisited and given another start with a number of governance modifications (UNEP and GRID-Arendal, 2013). But activities have not increased in the years after that. One of the reasons is that *AEO-3*, published in 2013, was the last process and report both driven and owned by AMCEN. In contrast, the 2016 *GEO-6 for Africa* report (UNEP, 2016a), along with the five other regional reporting processes implemented by UNEP, was perceived as a separate initiative from previous AEOs. For Africa, it had little to do with the goals of the Africa Environment Information Network.

Inevitably, the earlier IPCC-ization reform of GEO affected the degree of success of this initiative. The GEO process was refocused and left no resources for building capacity, a process that could have eventually ensured a more solid supporting scientific base of environmental information, which for Africa remains limited.

A number of the interviewees brought up the case of the *AEO-3* report (UNEP, 2013a) for one particular reason: It's timeliness and relevance to foresee the outbreak of the Ebola virus epidemic in Western Africa in 2013-2016. This report was structured around environment and health and implemented with the World Health Organization in response to the Libreville Declaration on Health and Environment in Africa in 2008 (WHO and UNEP, 2008). The declaration stated that Africa is the most vulnerable region to environment and health challenges, with 23 per cent of all deaths attributable to avoidable environmental risk factors at that time.

> The *AEO-3* pointed to some very interesting findings when it comes to the connection between the environment and health. If you look at the whole point around Ebola, it is well covered in that report. The whole issue around Zika, it is also well covered in that report. These issues became prominent when they took a global turn a few years ago. The *AEO-3* pointed out those connections to environment and even pointed arrows to exact places. The recommendation was to get further research into those connections and also to see if there could be some policy interventions in those areas. But these were not seriously taken up (Clever Mafuta interview).

All in all, GEO has resonated well in sub-Saharan Africa. But the picture is varied. Pioneers and some early adopters used the GEO approach in SoE reporting and outlooks on multiple governance levels, built national environmental networks, and improved environmental data flows. However, some less developed countries still lag in surveying their basic environmental performance.

A few interviewees also observed that francophone African countries were somewhat sidelined in the GEO process. The background seems to have been the limited ability of UNEP and, more precisely, the Division of Early Warning and Assessment, to work in francophone African countries, in addition to poor airline connections between Nairobi and West Africa. This contrasts with the Latin America and the Caribbean region where the existence of two dominant linguistic communities – Spanish and Portuguese – provided little hindrance to a region-wide application of GEO practices.

GEO, without a doubt, has been influential in various ways in the region of sub-Saharan Africa. It is also possible that GEO's multi-stakeholder processes involving policymakers, international organizations, academia and practitioners have penetrated sub-Saharan Africa more than some other global environmental assessment processes. Speaking of Africa as a whole, Jennifer Mohamed Katerere commented: "In Africa GEO had probably a greater reach than things like the IPCC" (Jennifer Mohamed Katerere interview). While the IPCC process penetrated mainly academic networks, GEO had influence through its processes on a wider community beyond academics:

> There has always been in the AMCEN a decision on GEO-related assessment processes and the need to build capacity. [With its] influence on the interactions at different levels and also use by non-governmental organizations and universities, the GEO process has been very significant over the years (Munyaradzi Chenje interview).

## 10.3 GEO in Asia and the Pacific: one size does not fit all

> Asia-Pacific is basically a microcosm of the world. There is so much diversity in the region that you could basically say that all of the issues that you would experience globally are being experienced in the Asia-Pacific region. And therefore, the challenge is much greater in a way (Peter Noel King interview).

Compared to other UNEP regions, the Asia and the Pacific region poses challenges like no other and thus may offer more complex terrain to achieve long-lasting influence from GEO. The region includes over half of the world's population and accounted for roughly a third of the world's Gross Domestic Product in 2018 (World Bank, 2020). Within this region, some of the most economically advanced countries neighbour some of the lowest-income countries in the world. An enormous ecosystem diversity coexists with a broad range of environmental problems experienced in the region. Finally, cultural and linguistic diversities have hindered the free flow of GEO approaches, in contrast to experiences in West Asia and Latin America and the Caribbean. In short, the region did not and does not today lend itself to a simple, uniform GEO approach.

In comparison with Latin America and the Caribbean, Africa and West Asia, the region of Asia and the Pacific was much more advanced in terms of national and regional SoE reporting by the time the first GEO arrived. India's first SoE report was published by an independent think tank in 1982, and Thailand prepared its first SoE report in 1985 (CSE, 1982; NEBT and MSTET, 1985). The United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) started SoE reporting for the Asia and the Pacific region in 1985 (UN ESCAP, 1985). The South Asian Association for Regional Co-operation had issued a regional study on natural disasters in 1991 and a regional study on climate change impacts in 1992 (Ahmed, 2016).

Regional SoE reports were completed at the request of the South Asia Co-operative Environment Programme, one on the state of the South Asian Seas (Gupta et al., 1990) and the other a South Asia environmental report (Huq, 1995). The Association of Southeast Asian Nations published its first SoE report in 1997 (ASEAN, 1997). Fifteen Pacific Island countries had their first national SoE reports published by the mid-1990s (Thistlethwaite, 1996) and the first regional SoE report for the South Pacific appeared in 1982 (SPREP et al., 2012). Finally, Bhutan stands out with a unique intellectual approach to development and reporting globally: its gross domestic happiness concept has been developing since the 1970s (Ura and Kinga, 2004).

At a more specific level, the International Institute for Applied Systems Analyses launched the Asian equivalent of its model simulating long-range transboundary air pollution consequences in collaboration with 23 countries in Asia in 1989 (Foell et al., 1995). Many current environmental problems in Asia, particularly China, are seen as a result of decisions taken at that time. It is unclear to what extent GEO may have contributed to

policymaking in the region, but its arrival was timely and brought useful tools and approaches for consideration.

The Asia and the Pacific region is exceptional due to the number of regional and subregional ministerial forums for environmental matters. They are less geographically overlapped than in the case of Europe (see Chapter 10.4). In the past, UN ESCAP held Ministerial Forums on Environment and Development every five years, and published regional SoE reports on those occasions. Four SoE reports for Asia-Pacific were published between 1985 and 2006 (UN ESCAP, 1985, 1992, 2006; UN ESCAP and ADB, 2000). Since 2015, UNEP has co-chaired the Forum of Ministers and Environment Authorities of Asia Pacific in collaboration with UN ESCAP. The Forum's meeting frequency increased to biennial. The Asian Development Bank has also been active in regional environmental governance with its Asian Environment Outlook reports (ADB, 2001, 2005). In 2012, all three organizations – UNEP, UN ESCAP and the Asian Development Bank – collaborated to prepare a report "Green Growth, Resources and Resilience: Environmental Sustainability in Asia and the Pacific" (UN ESCAP et al., 2012).

In addition to this, three subregional ministerial processes have been running since the 1990s:

1. The Association of Southeast Asian Nations runs an environmental ministerial meeting every few years; some are accompanied by a regional SoE report (ASEAN, 1997, 2001, 2006, 2009, 2017).

2. The South Asia Cooperative Environment Programme holds ministerial meetings every two to three years (Takahashi, 2001) and has published regional SoE reports with varying regularity (Huq, 1995). In parallel, the South Asian Association for Regional Cooperation initiated regional environmental cooperation and held environment ministerial meetings with varying regularity (Takahashi, 2001). UNEP partnered with the South Asian Association for Regional Cooperation to produce the South Asia Environment Outlooks according to the GEO approach (UNEP et al., 2014; UNEP, SAARC, et al., 2009).

3. The Secretariat of the Pacific Regional Environment Programme calls a ministerial meeting every year or two (SPREP, 2021) and has published regional SoE and thematic reports with varying regularity in 1982, 1991, 2005 and 2012 (SPREP et al., 2012).

UNEP has memorandums of understanding with all three organizations and is regularly invited to contribute to their environmental assessment processes. With the support of these regional organizations and the capacity-building efforts of the UNEP office in the region, the GEO approach has influenced national SoE reporting processes. Most countries in the region have regular SoE processes, and many of these are conducted in national languages and therefore are less visible to international audiences. Regarding national GEO reports across the region, the GEO processes have been embraced most enthusiastically in South Asia and the Pacific Islands (Annex IV and Chapter 6).

Due to conditions on funding received (with some donors wanting an explicit emphasis on climate change), the Asia and the Pacific region pioneered a new kind of environment outlook report series, Environment and Climate Change Outlooks. Thus the UNEP office in the region added four of these reporting processes to the existing stream of assessment reports in the 2010s (Annex IV).

From the point of view of political support to the GEO process, the region includes some of the most reluctant constituents – opposing any kind of international reporting on environmental problems – next to some of the most loyal supporters of GEO. Right from *GEO-1*, Japanese institutions actively contributed to the development of the series and to making the GEO methodology available in Japan. This was done, for example, by hosting the short-lived Policy Working Group at the time of *GEO-1*; by contributing analyses to almost all editions, especially the model-based scenario analyses of the first four GEO editions; and by translating technical reports of the early GEO editions into Japanese.

None of the interviewees for this book named specific instances of GEO influencing decision-making at national levels in this region. The arrival of the GEO coincided with the period of an increasing pace of industrialization in East Asia. Most importantly, China launched a major wave of economic reforms at the end of the 1980s and 1990s, aiming at privatization and opening up that resulted in a phenomenal increase in GDP and the average standard of living among its citizens. Between 1983 and 2012, average GDP growth of 10 per cent per year lifted 850 million Chinese people from poverty (World Bank, 2017). The country faced a strategic choice regarding the balance of economic growth, social development and environmental protection. GEO and other more targeted initiatives such as the World Bank's report *Can the Environment Wait? Priorities for East Asia* (World Bank et al., 1997) essentially tried to warn about the consequences of the grow-first-clean-up-later approach.

While there is no proof that GEO helped to shape the Chinese environmental reporting trajectory, there have been notable interactions demonstrating a keen interest by the Chinese environment authorities in GEO's global reach. First, after having criticized *GEO-1* for not having used China's own data and relying on globally harmonized data sets instead, the Chinese government promptly offered to host the planning meeting for the next GEO in Beijing (UNEP, 1997d).

Second, having received the draft *GEO-3* report for review, the Chinese government requested a bilateral meeting with the GEO Team at UNEP Headquarters. The Chinese representatives expressed major concern about Beijing's poor air quality being covered in the draft *GEO-3* and requested this be removed. While not explicitly mentioned during the meeting, this was around the time (mid-2001) that the city was selected to host the 2008 Olympics and a likely motivation for the appeal. While the poor air quality assessment remained in the report, information was added on the serious efforts underway to reduce the problem (UNEP, 2002e, pp. 212, 221, 222 and 251). Thus, while the Chinese government realized that the GEO report was a conduit that could alert a broad audience to Beijing's poor air quality, it also recognized it as a reliable channel to show that action was being taken.

Further evidence that the Chinese government considers a potentially broad outreach and wider utility for GEO reports is provided by the fact that it has supported the translation into Chinese of every global GEO report to date. As a result, Chinese and English are the only two official United Nations languages in which all global GEOs are available. In 2011, the China Council for International Cooperation on Environment and Development ran a feasibility study for a national series of comprehensive outlooks modelled after GEO. This idea still exists, but its potential implementation remains complex in the Chinese governance culture.

To conclude, a few trends of regional dynamics stand out concerning GEO's influence. Like in Africa, countries and subregions in Asia and the Pacific with existing structures for delivering information for environment policy typically joined the GEO process quickly. For example, they saw collaborating centres established early on. Australia was a notable exception. China became and remained involved throughout, in its own way. While South Asia was open to adopting the GEO approach, the Pacific Islands fully embraced the GEO and other global environmental assessment processes. Likely, this has been driven by the necessity to remind the rest of the global community that their very existence is at stake because of climate change.

## 10.4 GEO in Europe: getting noticed in a crowded place

> In the European Union, we do not need UNEP to do this; we are doing it (David Stanners - formerly of the European Environment Agency - interview).

The formation of GEO in the 1990s took advantage of experience gathered in the environment field in Europe and elsewhere during the 1970s and 1980s (United Nations, 2017). Early on, Europe's official statistical services were remarkably active in comprehensive environment reporting. For example, comprehensive national statistical compendiums on the environment have been prepared since the late 1970s by the statistical services of Finland, the Netherlands and Poland. The Soviet Union had been monitoring the environment and issuing reports since the 1960s, but they were for service use only and not publicly accessible (Mnatsakanian, 1992).

In addition, Europe of the 1980s featured well-organized reporting and capacity building for a range of multilateral environmental agreements, including those relating to long-range transboundary air pollution and the Baltic and North Seas and the Rhine (UNEP, 1999g). Environmental information was a valuable nexus for East-West collaboration across political systems in the statistical realm, through multilateral agreements and the International Institute for Applied Systems Analysis as a joint knowledge institute (Sliggers and Kakebeeke, 2004).

Several environmental assessment and reporting initiatives were developing in Europe parallel to the preparations for the first GEO. The United Nations Economic Commission for Europe (UNECE) launched the pan-European ministerial process 'Environment for Europe' in Dobříš Castle in 1991. An associated pan-European periodic SoE reporting process was launched with the Dobříš Assessment (EC Task Force for the EEA, 1994) in 1994-1995. Similar but specialized periodic reporting on human health and the environment was initiated under the auspices of WHO Europe (WHO, 1995). From 1990 to 1994, gradual steps were taken to establish the European Environment Agency (EEA), which became responsible for the European Union's (EU) SoE and outlook reporting. Interestingly, EEA's membership extends beyond EU member countries.

The first edition of the EEA State of the Environment and Outlook Report was published in 1995 (EEA, 1995a). The EEA also became entrusted with compiling periodic updates of the pan-European Dobříš Assessment until 2011. OECD and UNECE ran coordination networks on environmental information and

voluntary peer reviews on environmental policy (OECD, 2020; UNECE, 2020). In the 1990s, substantial efforts were devoted to environmental clean-up and improved environmental performance in the formerly socialist countries of the Caucasus, Central Asia and Central and Eastern Europe (OECD, 1999).

As a result, Western and Central Europe has seen no shortage of periodic, comprehensive SoE reporting. Environment ministers of EU member countries have additional environment-related assessments arriving on their desks periodically. There have been four environmental assessment processes running in parallel in Europe since the 1990s, listed here in order of increasing geographical coverage:

1. SoE reports for EEA member states, known later as State of the Environment and Outlook reports, published every four to five years (EEA, 1995a, 1999, 2005, 2010, 2015b, 2019).

2. Pan-European SoE reports for the 'Environment for Europe' ministerial process hosted by UNECE and led by the EEA, published every three to five years (EC Task Force for the EEA, 1994; EEA, 1998, 2003, 2007, 2011a).

3. UNEP's GEO reports where the treatment of the European regional component varied greatly between editions (Chapter 5).

4. Environmental Outlook reports of the OECD with worldwide coverage and extending from previous work on environment statistics and indicators. True outlooks were published in 2001, 2008 and 2012, and a precursor was published in 1999 (OECD, 1999, 2001, 2008, 2012).

Thus, since the mid-1990s, the European region has had a major supranational SoE report launched almost every year or two. Only the last decade has seen a notable consolidation in this field. Moreover, an environment minister of a European country juggles from two to four international environmental cooperation processes:

- Ministerial meetings every four years at the OECD;
- Quarterly meetings of the European Council of the EU;
- The 'Environment for Europe' process every four years hosted by the UNECE; and
- UNEP's Governing Council, now the United Nations Environment Assembly, with formal meetings every two years at UNEP headquarters.

Interviewed stakeholders confirmed that GEO had brought little additional value within the region, given the similar parallel processes running, which have been much more in-depth, continuous and coordinated than GEO with its participation only once every several years. The primary added value of GEO European exercises, aside from building capacity, was providing a geographically comprehensive picture of environmental state and trends: when and where the Eastern European, Caucasus and Central Asian countries stood outside of the EEA's reporting. This being so, GEO regional discussions have been on occasion patchy or uneven in terms of effective geographical coverage. This reflects the differences in information systems for environmental policy in Europe's multiple and overlapping country groupings (for details, see Table 11.1 in *GEO-5* (UNEP, 2012a, p. 292)). In addition, GEO regional discussions had to accommodate the exclusion and then the re-inclusion of the Central Asia subregion in Europe, as this varied from one global GEO report to the next.

The fledgling EEA was a particular case of GEO offering a European entry point into global environmental assessments. When GEO development work started, the EEA had just been legally established, but initially with severe limitations to its mandate. Global reporting, scenario work and policy assessment were off-limits. Engagement with GEO in the early days permitted the EEA to have a presence in these fields despite their lack of mandate. Gradually, the EEA developed its own style in these fields, creatively stretching its mandate by, for example, reporting on megatrends rather than scenarios.

Despite these limitations, there are aspects of GEO and its process that have made positive contributions in Europe. UNEP's capacity-building efforts and most GEO spin-offs in Europe have targeted Central[1] and Eastern Europe, the Caucasus and Central Asia (Chapter 5.3 on UNEP's regional structure and breakdown and the European section of Chapter 6.2). Arguably, in Western and Central Europe, GEO's most significant effect has been in terms of the inter-regional or global picture: illuminating the manifold connections linking environment and development worldwide. This was a useful strengthening of an emerging direction of environmental reporting predating GEO (RIVM, 1992). In this sense, GEO helped inform Europe's participation in focusing global collaboration and, subsequently, developing the Millennium Development Goals and Sustainable Development Goals.

[1] Central Europe was only the target of UNEP's and GEO's capacity building activities in the period before the countries of this subregion were gradually absorbed into the EU and, along with that, eventually became members of the EEA as well in the early 2000s.

> Ah! This is useful. You see: with *GEO-2000* conclusions, I can now point out that nitrogen overloading is more than just our national problem. (Laurens Jan Brinkhorst, Minister of the Environment of The Netherlands, later European Commission DG for Environment), upon reading through *GEO-2000* (Laurens Jan Brinkhorst, personal communication, 21 September 1999).

This strengthening of the worldwide context and hence the environment-development connection explains to a large extent why European counterparts continued to participate in the GEO process. That participation has undoubtedly been of immense value to the other regions for various formal and informal exchanges in knowledge, experience and views. European governments have been the greatest supporters of GEO throughout the years in recognizing its value to other regions of the world. A number of interviewed government officials, as well as Kok et al. (2008) and Lucas et al. (2020), confirmed that GEO and its companion products were useful for their ministries of foreign affairs in shaping development aid policies and capacity building programmes.

GEO's forward-looking analysis using a wide range of scenarios and models is another example of its relevance for the European region. Here, GEO and thematically focused assessments such as the IPCC reports were relatively advanced. At the European science-policy interface, GEO's early worldwide regionalized assessment process has drawn the most attention, in combination with its orientation to the future (Kok et al., 2008). Once GEO had been set up and created an expectation of a periodic process, it became a helpful reference point in expanding and mobilizing resources for the toolbox for regional or worldwide integrated environment assessments (Bakkes, Grosskurth, et al., 2000; Kram et al., 2012; PBL, 2007) (Chapter 5).

Often, co-funding from EU programmes was obtained – not specifically for GEO, but for analytical tools that would serve multiple assessments and outlooks. Gradually a community of practice formed The Integrated Assessment Society. This was not limited to Europe but has maintained a strong presence there (TIAS, 2020). Through contributions to new assessments, such as the International Assessment of Agricultural Knowledge, Science and Technology for Development, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and an early, GEO-style outlook on resource efficiency for the European Commission, this process reinforced itself (van den Berg et al., 2011, 2016).

However, the story of GEO's influence in Europe, landing in a mature information and reporting landscape, features at least two missed opportunities.

First, between East and West: GEO would have enabled a logical and relatively easy expansion of the pan-European reporting mechanisms to include the whole of Russia as well as Central Asia and to move from conventional SoE reporting to assessments, including outlooks and policy assessment. This could have facilitated a more robust information flow between the East and West and would have facilitated a better balanced pan-European SoE reporting. This opportunity seems to be even more relevant after the discontinuation of the UNECE-led pan-European environmental assessment reports opening the niche for GEO's contribution in the region (EEA, 2011a). Second, between North and South, GEO would be the perfect framework to conduct a policy-oriented assessment of environment and development of all countries bordering the Mediterranean Sea. Although such an assessment process could have been conducted in earlier years, such an opportunity would seem to remain valid.

## 10.5 GEO in Latin America and the Caribbean: riding the GEO wave

> In five years, we were able to build an empire (R. Norberto Fernandez interview).

The Latin America and Caribbean region greeted the arrival of GEO in the late 1990s under conditions ripe for a major influence in the region and beyond. Environmental pressures had been mounting rapidly, especially with rapid and uncontrolled urbanization in the region. Many countries of the region had an obligation to conduct SoE reports by that time but lacked the knowledge and resources to do so.

GEO has left a significant mark on the Latin America and the Caribbean region in many ways, but more significantly, the region itself has shaped GEO for the rest of the world. Even before *GEO-1* arrived, experts from the region argued for a strong capacity-building component to build on and reflect the regional perspectives (UNEP, 1997e). When the first global GEO arrived in the region and was being discussed among its primary audience – the Forum of Ministers of Environment of Latin America and the Caribbean – questions were asked that required richer regional details to be answered.

Therefore, in 2000 the 12th Forum of Ministers of Environment of Latin America and the Caribbean requested UNEP to provide leadership in the

preparation of national, local and targeted GEOs, as well as national GEO for youth reports, and to urge regional organizations and partners to share and open up environmental data to support the GEO processes at all levels (UNEP, 2000a). The regional UNEP team decided to apply the methodology open-mindedly and run GEO processes for different geographic scales and audiences to respond to this demand (Annex IV).

As R. Norberto Fernandez, a former regional coordinator of UNEP's Division of Early Warning and Assessment in Latin America and the Caribbean, stated, "because of the capacity-building efforts, we were quick to understand that we were talking about a family of products. We were producing a family of products to address a family of issues at different levels" (R. Norberto Fernandez interview). This altered the way GEO has been perceived in all other UNEP regions: different products for different audiences and geographic levels; a capacity-building process for better environmental governance responding to local demand; and a platform for stakeholders to exchange views and ideas on environmental issues.

The Latin America and the Caribbean region became a living laboratory for GEO: the idea of GEO has been tested and adapted in various contexts according to the needs of the users. The global GEO was not enough. The need to discuss regional specifics was met by commissioning regional GEOs: *Caribbean Environment Outlook* in 1999 (UNEP, 1999a) and *GEO for Latin America and the Caribbean* in 2000 (UNEP, 2000b). The younger generation's interest in GEO was met by numerous regional and national *GEO for Youth* reports. The obligation to conduct SoE reporting was met by adopting the GEO methodology and approach for a country, GEO Chile being the first launched in 2000 (CAPP, 2000) (Annex IV).

GEO for Cities reporting processes met the urgency to respond to the region's mounting urban environmental problems: the first such reports were published for the Brazilian cities of Rio de Janeiro, Goiás, and Manaus in 2002 (PNUMA, 2012). The demand for intersectoral applications of GEO also led to the development of interdisciplinary assessment frameworks, such as the GEO for Health (PNUMA and OPS/OMS, 2009). And finally, the first regional version of the GEO Data Portal was developed by the staff of the University of Costa Rica to support environmental assessment processes at various levels (Edgar Gutiérrez-Espeleta interview). The GEO experience in Latin America and the Caribbean has been thoroughly documented through methodology manuals and guidelines to facilitate the transfer of knowledge to other regions.

These initiatives that germinated from the GEO process in the Latin America and the Caribbean region eventually created an enriched model for applying the GEO approach in other regions that were beginning their environmental assessment and reporting. The exported GEO formulas have been applied with varying success in Africa, Asia and the Pacific, Central and Eastern Europe and West Asia (Chapter 6). Their elements include:

- Regional GEO reports with continental, political or administrative delimitations
- Regional GEO reports with ecosystem delimitations
- National GEO reports, one-off publications or regular ones replacing SoE reports, with the Integrated Environmental Assessments (IEAs) and GEO approach becoming a standard for environmental assessment and reporting
- City-level GEO reports
- GEO reports for specific audiences, such as youth
- GEO reports/methodology for separate sectors, such as GEO for Health
- Developing a regional environmental data repository

The UNEP office in the region was very effective in responding to the bottom-up demand in terms of methodology, tools and raising funds for these extra activities. Most importantly, it acted as a convening power in the region, facilitating a science-policy forum on environmental matters and shaping discourse on regional priorities. Many interviewees confirmed that GEO became a key topic of discussions in the Forum of Ministers of Environment of Latin America and the Caribbean. These meetings have served well at both ends: to validate and strengthen the position of ministers of environment of the region and to guide the regional strategy of UNEP. "The process was very important, and it empowered not only us, as UNEP, to understand what we should be doing, but the countries themselves to be able to go back to the cabinet tables with a stronger position" (Kaveh Zahedi interview).

GEO swept the region as a movement. Perhaps the best statement to summarize the influence on the region comes from Graciela Metternicht, a former regional coordinator of UNEP's Division of Early Warning and Assessment in Latin America and the Caribbean:

> For me, the most important role for what I could say was the product that was seen as authoritative in many governments, very much used for advocacy and the media and the non-governmental organizations in the region…through the GEO process, sometimes some networks began and were maintained after the process was over. So, like…a nexus between stakeholders. And for advocacy, whenever someone wanted to make a fact or argue that they would say, "the GEO for Latin America and the Caribbean says this or says that" (Graciela Metternicht interview).

The collaborating centre network was instrumental in achieving success in the region. Once they acquired GEO's methods and tools to the region, these institutions became the key implementation partners supporting UNEP's regional GEO undertakings by facilitating networking and knowledge brokering, providing capacity building and policy advice, and leading the preparation of GEO reports. Proof of the network's outstanding performance is that the GEO approach became a standard for SoE reporting in the region. According to Edgar Gutiérrez-Espeleta:

> A political decision was made in the region. We wanted GEO to become part of the political decisions of ministers and to have a review of the state of the environment in our region made the way it was set up by the headquarters of UNEP; meaning collaborating centres, science-based, independent (Edgar Gutiérrez-Espeleta interview).

Although regional GEO activities have lost steam since then, the GEO approach remains in use until this day as part of the requirements of various assessment assignments in SoE reporting procedures and university courses (Chapter 6.4).

Another indicator of GEO's influence is that several leaders from the collaborating centres were propelled to prominent positions in national and international levels of environmental policymaking:

- Edgar Gutiérrez-Espeleta - Minister of Environment and Energy, Costa Rica, 2014-2018 and President of UNEA-2 (2016) and UNEA-3 (2017)
- Rosario Gómez Gamarra - Deputy Minister, Energy and Mines, Peru, 2009-2011
- Manuel Pulgar-Vidal Otálora - Minister of Energy and Mines, Peru 2011-2016
- Elsa Patricia Galarza Contreras - Minister of Energy and Mines, Peru, 2016-2018

The interviewees could not point towards specific environmental policy changes at a national level as a result of the GEO influence in the region. However, it is likely that the compilation of GEO reports on different geographical scales in this region has helped to speak directly to national policy-maker audiences and policy implementing institutions. A report called *Proyecto GEO Ciudades: 10 años* outlines several such examples (PNUMA, 2012). Overall, the GEO-Cities projects have helped establish a systemic view of urban environmental problems. The process has brought together various institutions and contributed to information exchange and common action plans. The participatory nature of the process and shared ownership of the way forward have been acknowledged (PNUMA, 2012). GEO-Cities projects have strengthened the technical capacities of municipal personnel and, in many cases, also helped establish bodies with advisory, supervisory or implementation functions. Several municipalities report increasing their exposure to national and international organizations and networks. The GEO-Cities projects have served as drivers towards improving urban environmental management (PNUMA, 2012). Other effects mentioned in the report include:

- Formulation of new municipal laws with examples including air pollution control, urban ecosystems and green areas, watershed protection, wastewater treatment, environmental monitoring and waste management;
- Environmental education initiatives;
- Improvement or contribution to urban planning processes;
- Contribution to strategic planning at municipal and regional levels;
- Establishment of multi-stakeholder round tables on environmental matters; and
- Additional scientific inquiries.

The GEO-Cities initiatives have inspired outlook and assessment work in other regions, but nowhere as purposefully and systematically as in Latin America and the Caribbean. In fact, the approach of transposing, adapting and customizing environment assessments to speak to multiple audiences in the region has proven to be a successful multi-tier strategy for outreach and influence.

## 10.6 GEO in North America: acting in a region of fading interest

> I do not think that there was much direct traction within the USA of GEO. I thought that the North American aspect of GEO lacked leadership (Paul D. Raskin interview).

In contrast to Europe, the launch of the GEO initiative in the 1990s coincided with a period of fading presence of SoE reporting in North America. This is a UNEP region of only two countries, the United States of America (USA) and Canada. Interestingly, SoE reporting developed in the USA as early as the 1970s. However, by the time GEO arrived, both countries had discontinued their regular SoE reporting, the USA in 1997 and Canada in 1996 (GC/UNEP, 2008).

Even though national initiatives have lost steam, some subnational SoE and outlook activities continued, and environmental think-tanks in North America continued to produce many environmental reports. Some of them were similar to GEO in terms of global scope and ambition, including the World Resources Report published by WRI that was first launched in 1986 (WRI and IIED, 1986) and the State of the World Report by the Worldwatch Institute, which ran from 1984 to 2017 (Brown et al., 1984; Worldwatch Institute, 2017). Nevertheless, these initiatives could not be considered to replace a mandate to report regularly on the state of the environment within the national or federal jurisdiction. Interestingly, two authors of this History recall separate instances in the mid-2000s when they were invited to Canada to help rebuild national or provincial SoE and outlook capacities.

As it turns out, regional environmental reporting continued without national environmental reporting. The Commission for Environmental Cooperation (CEC), established under the North American Free Trade Agreement, has been given a supranational mandate to report on the state of the environment of the three parties to the trade agreement: Canada, the USA and Mexico. The text of the agreement does not specify how often these should be published (CEC, 2020). So far, the CEC has published three: two SoEs and one study following the GEO approach (CEC, 2001, 2008, 2010).

The North American Free Trade Agreement does not have provisions to harmonize environmental legislation and enforcement among its parties as the EU does. Instead, the CEC works on a case-by-case basis to resolve

trade-related environmental disputes and promote environmental sustainability in the region by various means (CEC, 2020). Although the mandates of the UNEP regional office in North America and the CEC overlap to some extent, there has been relatively little collaboration between the two entities. According to the interviewees from the region, the CEC saw its role as strictly regional, limited to the three countries under the trade agreement without much interest in anything beyond that, including the GEO initiative (Jane Barr and Ashbindu Singh interviews).

Overall, little evidence has been found to prove GEO's relevance to, usefulness for and influence on the region of North America. Even though it has been relatively easy to report on environmental trends and progress in the region – same metrics, indicators, one dominant language – little has been achieved in the form of regional cooperation as a result of GEO efforts. Even North American regional consultations and launches of the global GEOs occurred separately as two events, one in Canada and one in the USA. There has been no need to apply the GEO approach on a regional, national or local scale. Apart from the United Nations headquarters in New York, other international organizations and non-governmental organizations, as well as several universities, GEO has probably had a very limited audience in the region.

Another question is how GEO may have served the global interests of the USA and Canada. On the one hand, the USA has always been an influential force in shaping the GEO through the Governing Council and UNEA, various stages of government consultation processes, and GEO advisory bodies. The USA has always supported UNEP's data infrastructure efforts and saw those as one of the main reasons for GEO. The Canadian government sponsored the Young Canadian Leaders for a Sustainable Future programme, run by the International Institute for Sustainable Development based in Winnipeg. A number of young Canadian professionals from this programme made significant contributions to GEO, particularly in support of GEO for Youth activities, during their UNEP internships. One of GEO's longstanding partners, the International Institute for Sustainable Development, took a major role from the 1990s to around 2010 in GEO capacity development worldwide (Chapters 3 and 7.4).

## 10.7 West Asia and North Africa: GEO as a professionalizing force

> I think that one of the advantages or added value of the GEO process was really this - that you build a new generation with a very good methodological approach by showing them the environmental issues in a very scientific way, in an unbiased way (Waleed Khalil Zubari interview).

West Asia and North Africa together probably rank second after Latin America and the Caribbean in terms of visibility of GEO's regional influence. Here, the arrival of GEO was embraced with similar enthusiasm and eagerness. GEO's influence remained limited to the professional domain – national and occasionally regional environmental authorities and research and educational institutions. Arabic being the dominant common language certainly helped accelerate the spread of knowledge, as Spanish did in most of Latin America and the Caribbean. Even though West Asia and North Africa belong to different regions in GEO assessments, practitioners in these locations have worked closely together for many GEO-related activities and reports. Therefore, unlike elsewhere in this book, for the discussion of perceptions and influence of GEO, North Africa and West Asia are here considered together.

The preparation of *GEO-2000* and *GEO-3* was associated with extensive capacity building in West Asia and North Africa, especially the capacity of the collaborating centres. This was particularly obvious in the case of the Centre for Environment and Development for the Arab Region and Europe in Cairo, Egypt, and the Arabian Gulf University in Manama, Bahrain. Since then, the Centre for Environment and Development became a centre of excellence for GEO-related capacity development activities supporting UNEP in North Africa and West Asia and the rest of Africa. The Arabian Gulf University adopted the GEO methodology in research and the teaching process, establishing courses including on IEA and reporting. Many master's and doctoral students used the approach in their research. Arabian Gulf University and its experts became a regional powerhouse in environmental assessment and related issues.

These two collaborating centres have been instrumental in facilitating the spread of the GEO approach. Their teams have been called upon numerous times, and continue to be, to deliver capacity-building workshops for environmental authorities in the region and to lead regional, national and local GEO processes. The third prominent centre of excellence was the Arab Center for Studies of Arid Zones and Drylands in Syria. It coordinated

the region-specific scenario policy study for West Asia in *GEO-2000* on freshwater use and availability. Arguably, this is one of the clearest and most pertinent pieces of scenario analysis ever delivered through GEO (UNEP, 1999g, p. 356).

> UNEP was providing us a lot of training workshops for doing this. We had a training workshop on data first, data collection and then DPSIR [approach and framework] and then policy analysis and then we had scenario development. All these…accelerated the whole process of learning for us. And then, we started to do this for the others, not only to train our students (Waleed Khalil Zubari interview).

Before the arrival of GEO, recently established ministries or environment agencies of some countries in the region produced progress or activity reports (Adel Farid Abdel-Kader interview). There was a lack of knowledge on how to conduct comprehensive SoE reports and outlooks that could feed into policymaking discussions. When the GEO methodology became available, the regional UNEP office received many requests for capacity-building workshops and customized GEO processes on various scales. "Do it the same way as GEO is done" (Ahmed Abdelrehim interview) was the message usually received from countries by UNEP and the collaborating centres, representing trust and recognition of quality. Many national SoE reports followed the GEO methodology and structure.

By now, most countries in West Asia and North Africa have had at least one national SoE report done according to the GEO approach. Egypt has adopted the GEO approach as a standard for annual SoE reporting (EMoE, 2021) (Chapter 6 and Annex IV). Jordan, Saudi Arabia and Syria have implemented environmental data portals following the model of the global GEO data portal (Ahmed Abdelrehim interview). In contrast, the production of GEOs at other geographical levels of scale did not take off here. The notable exception is the 2010 Environment Outlook for the Arab Region (UNEP et al., 2010). It spanned the GEO regional divide between West Asia and North Africa on the basis of a common language.

GEO had a strong bearing on the regional environment and sustainable development decision-making at the League of Arab States, particularly the Council of Arab Ministers Responsible for the Environment. GEO was considered a credible source of information on global and regional environmental issues and was used in shaping decisions to enhance and strengthen environmental work in the region. In addition, GEO reports have influenced the voice of the region's countries in international development forums such as the World Summit on Sustainable Development in 2002, Rio+20

in 2012, and reporting on the Millennium Development Goals (Adel Farid Abdel-Kader interview). Similarly, the GEO process had a bearing on the Council of Environment Ministers of the Gulf Cooperation Council.

For example, the ministers of the Gulf Cooperation Council called on member countries to prepare their national SoE reports based on the GEO approach and also called for the preparation of a regional GEO for the Gulf Cooperation Council countries (Adel Farid Abdel-Kader interview). Furthermore, the third Islamic Conference of Environment Ministers called for an Islamic Countries' Environment Outlook (Adel Farid Abdel-Kader interview). West Asia is the region where it has been possible to establish a causal chain between the global GEO down to changes in national policies through the capacity-building link. Research conducted at the Arabian Gulf University using the IEA/GEO methodology on various environmental issues in the Gulf Cooperation Council countries was, in fact, successful in getting the attention of policymakers. This included issues such as marine sand mining, mangrove ecosystems and traffic congestion in Bahrain; household pharmaceutical waste, dust phenomena, vegetation cover and desert spring camping activity in Kuwait; gravel mining and sand drift in Qatar; air quality in industrial areas and groundwater quality in agricultural areas in Saudi Arabia; and mangrove ecosystems, rangeland and overgrazing, and groundwater quality in mountain areas in Oman. Some of this research led to scientific awards (Asma Ali Abahussain interview).

The staff of the Arabian Gulf University recount the professionalizing effect of GEO in the region:

> What I have learned from GEO – not to be in conflict with policymakers, try to have evidence, try to speak with their interests in mind, not to say all the time "environment-environment," convert it to economy, convert it to health, convert it to security. These are the three main things that policymakers are interested in, and we are doing this in most of our research - trying to give the cost of environmental degradation in terms of money, health and security (Asma Ali Abahussain interview).
>
> For example, one of the things that we normally do, when we carry out an SoE report, which is our way of communicating our ideas to the decision makers in terms of environment, it used to be very negative...We just mentioned problems, we did not mention what they were doing afterwards. And when GEO came with the IEA, we simply realized that you cannot just criticize; you have to actually say what are the problems, tell them what they are doing about it, and if it is enough or not. And that was a very important scientific, unbiased approach to show the people what was going

> on, and that was the appeal of the IEA. And then you analyse their policy, and you are not condemning the officials…but you are telling them that the existing policies are not enough to really take you to the future that you want. And then you show them the scenarios…and what you can do about it. That was a very important approach to tell the decision maker what has been hidden and what is the cost of inaction (Waleed Khalil Zubari interview).

## 10.8 Conclusion

GEO evaluation reports have primarily assessed the influence of the global GEO. However, there is far more to GEO than just the global report and a global process. The dynamics behind the regional receptions – as well as the rollout of the regional, national and local GEO reports and processes – have remained largely unaccounted for and therefore somewhat underappreciated. The authors' findings can be summarized as follows:

1. Research for this book traced the wealth of assessment reports worldwide bearing the GEO brand or applying the GEO approach to a total of over 250 assessments. The majority of these are subglobal. GEO has done very well if being copied is a proper measure of success.
2. Each region has had a special customized relationship with GEO depending on regional context: advancement of environmental science and environmental policy, severity of environmental problems, level of environmental awareness, presence of competing environmental assessment initiatives, and condition of socioeconomic and political pressures. Interviews for this book provided convincing illustrations of the co-development of GEO and regional assessment processes in fruitful interaction.
3. Obviously, timing mattered. Globally, GEO emerged when the time was ripe for modern assessments on environment and development. In terms of regions, GEO came at exactly the right time for Latin America and the Caribbean and for West Asia. At a more detailed scale, the GEO methodology and brand arguably appeared at the right time for parts of Africa and parts of Asia and the Pacific.
4. Latin America and the Caribbean has served as an innovation laboratory for GEO. In responding to a bottom-up demand, practitioners in the region pioneered a multilevel pathway for GEO and devised a formula for maximizing influence and creating ownership across

different scales and among different stakeholders. Other regions have found this approach useful, and some have followed in a similar manner, with varying degrees of success.

5. In Africa, countries or subregions that were already advanced in environment assessment appear to have made most of the GEO methods. Environment assessment in the Asia and Pacific region was already advanced and took up the GEO methodology early. The region is home to some organizations that contributed early on to developing GEO. But GEO's influence here was not as region-wide as in some other regions. Of note is that this region is half the world, and disseminating a message across it is resource-intensive, if only because of the many languages involved.

6. Interestingly, interviews for this book identified language differences as a barrier for the uptake of GEO methods across sub-Saharan Africa (differences between French and English as the most common international languages, with their associated professional circuits). But the existence of two predominant, though more related languages in Latin America and the Caribbean (Spanish and Portuguese) apparently constituted little hindrance to develop a thriving and coherent programme at the scale of the region.

7. Flexibility proved to be absolutely necessary in applying a general methodology in an inspiring way. Nevertheless, the uptake of the GEO approach in the regions could not have happened without an innovative model document on the global scale that was seen as credible, relevant and, most of all, legitimate. The legitimacy of the GEO process has helped to open many doors. SoE reporting and environmental assessment processes, especially in the developing world, have received a solid foundation thanks to GEO and are now considered prerequisites of modern environmental governance and policymaking.

8. In the spirit of co-development, the most enthusiastic regional uptake of the GEO happened during its early iterations, when the collaborating centres were the driving force in the global process and the regional spin-off initiatives. As the collaborating centres moved to a much more subsidiary position and UNEP's related capacity-building programmes were de-emphasized by the end of the *GEO-4* process, regional replications of GEO also declined, along with its model of collaboration. Some of the early GEO influences persist in the regions, but much of the earlier momentum has been lost due to insufficient continuity and outreach efforts.

9. In many cases, a national GEO was the first comprehensive environment report a country ever produced, and the GEO approach emerged as an international standard. On the national level, global GEO processes and reports provided a valuable global or regional framing for local environmental problems and gradually transformed to support national policy responses, with *GEO-5* and the global edition of *GEO-6* standing out in that respect. In contrast, *GEO-6* regional work seems to have remained unconnected, from regional policy and advocacy as well as from global GEO.

Chapter

# 11

# Beyond GEO-6

## 11.1 Introduction and setting the scene

This chapter considers the future of the Global Environment Outlook (GEO) from the perspective of a new generation of assessment practitioners who will work in a different and more complex era. For one thing, their assessment practice will find itself dealing with competing alternatives, like the early and present-day GEOs but different. What could GEO mean for them in terms of inspiration and know-how? In outlook style, the chapter explores four rudimentary scenarios.

Having arrived at the start of the third decade of the 2000s with *GEO-6*, the GEO report series faces several challenges. First, it struggles with growth, perhaps too much unwarranted growth, as illustrated by the size, complexity and cost of its latest production process. Second, it struggles with governance changes.

The IPCC-ization reform during *GEO-4* dismantled the network of collaborating centres on which the whole process leaned and led to the expectation that governments have to be consulted at every turn. Increasing requirements to ensure credibility added additional review cycles to the GEO process: five review cycles for *GEO-6* (Figure 7.6.2) (IISD, 2021). Third, unexpected changes in some broader framework conditions, such as the responses to COVID-19 and the growing animosity among relevant United Nations (UN) member states, will have currently unclear consequences for continuing GEO assessment as usual. Lastly, the GEO series increasingly suffers from niche, format, and – importantly – funding uncertainties.

However, the GEO formula has proven valuable and influential in different ways during its 30-year history. GEO focuses on linkages among global and regional challenges and across themes and sectors – as well as the past, present, and future. It devotes equal effort to its content and its process, and it does not wait until the perfect assessment method has been agreed. Instead, it began and has operated ever since with an approach of learning-by-doing, which helped create an open platform for new participants and perspectives. Even if it was not perfect, it was seen and welcomed as useful, and demand was confirmed by the repeated extension of its mandate by the United Nations Environment Programme (UNEP) Governing Council and, since 2014, by the United Nations Environment Assembly (UNEA).

> I think there is still room for GEO in today's world. There is a lot of room for a GEO report; yes…the thing is to remember what is important…The process is very important. Let's talk about productivity, let's talk about equity, let's talk about resilience. How to increase the capacity of our people to actually face the problems that are going to come in the future or in the medium term? (Edgar Gutiérrez-Espeleta interview)

Over 25 years, GEO's production has become increasingly complex and cumbersome, while the Secretariat's capacity became seriously inadequate during *GEO-5* and *GEO-6* (Annandale and Turner, 2018; Rowe et al., 2014). Besides capacity constraints in Nairobi, the reduced role of regional coordinators[1] in the former Division of Early Warning and Assessment had other negative effects. Ad hoc teams of individually nominated authors and supervisory bodies have largely replaced the productive network of collaborating centres. Negotiated and government-approved summaries for policymakers have been introduced, profoundly adding to the frustration of many contributors, without guaranteeing that their findings make it into final texts negotiated by governments (IISD, 2021).

[1] Currently the regional coordinators no longer exist in the science/assessment division

An honest evaluation of GEO's current dynamic must conclude that its intellectual base has eroded due to the replacement of its collaborating centre network with more ad-hoc groups of government-nominated experts. In contrast, its compilation has become more open to the political opinions of governments. GEO's institutional memory from its first two decades has largely disappeared. Outreach efforts, always ambitious in the earlier GEOs, have shrunk and have not been adapted to today's realities. GEO's messages are hardly heard amidst the noise in an increasingly crowded assessment landscape (IISD, 2021).

A notable shift in emphasis culminated in *GEO-6*. Discussion of policy options has always been an element of GEO, even in the earliest preparations for *GEO-1*, but has become more specific and elaborate (Chapter 4.5 and references therein). Despite the policy element of GEO being one of the most contentious, as it relates to the issue of policy options versus recommendations (Chapter 5.3) and the introduction of summaries for/by policymakers (Chapters 3.5 and 7.6), the policy component has become more in demand (Kok et al., 2009) and subsequently has grown in size. *GEO-5* and *GEO-6* are good examples of this development.

A new but related development is that the latest edition of the GEO series included separate global and regional assessments for the first time. The six regional assessments were published as individual volumes, three years ahead of the global report (Chapters 5.4 and 6.2). While representing an experimental departure from established practice, this development is problematic, given GEO's core achievement of integrating global and regional perspectives on environment and development. It represents a trade-off: full regional outlooks allow more detail and context, but separating them from the global assessment takes away from the integrated perspective. In addition, due to the way the *GEO-6* process was organized, the regional assessments did not really inform the global assessments or vice-versa. A global assessment is not simply a sum of regional assessments, as there are always more complex dynamics at play.

Information technology and information ownership, taken broadly, are struggles that will persist, if not intensify, for GEO through the following decades. They range from trust in, access to and ownership of data and information to the appearance of new, multiple dissemination formats. Following in the pioneering footsteps of the global GEO Data Portal, UNEP-Live has been costly and less than a resounding success (Annandale and Turner, 2018; Rowe et al., 2014). Its successor, the World Environment Situation Room, offers a dashboard of various resources and varying quality.

Further developments in modern communications and information technology, interpreted broadly and including mobile technology, will present GEO with opportunities as well as challenges and trade-offs. As a parallel trend, growing recognition of the validity and relevance of traditional and local knowledge call for complementing scientific data with qualitative information and narratives in assessment (Mazzocchi, 2006; Obermeister, 2019). These developments will affect multiple fields, including quality and type of data and indicators, modelling, scenario analysis, style and means of collaboration and engagement, presentation, navigation and interpretation of findings, and frequency of updates.

The world, meanwhile, is moving rapidly and is heading towards particularly crucial challenges and opportunities, old as well as new. The third decade of the century inherits an array of tasks and trials. Among these are Agenda 2030 and the Sustainable Development Goals (SDG) process (UNGA, 2015). Competing narratives include the social pains of economic and energy transition; the struggles of COVID-19 and post-COVID-19 recovery; security issues; and, more generally, the re-emergence of a still globalized yet multipolar world. While China is taking an increasingly active stance vis-à-vis its stewardship responsibilities in the environment and sustainable development realms (CPC, 2021; de Boer, 2021), the risk of great power confrontation has reappeared with a vengeance.

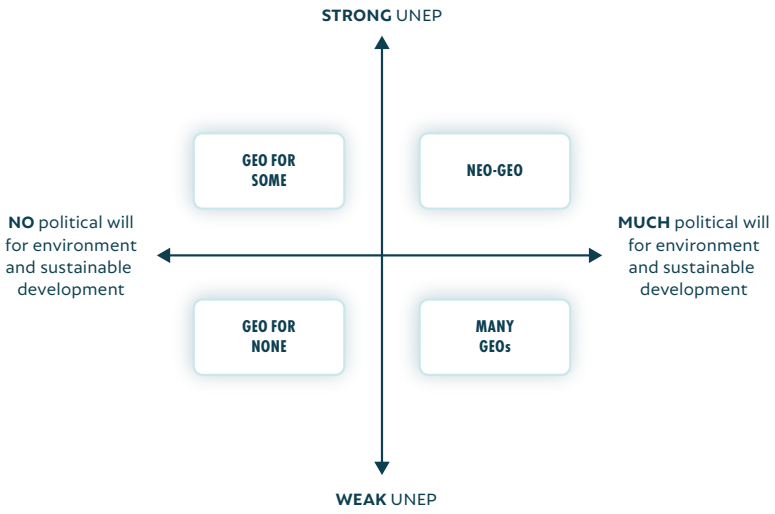
Over and above these challenges, this decade inherits an ever-increasing squeeze on natural resources and on the ability of ecosystems to absorb pollution. This inheritance is a function of unsustainable levels of per capita resource use in large parts of the world and powerful long-term trends (UNEP, 2021e). Even as the human population in global terms is projected to stabilize in the 21st century, the allure of 'modern' lifestyle is a key trend that threatens to keep pushing resource use and ecosystem degradation beyond sustainable limits. In terms of long-term trends with long-lasting impetus, two stand out. One is ongoing climate change (IPCC, 2021). The other is continued population growth in Africa, West Asia and Central Asia, and parts of South Asia and Latin America (UNDESA, 2019b), accompanied by intensifying intraregional and interregional migration (Rigaud et al., 2018).

Moreover, in this decade, any assessment programme such as GEO will operate in a landscape featuring not only fast facts and divergent perspectives but also amplified deliberate disinformation (European Commission, 2018; Gillam, 2020; Posetti et al., 2018). The latter significantly increases the challenges to environment assessment programmes to be effective. Yet, the last three GEOs have been severely handicapped in terms of outreach (Chapter 8).

## 11.2 Four scenarios of what could happen to GEO in 2020-2030

Does GEO need a total rethink? Of course it does. Absolutely. It sort of became too good for its own good. There are several very, very novel, redeeming elements of GEO that have come about in these two or three decades and wouldn't it be great to exploit those and to direct all of those good ideas, goodwill and good intentions behind those into a more modern process and product? (Anonymous interviewee). The following four scenarios were developed collectively by the authors following the methodological approach described in Module 6 of the *Integrated Environmental Assessment Training Manual* (UNEP and IISD, 2007): *GEO for Some, GEO for None, Many GEOs* and *Neo-GEO*. The scenarios are structured around different assumptions about critical uncertainties. The four scenarios develop as a narrative, consistent with the assumptions. The scenarios are not predictions but are internally consistent stories of how GEO futures might unfold. They help identify cross-cutting issues and assessment strategies that are robust across the range of defined futures.

**Figure 11.2.1. A map of future scenarios for GEO**




Against this backdrop, two critical uncertainties in the 2020s for GEO and its legacy are imagined. On the one hand, we could envision either strong or weak political will for collaborative action on environment and sustainable development. At the same time, UNEP's relevance and contribution

could be imagined as growing, shrinking or even disappearing. Of course, these two dimensions are connected. Still, persistent weaknesses of UNEP show that even under heightened public interest in the environment and sustainability, political and financial support for UNEP is not guaranteed. Thus, uncertainties about political will and UNEP's strength provide the two axes that outline four scenarios (Figure 11.2.1). Like many scenarios, these are schematic and artificial but allow one to sketch out GEO possibilities and highlight several implications.

## *GEO for Some*

Imagine there is not much political will for environment and sustainable development, but, at the same time, there is a relatively strong UNEP. The world has other priorities. Global considerations are framed in terms of national and corporate security. This world does not share. It makes no difference that UNEP issues alarmist statements: they are not heeded. Environment has a role in policy, but increasingly as a self-serving strategic asset. In this context, UNEP and especially GEO become intellectual assets and instruments for managing narrowly delineated risks and justifying self-interested actions to those with influence. Consequently, funding for UNEP and GEO is adequate, but the funds go to further mimicking thematic science assessments, like the Intergovernmental Panel on Climate Change (IPCC), but without any responsibility to serve a corresponding treaty and Conference of Parties.

> Environment ministries in most countries don't have the ability and the capacity alone to put in place the policies that are needed to protect the environment, so it's important to bring in people from other ministries... In doing GEO, UNEP might need to join forces with others...to do this (Helen Mountford interview).

> GEO is more needed than ever if you organize it well... If we are talking about a crucial, focused message of the joint ministers of environment in the world, yes,..it is very very relevant if you organize it like that... (Frits Schlingemann interview).

For GEO, the upshot is a decade of writing on demand, in addition to useful work monitoring the existing multilateral environmental agreements that lack their own assessment functions. Its periodic Summary for Policy Makers negotiations are predictable but sometimes interesting, and they become GEO's intellectual focus. However, with this focus on issues that matter for those with influence, GEO provides a fragmented picture, with-

out an integrated perspective. Eventually, by the time a new generation of global targets is on the horizon, the attention moves elsewhere, and GEO is merged with other global assessments or discontinued altogether.

## *GEO for None*

Imagine there is not much political will for environment and sustainable development and, at the same time, there is a weak UNEP. UNEP does not matter anymore. With multilateralism in retreat, governments fail to renew GEO's mandate, and GEO effectively disappears. Fake environmental information takes over the support of decision-making, based on prejudice and ignoring foresight for ecological integrity. Some surviving non-governmental organizations or their networks try to move into the niche vacated by UNEP. Within this network of non-governmental organizations, the exchange of methodological know-how and emerging methodological techniques happens via relatively simple webinars, policy briefs, and occasional academic papers or talks. The process draws its energy from the teams, often networked, that work on other assessments. It is neither top-down nor bottom-up and similar to GEO during its first decade, but with less coordination, capacity, continuity, or recognition.

Surprisingly, the GEO legacy still has a role here: as a standard in broad-based assessments that are thematically cross-cutting and integrate global and regional issues. But established support systems providing capacity development and access to data, models, reliable information and expertise have collapsed. All achievement is ad hoc and fragmented in terms of continuity and thematic perspective. Thus, it is difficult to consistently measure progress towards the environmental Sustainable Development Goals (SDGs) or any other global environmental goals and to underpin alternative policy ideas other than with anecdotal evidence.

> There is an important role to do. It has to do with the question whether we can get anybody to listen to a report or an outlook in the noisy-media-false-facts-social-Facebook kind of world we live in. I'm beginning to think that it's almost better to have cells of small activists who are blogging and Facebooking and starting memes that are factual and important rather than full reports because, at least recently, in the USA, people ignore anything published that way. They learn through their friends' networks (Allen L. Hammond interview).

## *Many GEOs*

Imagine there is a strong political will for the environment and sustainable development, but, at the same time, there is a weak UNEP. There is a strong sense of environmental innovation happening at all levels, and all fields of global society and global environmental assessments are leading the way forward. Governments and other non-state actors are taking leadership everywhere, recognizing the sharper focus and buy-in value of participatory assessment processes rooted in specific national, regional, local or thematic contexts. Voluntary but ambitious implementation of the SDGs is driven by and inspires many assessment reports, including strategic outlooks, informing priority setting, solution-oriented transition planning, judging rates of progress and exploring strategic alliances. The multitude of assessments produces a multitude of findings, not necessarily consistent among themselves or adequately covering all regions or critical themes.

The proliferation of assessments with partially overlapping scope, mandates and results causes tensions regarding timeliness and authority of statements, over-stretched analytical teams, competition for resources and eventually readers' confusion, possibly in the service of political convenience. Stakeholders can select from environment-related assessments by theme (climate, land, food…), sector (energy, agriculture, finance…), region-cum-global-context, interest group, media outlet, knowledge organization – or start their own assessment, supported by a multitude of artificial intelligence-assisted assessment platforms.

There is limited central coordination, apart from a push for an industry-wide standard for integrated environmental assessments. Many sectoral initiatives take over the role of GEO. 'Information consolidators' become important sources for governments and the media, a service provided by consulting companies combining expert knowledge with machine learning. Syntheses covering multiple assessments are compiled increasingly frequently and in competition. The science community joins the party in a big way. A limited role remains for UNEP, and GEO evolves towards an online information resource, among many others. At the bottom line, the result is a proliferation and a multiplicity of environmental information.

> Sustainable development and environment…is an absolutely accepted topic in private business. There's not a single bigger company or smaller company anymore, at least in my country…not producing sustainable development reports, not being linked with a lot of assessments of its own activity (Klaus Töpfer interview).

> Which integrated and disruptive technological and financial solutions that are socially acceptable, economically feasible and affordable, and environmentally sound are ready for the market? How do we transition in real terms to a more sustainable world aligned with the SDGs? In summary, GEO needs, once again, to think outside the box and reinvent itself (Veerle Vandeweerd interview).

## *Neo-GEO*

Imagine there is a strong political will for the environment, sustainable development and a strong and effective UNEP. The UN thrives in a world recommitted to multilateralism, and UNEP positions itself well in the UN system. This world works together. GEO continues as the existing operation led by UNEP and brings the advantages of experience and routine. Over and above this, UNEP and the GEO team succeed in making the GEO process truly transparent and modular, profiling GEO once more as the interlinked forward-looking and solution-oriented assessment for the whole breadth of environment and development. This is accepted as a much-needed anchor for a multitude of specific and sometimes rival sustainable development assessments: national, thematic, sector-oriented and so forth. This is a rare and presumably welcome achievement in the 2020s, against the seemingly ever-expanding partisan mood of distrust and post-COVID societal and economic malaise.

UNEP engages more strongly with the business sector and both governmental and non-governmental institutions that represent credible regional, thematic and methodological expertise. It achieves successful innovation, primarily by organizing pilot projects, such as citizen science and revitalizing traditional knowledge. UNEP becomes a trendsetter once again. The GEO process is reinvented with a strong mandate and collaborative network. Among other achievements, it helps to initiate a timely response to environmental emergencies, and its early warning function triggers preventive action. GEO becomes a source of inspiration for regional, national and sectoral assessments and action towards achieving the SDGs on a long-term sustainable trajectory.

> GEO is still relevant. I think it is because, yes, we are flooded with information but to make policy, you also need to interpret that information into the right line in order to put it into context, to put it into a framework. And that's what *GEO-3, 4, 5* did...GEOs are essential because (of the) three... social, economic and environmental pillars. For the SDGs, GEO could be one of the lenses through which you look at the SDGs, particularly SDG-15 (Graciela Metternicht interview).

> There is so much unreliable and fake information on the net and everywhere. I think that is a part of the free exchange and flow of information, that's the strength of the internet but don't forget also the old-fashioned way of information sharing at the same time. You have to have something with a scientific stamp on it…people need to go to one place where you can get the correct and certified information, and this is one of the things you should market. These are the facts; this is the best we know at this stage…this information is free…it is controlled, it is updated. Then it comes with a prestige (Tore J. Brevik interview).

## 11.3 Messages for the future of GEO

Viewed across these scenarios, against the background of the contents of this book and documentation from the recent *Future of GEO* project (UNEP, 2019a), some cross-cutting points emerge.

### *Streamlining the process while inviting more diversity and accommodating complexity*

To begin with, diversity and multiplicity of assessment processes and perspectives will shape the 2020s' landscape of assessments, which is very different from when GEO was born. The great variety of assessments on environment and sustainable development is apparent now, meaning that UNEP will not be publishing the only authoritative high-level overview of environment and development throughout the 2020s. In addition to the political context, continuation also needs ongoing support from the United Nations General Assembly, on UNEP's ambitions and on demands by the UNEA to reshape the GEO process (UNEP, 2019j), also considering UNEP's 50th anniversary in 2022 (Ivanova, 2021; UNEP, 2020d).

In this complex landscape of competing assessments and issue frames, emergencies and post-emergencies, one dictum of GEO will be as important as ever, namely: the process is as important as the product. Suppose GEO continues as a formalized UNEP-led process. In that case, two or three of the above scenarios imply that the process of design and participation needs to be very clear and as streamlined as possible to accommodate the inherent complexities. Preparing a GEO can never be a simple process, given its formula of global scope and regional/sectoral detail, coverage of the totality of environmental issues, and broad participation inside and

outside of the UN. But a view to the recent past and the future suggests that streamlining is possible as well as necessary. Experience from earlier stages indicates that the GEO machinery must be entrusted with a degree of self-organization. This must be understood as different than the report preparation process, which recently featured five stages of review and five authors' production meetings for *GEO-6* (IISD, 2021; UNEP, 2018b).

Multiple, different expectations of GEO emerge in the scenarios presented above. Among other things, they concern the balance between some of GEO's inputs, for example, in assessing the real-life effectiveness of policies. Other inputs to be balanced include formal science and measurement, qualitative information and narrative, illustrative cases, normative vision and common sense. To address these different expectations in the 2020s, GEO and GEO-like assessments could benefit from setting up separate workstreams dealing with formal science inputs as opposed to illustrative case stories, for example. Thus far, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is leading in terms of the inclusion of different forms of indigenous knowledge among global environmental assessments. It also demonstrates the need for carefully selected forms of indigenous knowledge-crafted processes to achieve this (Tengö et al., 2017).

Multiplicity also applies to the main narratives of global assessments in the next decade. The story of the SDGs so far has been largely positive with regard to their approval in 2015 (Chasek et al., 2018) and their embrace of progress monitoring by a variety of societal actors. Being supported by assessments beyond the global *Sustainable Development Goals Report* and offering strategic foresight provide further affirmation (UNDESA, 2019a). At the same time, there is a possibility that the policy discourse, globally and regionally, will focus on subsets of urgent or high-priority issues and override the SDG agenda.

This focus may even be catalysed by national implementation of the SDGs. Therefore, a broader scope than the SDGs alone would make GEO useful in other issue frames, as well as on longer time horizons. The SDGs – being a political compromise – are not only very complex but, in some of their substance, are also clearly insufficient and too mechanical to lead to the necessary deeper and systemic transitions. Simply reporting on the SDGs would not highlight that, so something more is needed. That 'something'– broad-based, systems-oriented assessments and outlooks, not limited to dominant discourse – can only work if the processes are shielded from political interference (Hajer et al., 2015).

One last aspect of multiplicity will remain an essential influence on GEO in the 2020s, namely whether the world will globalize further, deglobalize, or both. That aspect relates to the representation of regional, multi-scale and global perspectives at the same time, in the same assessment and the same summary for policymakers.

> The regional dimension will be of highest importance, having in mind that there is a re-nationalization of the global world, so we are not any longer on the trip to globalization…it is a matter of fact much far beyond the Trump effect (Klaus Töpfer interview).
>
> I also believe there is a need to see all of the environmental sectors together and see the interactions between them and the only product I know that is doing that is the GEO process (Anonymous interviewee).

## *A global but specific GEO*

GEO needs to continue being global and specific at the same time. It has been a defining feature of GEO since the beginning, and this feature is important in each of the presented scenarios, although it plays out differently. What made GEO so useful in the past is the integration of worldwide systemic changes and regional and sectoral realities. After all, GEO's subject matter is environment and development. The connections are in terms of measurement, challenges and opportunities, and evidence of how policy options play out in different situations. Three implications are worth highlighting.

First, those working on integrated environment assessments in the coming years – designing, commissioning, compiling, or reviewing them – would be well advised to consider that the success of GEO stemmed in large part from it being neither solely top-down nor solely bottom-up. Successful evidence-based assessments on environment and development in each of the scenarios considered would continue to build on both approaches. Therefore, their process should marry bottom-up and top-down perspectives, not separate them as the regional and global parts of the assessment in *GEO-6*, or prioritize one and not the other. The sum of regional GEO reports does not equal an effective global GEO, as was learned in the process of *GEO-6*, in particular not for the influential outlook component.

Second, the importance of being global and specific at the same time is another reminder that in the future, it will be essential for GEO to reconstruct a network of collaborating centres with clearly defined roles in the assessment as UNEP's regional and sectoral 'antennae' among other

things. This is even more important in a world of growing polarization and divergent development pathways.

Third, in addition to establishing and re-engaging a network of collaborating centres, the four scenarios reflect a need for a worldwide entity to continue encouraging best-practice state of the environment and outlook reporting around the world and fostering a global and regional practitioner community. The GEO unit at UNEP and its regional representatives used to play that role and responded proactively and successfully to requests for capacity building, fundraising, and assistance in conducting state of the environment reports using the GEO approach. The peak of this activity probably was in the mid-2000s, judging by the UNEP/GC report on the state of the environment reporting at the national level across the world (GC/UNEP, 2008) and the timeline reflecting its results in figures 6.5.1, 6.2.1 and 6.2.2. In the last decade, this function of encouraging modern environment reporting worldwide seems to have become submerged among other priorities. It remains to be seen if UNEP and its GEO team, or another entity, would resume this worldwide role.

## *The collective memory of GEO*

The collective memory of GEO needs to be retrieved, maintained and made publicly accessible, irrespective of the scenario. Even if GEO as we know it will not be continued after *GEO-6*, its history and experience of 25+ years is very instructive for new practitioners and was the main reason for writing this book. Applying lessons learned through the GEO formula would save time, effort, and costs for improving assessments of environment and sustainable development in the 2020s and beyond. The contents and approach of GEOs and all other associated assessments represent an important source for future research and environmental governance efforts. Only through good understanding of the past can we make sense of the present and the future.

Retrieving and maintaining the collective memory of GEO requires effort. Research for this book traced hundreds of GEO reports for individual regions, islands, countries and cities, as well as dozens of preparatory, technical meeting, evaluation and spin-off reports. GEO is a public good, but we five authors were struck by the deplorable state, or non-existence, of UNEP's online and paper archives on it, even for the main reports. Fortunately, when the research for this book concluded, access to a core body of earlier GEO documents seemed restored via the UNEP Document Repository (UNEP, 2016j).

Specifically, the GEO collective memory is important because GEO developed through learning-by-doing. Engagement in the actual process of making GEO-style assessments has produced widespread and valuable experience and know-how of science-policy interactions. Examples include applying the DPSIR framework of Driving forces - Pressures - State - Impacts – Responses, region-specific framing, and scenario-based outlooks. Documentation of the problematic replacement of the GEO Data Portal by UNEP-Live, and eventually the World Environment Situation Room, should be useful while UNEP navigates the challenges, opportunities and trade-offs of new information technologies and data ownership in the next decade. GEO has witnessed three attempts to reinvent its environmental data strategy. Each of them scrapped previous efforts, starting from scratch in an attempt to catch up with political discourse, social media and communication technology realities, without much reflection on lessons learned from the previous iteration.

The capacity to conduct environment assessments can be transient and fragile, like memory. As much as GEO contributed at one time or another to the capacity of its partners and readers to generate and use information and knowledge arising from integrated environment assessments, that capacity can quickly disappear. This can happen not only in developing countries or in countries of turmoil but even in countries with strong public administration and a solid environmental track record. Rebuilding lost capacity to conduct an integrated environment assessment can be frustrating and costly. The restoration is even more complex and more expensive if our understanding of how environmental assessment and reporting is done is not curated in some systematic way. Importance combined with fragility is illustrated by the following two quotes.

> [...to strengthen the role of UNEP] promote a strong science-policy interface, building on existing international instruments, assessments, panels and information networks, including the Global Environment Outlook, as one of the processes aimed at bringing together information and assessment to support informed decision-making (UNGA, 2012 paragraph 88 (d)).

> These processes run on goodwill. A couple of thousand dollars to attend a meeting or some sort of nominal remuneration, that's not what's driving the intellectual power that is going to get GEO to be a good piece of work. It is the goodwill of institutions, the goodwill of collaborating centres, the goodwill of researchers who feel that it is a public service (Anonymous interviewee).

## *GEO support systems*

What will happen to the support systems required to produce worldwide integrated assessments constitutes an important open question for the current decade? How this question is answered will affect how assessment work is conducted and how effective the assessments will be under all scenarios. For GEO, this question has extra weight given the changes in later GEO reports; the prospect of increased multiplicity in terms of assessments, actors, narratives and scale; and a fading memory. For example, an open-access data facility for comparable and trustworthy data, whether managed through UNEP or another body, is essential for the world's environment-related assessments. One of the GEO Data Portal lessons, notwithstanding its relative success, is that consistent data provision for global assessments is never easy and requires staffing and resources beyond what UNEP alone has been able or willing to provide. Services provided by any data repository take many years and multiple qualified partners to establish, and regular maintenance and updates of the contents are required. This is true even in the age of crowd-sourcing data and the availability of data mining, text analysis, machine learning and other quasi-automated analytic methods that need to be hosted, curated, maintained and funded.

> ...because it is something that you can reference, something that you can cite, that is built on credible science, it's something that involves wide stakeholder participation, I think GEO will for a long time be relevant (Clever Mafuta interview).
>
> I think it's important that experts are giving voice with real data, and it's not just like social media running the show (Jane Barr interview).

Among the important support systems for GEO-like assessments are potentially transient systems, and their continuation cannot be taken for granted. One major example is the network of GEO partner institutes, providing GEO's regional roots and continuity of experience. Continuity of the network between global editions became a considerable problem in later GEOs. But even within seemingly continuously involved collaborating centres of *GEO-1* to *GEO-4*, maintaining a pilot-flame relationship with GEO in between editions was often problematic, amid all other activities. The IPCC has successfully addressed similar problems through inviting its key contributing organizations to set up the *Integrated Assessment Modelling Consortium* (IAMC, 2021). It keeps the network alive, motivated and developing across global reporting cycles. Especially in a scenario featuring a strong UNEP, the organization of future GEOs could conceivably benefit from a similar structure.

Equally important is the related question of how GEO will motivate its many voluntary contributors in view of government representatives rewriting and summarizing their work. In addition, the prospect of years of COVID 19-inspired restrictions on in-person meetings and other interactions among contributors across the globe is already significant and seems potentially lasting. Together, these developments may take away the critical, personal, inspiring reward for their unpaid work, primarily global in-person networking. In other words, these developments invite questions about the actual motivation, hindrances and disincentives for contributors to join GEO and other global environmental assessment processes under new circumstances.

These systems also include smaller but essential components that are likely to remain important for future assessments. One example is a system of consistent definitions of the world's regions and catchment areas. These enable GEO to clearly and straightforwardly compare scenarios and alternative information sources, bridging biophysical reality and UN political rules for mapping and geographical designations. Another small but crucial supporting component is the light-footed coordination among worldwide assessments during *GEO-4* (Box 3.5.2). As suggested by interviewees, such coordination[2] would be advantageous in the crowded assessment and reporting landscape of the 2020s and beyond.

Even in the absence of GEO as we know it, the lessons from its past 25+ years will have practical value. In addition, each scenario offers the possibility of complementing the traditional GEO with new technology for engagement, outreach, technical updates and presence between global editions. This seems a necessity and an opportunity for GEO to have a viable future.

## *Financing GEO*

GEO's financing and sponsorship structure is especially ripe for further revision if GEO is to be continued and effective. This is obvious when viewed across the scenarios and the history described in this book. Across the scenarios, with their different futures for GEO, its resources vary between extremes. GEO's financing has been an ongoing problem throughout most of its history. Notwithstanding funding changes as described in Chapter 7.9, the problem with GEO's financing model seems to be growing. Insufficient

[2] This was probably considered by UNEP in 2018 when setting up the Ad hoc Global Assessments Dialogue.

funds, for example, were likely a primary reason why the dissemination and outreach of GEO-6 never reached their full potential.

The scenarios suggest an additional issue is to be reckoned with in the future. For a very significant proportion of its budget, GEO was sponsored through funding or in-kind contributions by an evolving assortment of governments. The centre of gravity of the sponsoring has always been in Europe. In return for their support, the sponsoring governments have, for the most part, asked for quality, not influence on GEO's contents. But such a hands-off attitude from sponsoring governments cannot be taken for granted in the 2020s, in the context of contemporary global shifts and our scenarios. With this in mind, further revision of GEO's funding model should also consider its effect on GEO's continued legitimacy as seen by all its constituents, key stakeholders and audiences.

## *Revision of GEO mandate*

With the benefit of 30 years of GEO experience, including the design period before *GEO-1*, it makes sense to consolidate and prepare for a complex and turbulent period ahead. Conceivably, UNEP's 50th anniversary in 2022 would provide a significant moment to do so. This is the logical opportunity to consolidate and modernize UNEP's successive mandates to produce GEO editions and apply the result to the GEO series, starting with the 2020s. The UNEA-2 mandate for *GEO-6* was already formulated in plurals, as assessments, anticipating more than the next edition (UNEP, 2016g). A mandate revision was apparently aimed for by UNEA-4, too, in its resolution on the reform of GEO (UNEP, 2019j).

The Future of GEO process (UNEP, 2019a) may propose a logic of stepwise reconsideration of GEO's function, governance, process design and methods, format and finance (IISD, 2021). Moreover, the history described in this book suggests that a mandate revision is an opportunity to ensure that the respected aspects of the assessment, including an outlook, remain essential and defining components of GEO. A key question to be explicitly addressed is whether GEO is meant to be independent – an assessment by UNEP – or is an intergovernmental report. If the latter, what intergovernmental process is it meant to inform?

Statements of clearer expectations, if not a new mandate itself, could guide important operational decisions such as the re-establishment of a collaborating centres network or a reconsideration of key audiences and associated formats of outreach. Whether or not UNEP can commission, or

help other bodies to commission on its behalf, original research is another question worthy of re-evaluation. Commissioning research into suitable methodologies for environment assessments has not been part of GEO operations lately, probably as a matter of habit and by copying the constraints of IPCC, because there is no formal rule against it for GEO. Should original research – that is, research into methodologies suitable for environment assessments – again be re-considered for GEO, this may open new grounds and new methodological approaches to contribute more substantive, original, and relevant results related to policy and scenario analysis. UNEP is arguably one of the few organizations that can commission studies of global scope in these fields and has done that in the past.

## 11.4 Conclusion

The motivation for writing this History arose from a shared sense among the five authors that GEO, the most ambitious global environmental information and awareness-raising initiative to date, is at a crossroads. In reality, GEO finds itself going through an identity crisis. The global environment assessment landscape has become dense and overcrowded. As the relative importance of its flagship report has appeared to fade, GEO began to emulate and adopt some of the elements of other global environment assessments that were perceived to be effective and significant. However, it was also a common perception that with the wholesale switch to a new operating model, the experience and the memory of the 30 years of GEO was eroding quickly, including many successes and achievements that would have been worth preserving. The UNEA-4 resolution on the review and reform of the GEO process (UNEP, 2019j) confirmed the diagnosis. The subsequent *Future of GEO* process that began in 2019 (UNEP, 2019a) only just reached a resolution as this History went to press (UNEP, 2022b) (Annex I)

Among the scenarios constructed for the future of GEO by the authors of this History, there is only one (*Neo-GEO*) that envisions an effective GEO. However, this scenario requires both a strong UNEP and a renaissance of environmental multilateralism. It rests on the assumption that GEO still has a niche in the crowded global environmental assessment landscape to report on the totality of the environment and sustainable development, but it needs to position itself anew and find a new governance formula. In all other scenarios, the future of GEO is bleak or, at best, rather compromised. GEO risks becoming a tool in the hands of the powerful, who

dictate what they want to be said, thus delegitimizing itself. GEO could fail to find its niche and become submerged in a multitude of global environment assessments and reporting initiatives from other societal actors. Or GEO as we know it could be discontinued, with some ad hoc initiatives trying to replace it but lacking resources, capacity and legitimacy.

Whether GEO has a useful future in the 2020s and beyond will depend on several external driving forces and on GEO's ability to innovate and benefit from its own experience. To accomplish that, GEO would have to streamline the current process, restructure, and expand the role of partners and stakeholders in the process. It would have to highlight more local detail in policy experiences and options and continue balancing global, regional and multi-scale perspectives. It should ensure scientifically valid and well-supported findings and not fall victim to governmental review. It would have to secure stable, reliable and no-strings-attached financing, allowing it to invest in and maintain key support systems and staff. It would need to engage in capacity-building activities in the regions that still require them the most. And finally, it would need to engage in a non-stop cycle of outreach and knowledge-brokerage activities for multiple audiences in numerous formats to facilitate the uptake of GEO messages. These are certainly the major aspects, if not all that are needed, for a meaningful GEO reform to happen.

# Concluding Remarks

This book on the Global Environment Outlook (GEO) took the reader on a journey through the broad GEO landscape that has developed since the early 1990s. Our overall goal has been to document both the history of the process (or more correctly "processes," since these have been manifold) and the vast array of products that have resulted and that could continue to result from it. Collectively, these processes and products represent a significant mark on the practice of integrated environmental assessment and reporting that peaked during the first decade of the new Millennium. What we refer to as the "IPCC-ization" of the global process that began with *GEO-4*, has led to the most recent GEOs being prepared in a very different way than the earlier GEOs. These changes in GEO involved significant tradeoffs. While GEO's institutional setup and engagement with science became more aligned with the approach of other global assessments, its ability to influence the broader community of practice of integrated environmental assessment has taken a back seat. While it is not our intention to judge the GEOs' relative quality or overall merit of the methods chosen, there are lessons to be learned in terms of the different paths taken.

## The main take-away messages from this book are as follows:

**A. GEO is as much a process as it is a set of reports.** All current respected global assessments on environment and sustainable development now usefully adhere to this, whereas GEO invented it. The GEO way of doing a global assessment - process and product - has constantly undergone evolution but, in retrospect, GEO's essential formula has been remarkably consistent:

1. Covering a broad spectrum of issues, including socio-economic aspects, GEO looks at environment and development as a whole. It identifies issues at this interface that would not emerge from thematically-focused assessments, and thus offers integrated analysis grounded in a systems view of the environment.
2. Combining regional as well as global perspectives throughout. With cross-scale perspectives also in mind, global environmental issues are framed in a regional context and vice versa.
3. Employing an assessment process that is both collaborative and participatory through a dynamically evolving network of participating individuals and institutions.
4. Using an approach designed to be science-based and policy-relevant, with a process and conceptual framework that balance consistency with flexibility.
5. Incorporating three time dimensions to enable learning from the past, understanding the present and looking into the future.
6. Including an assessment of policies, without being "policy-prescriptive."
7. "Learning-by-doing," in which there is always an element of experimentation and capacity building. Such an approach is needed even more in today's constantly changing landscape of science, policy and socio-economic issues and crises as related to environment and sustainable development.

**B. The Global Environment Outlook has been a major success in terms of emulation and influence**. GEO is perhaps best known for its signature global reports on the state and trends of the global environment. These, however, are only the tip of the iceberg. From establishing a globally coordinated but regionally engaged process, GEO became an assessment *system*: its methods, practices and brand have been adopted at other

geographic levels worldwide. In terms of richness of processes and reports, its most prolific period stretched from the late 1990s to the early 2010s. And if being mimicked is an indicator of impact, *GEO has a superb record*. Research for this book identified over 250 'GEOs' and GEO-inspired assessment initiatives linked directly or indirectly to the global process. These assessments aimed at establishing a firm factual basis *plus* enhancing local and national environment-related policies *plus* strengthening foresight in policy-making. This treasure trove of GEOs and GEO-inspired reports is thoroughly documented in Annex IV of this book.

**C. GEO has achieved a diverse set of outcomes, influences and impacts.** In broad terms, this book has identified three interconnected types of influences from the GEO process:

- The GEO model has been adopted in many instances and often with great autonomy, and has been a trailblazer for other high-profile assessments that considered the environment in a wide systemic framework.
- A contribution to enhanced capacity for conducting integrated environmental assessment (IEA) and for related policymaking. Although characterized by discontinuities, a community of practice in IEA was effectively fostered by UNEP from the late 1990s until the switch to the IPCC model after *GEO-4*.
- A strengthening of the treatment of linkages between environment, development and systems thinking in higher education, through process and content uptake by academia and their inclusion in university curricula. This is a spin-off impact, not a planned one, though with significant future potential.

Exploring influence of the global GEOs in particular (through their evaluation reports, among other things), the authors identified the following modalities:

- awareness raising (through mass media as well as scientific journals);
- agenda setting at global, regional, national and institutional levels;
- political and policy discourse (revealing alternative policy opportunities);
- proposal of potential solutions before they gained traction or became popular with a broad segment of the world's population, such as shifting to a lower-meat diet;

- consensus building (reducing the risks of political decision-making and action); and
- guidance for global compacts and resolutions (the SDGs, Rio+20).

**D. Over its nearly 30 years of existence, GEO has seen important changes in information needs and policy context.** Most importantly, the focus on environment assessment has shifted from issue framing and agenda setting to options for action. While policy options and an estimate of their potential effects were included as early as the very first GEO, a structured overview of local policy initiatives and how they played out was one key innovation of *GEO-6*.

**E. Given the risks and uncertainties in environmental and sustainability challenges, assessments must have the ability to learn and evolve. Learning requires remembering, and little memory seems to be built into the current system of GEO.** In addition, the remaining memory of the experiences with earlier GEOs is fading fast. The lack of institutional memory has been exacerbated by the inevitable turnover of UNEP staff as well as the same at many contributing institutions. While it was somewhat of an incidental benefit, the importance of creating and maintaining IEA capacity was recognized and built into the network of collaborating centres, and in all likelihood would have continued to work well over time. UNEP's current lack of documentation on GEO's ongoing evolution, including its methods, outputs and achievements, is regrettable, although there are recent signs of improvement in this area, with an increasing number of past GEO documents being added to the 'wedocs' website. After all, GEO and other UNEP-managed systems are meant to underpin processes to address changes at a planetary scale, and an ability to learn from what was previously done remains critical. This process weakness seems difficult to justify *vis-à-vis* donors, participants and indeed UNEP's main clients and constituents, governments themselves. Moreover, the lack of transparency, openness and loss of institutional memory could prove to be a large handicap in securing stable financing for future GEOs.

**F. Among all the changes to GEO over the years, one in particular remains controversial**. Nicknamed the "IPCC-ization" of GEO, the change occurred during GEO-4 and altered the process in three ways: the introduction of a global consultation at the beginning of each GEO cycle; a new process for the nomination and selection of experts to participate in GEO; and a nego-

tiated summary for policy makers. The first of these is non-controversial, as the global consultation formalizes government involvement. But with the "IPCC-ization," the wide network of collaborating centres that had in large part prepared earlier GEOs under the guidance and coordination of the UNEP Secretariat was sidelined and all but disappeared. Instead, a new procedure was developed whereby governments and other stakeholders nominate individual experts, who are then selected to undertake various roles in the process. Also, from *GEO-4* onward, the summary for policy makers became subject to line-by-line negotiation and approval *by* policy-makers.

Views differ on the negotiated summary for policy makers: on the one hand, this new approach creates a specific moment to acknowledge the strength of evidence underlying GEO statements and potentially greater environmental consensus at a global level. It also gives governments a more active role and ownership of key messages. On the other hand, the negotiation of summaries for policy makers is seen as a potentially misplaced ritual that only serves to remove elements that are considered politically sensitive, but not increase policy relevance. In this view, it carries the risk of sanitizing GEO of findings that, while well supported from the scientific perspective, may be seen as "inconvenient truths" for others.

**G. The future of GEO is reflected on in this book.** The principal question is, will GEO or more generally, comprehensive global environmental assessment, still have a useful role and be worth all of the effort involved? While the Future of GEO process and UNEA-5's resolution on GEO has given its answer, more detailed design work on GEO is just about to start that will influence the way we think about the environment at a critical moment in human history.

It is clear that due to the increasingly complex and interconnected environmental scene, thematic assessments alone will not suffice. In addition to assessments focused on climate change and energy, biodiversity and ecosystems, the circular economy or water, there is a place and an urgent need for drawing these perspectives together, as some of the most significant issues, problems and solutions may emerge at their interface.

For a redesigned GEO to become effective in the complex assessment landscape of the 2020s, some successful techniques from GEO's history could be reactivated. These could include, for example, GEO serving as a "chapeau" for knowledge gained from more focused thematic assessments; a revival of the light-footed coordination among various global

assessments that functioned well in the mid-2000s; re-establishment of a flexible but sustainable network of collaborating institutions that would enable GEO to maintain awareness of regional issues in environment and development; as well as bringing knowledge gaps to the attention of the research community and potential funders. In addition, information technology would allow for much greater outreach than when GEO began in the 1990s. These are all potential starting points for redesigning GEO in the 2020s.

**H. The practical, productive lessons from nearly 30 years of the Global Environment Outlook are particularly useful in light of the UNEA decision to continue GEO and the related intention to put it on a more stable institutional and financial footing.** The real issue is not GEO's future, but ultimately, the sustainability of our planet. In this sense alone, the authors believe that an ongoing process for integrated assessment of the environment remains vital. Thirty years after the development of GEO began, and twenty-five years after the first edition was published, there is no shortage of literature on how to do a global (or other geographic level) environment outlook. But the authors find the story of the Global Environment Outlook and its approach particularly appealing and instructive, as well as encouraging, for similar efforts that may be undertaken now and in the future.

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# Annex I: The Evolution of UNEP Mandates for the Global Environment Outlook

Having set the Global Environment Outlook (GEO) process in motion in 1995 and received the first GEO report in 1997, the governing body of the United Nations Environment Programme (UNEP) has taken a keen interest in GEO ever since. Whether it has been to acknowledge process outcomes, provide the mandate for the next report, or give up-front guidance on how it would like GEO to evolve, the governing body has repeatedly included GEO in its decisions over the years.

By voicing new expectations and actions for both processes and products, the decisions have been a significant driving force for the evolution of successive GEOs. While the new directives articulated in the decisions may appear to have come out of the blue, many of them originated from experiences gained during GEO and other ongoing assessment processes as potential ways to strengthen future GEO activities and outcomes. These new ideas were then included in the draft decisions prepared by the UNEP Secretariat, in consultation with the Committee of Permanent Representatives in Nairobi, and subsequently considered and negotiated by member states in their decision-making process.

A brief analysis of these decisions provides insight into, and an explanation for, some of the changes that GEO has undergone since its first edition. The paragraphs below summarize substantive points, focusing on the new directives agreed by member states.

The first GEO received a favourable reaction when it was launched at **UNEP's Governing Council (GC-)19** in early 1997. The GC decision 19/3 noted "with appreciation the timely production of the new, comprehensive report on the state of the world environment, Global Environment Outlook-1, ...as well as the participatory assessment process (known as the Global Environment Outlook process) which has been established to support United Nations Environment Programme assessment activities, and

its components (the scientific working groups, network of collaborating centres, regional and United Nations-wide consultative mechanisms)" (GC/UNEP, 1997 Decision 19/3, paragraph 1).

In paragraph 3 of the same decision (19/3), it also approved "the continuation of the Global Environment Outlook process and the production of the biennial Global Environment Outlook reports, following the guidelines set out in Decision 18/27 C, taking into consideration the recommendations pertaining to future Global Environment Outlook reports that have emerged from the Global Environment Outlook process and subject to the allocation of adequate funding" (GC/UNEP, 1997 Decision 19/3, paragraph 3).

Thus, Decision 19/3 not only recognized and endorsed the GEO process that had been established, but also renewed UNEP's mandate to produce the GEO report and confirmed an initial periodicity of two years. At the same time, it left the door open for future modifications based on lessons learned and acknowledged the need for sufficient funding.

Decision 19/3 also stressed the importance of working together with other UN entities on future GEOs, as well as holding regular consultations with governments on the GEO framework. On another issue that reappeared many times in subsequent decisions and became a virtual leitmotif in the global process, the decision urged "major report producers to collaborate and use a common data and knowledge base, comprising indicators, models, scenarios and expert systems, in order to avoid duplication, save cost and ensure that global reports are mutually supportive" (GC/UNEP, 1997 Decision 19/3, paragraph 6)

Two years later, having expressed appreciation of the broad participatory approach undertaken to prepare the second GEO report, the **GC-20** Decision 20/1 of February 1999 requested UNEP's Executive Director (ED) to produce "a third Global Environment Outlook in the form of a "30 Years After Stockholm" report, to be published in 2002" (GC/UNEP, 1999 Decision 20/1, paragraph 4). Given the explicit request for *GEO-3* to look thirty years backward to the Stockholm Conference of 1972, there would also be a rationale to gaze thirty years into the future with its Outlook chapter. In the same decision, GC-20 requested, for its twenty-first session in 2001, a "user profile and qualitative analysis of the actual use of the first and second Global Environment Outlook reports and the Global Environment Outlook process, together with a proposal for an optimal frequency and production schedule for future Global Environment Outlook and related reports" (GC/UNEP, 1999 Decision 20/1, paragraph 3).

The **Seventh Special Session/Global Ministerial Environment Forum (GMEF) of the GC** held in February 2002 considered UNEP's contribution to the World Summit on Sustainable Development that would follow in June. The GC noted that GEO-3 would "mark a major UNEP contribution... by analyzing the changes in the environment since the 1972 Stockholm Conference" (GC/UNEP, 2002 paragraph 89). The Appendix containing the accompanying Statement of the President of the GC to the World Summit on Sustainable Development reiterated this point but, more significantly for future GEOs, voiced "a common view that the scientific basis of decision-making in global environmental issues should be further strengthened" (GC/UNEP, 2002 Appendix, paragraph 10). Strengthening the scientific base of UNEP became a preoccupation and recurring theme of both the Secretariat and the GC in the following sessions and had significant spin-offs for the GEO process.[1]

**UNEP's GC-22**, held in February 2003, commended the ED "on the production of the third Global Environment Outlook report...and its publication in May 2002, prior to the World Summit on Sustainable Development" (GC/UNEP, 2003b Decision 22/1, part I, preambular paragraph). In terms of the future of the process, it introduced some significant new elements. The ED was requested "to continue keeping under review the world environmental situation, and providing early warning on emerging environmental issues of wide international significance..." (GC/UNEP, 2003b Decision 22/1, Part B, paragraph 1). It specified two approaches: "Preparing the comprehensive Global Environment Outlook report series, following the full participatory and consultative Global Environment Outlook approach, every five years, with the next report for 2007"; and, "Producing annual global environment outlook statements on the environment...highlighting significant environmental events and achievements during the year and raising awareness of emerging issues from scientific research and other sources"(GC/UNEP, 2003b Decision 22/1 part B, paragraph 1a and 1b). This annual statement was the beginning of the *GEO Year Book* series, envisaged as a product that would keep the name of GEO alive during the five-year intervals. Its name changed to the '*UNEP Year Book*' in 2008 and evolved into the '*Frontiers*' report from 2016.

But Decision 22/1 also included another request that was to have a significant impact on the future series of reports: UNEP should also support "sub-global integrated environmental assessment processes, including the

[1] An Intergovernmental Consultation on Strengthening the Scientific Base of UNEP, which took place in January 2004, made many recommendations for how this could be done for future GEOs (IISD, 2004).

production of regional, sub-regional and national environment outlook reports, in partnership with relevant authorities and institutions" (GC/UNEP, 2003b Decision 22/1 part B paragraph 1c). This green light to take the GEO process to the regional, sub-regional and national levels reflected GEO's success at the global level and led to dozens of reporting processes and products at these sub-global geographic levels.[2] However, it would also have consequences for the global GEO process by downplaying regional aspects within some of those reports.

As well, Decision 22/1 reiterated the need to cooperate "with Governments and relevant organizations to develop up-to-date and harmonized integrated databases and indicators that provide the basis for early warning, monitoring and assessment" (GC/UNEP, 2003b Decision 22/1, part B, paragraph 1f). Finally, it called for the promotion of "networking with relevant institutions to enhance the exchange and dissemination of environmental data and information, including through the use of information and communication technologies" (GC/UNEP, 2003b Decision 22/1, part B, paragraph 1g).

In February 2005, before work began on *GEO-4*, a significant new component arose in the global GEO process. A *Global Intergovernmental and Multi-stakeholder Consultation on GEO-4* was held in the two days before **GC-23,** with the outcomes noted in one of the preambular paragraphs of Decision 23/6 (GC/UNEP, 2005). The *Statement on the scope and process for GEO-4* that resulted from the consultation was very detailed and included no less than 34 key questions that *GEO-4* should answer (UNEP, 2005f)! So it was no longer up to the UNEP Secretariat and GEO partners to determine what the next GEO should examine. The governments and other stakeholders made their expectations crystal clear. The Statement also voiced participants' expectation of a follow-up global consultation in 2007 and made specific process recommendations, including ways to ensure and use the best scientific knowledge and expertise for *GEO-4*. These outcomes undoubtedly prompted many of the changes made to the GEO process from *GEO-4* to strengthen the rigour and scientific credibility of its reports.

The increased involvement of governments in the GEO process became more evident at **UNEP's GC-24** held in February 2007. In Decision 24/2 on the *World environmental situation*, Governments and experts were called

[2] Actually, quite a number of sub-global assessment processes had already been undertaken prior to 2003 (Annex IV). For example, the first *Africa Environment Outlook* was completed in 2002, and three GEO Small Island Developing States reports had been published in 1999. At national level, Latin American countries had forged ahead and completed reports for, amongst others, Barbados, Brazil, Colombia, Costa Rica, Cuba, Chile, Mexico, Panama and Peru.

on "to contribute to the finalization of the fourth Global Environment Outlook report…by, among other things, reviewing the summary for decision makers in 2007, participating in the second global intergovernmental and multi-stakeholder consultation in September 2007 and supporting outreach activities relating to the fourth Global Environment Outlook report" (GC/UNEP, 2007 Decision 24/2, paragraph 6). Together, the directives for *GEO-4* resulting from GCs 23 and 24 brought about a sea change in the GEO. This more direct role of governments in GEO, from start to finish, underlined their desire and the need to increase the relevancy of both the process and the product.

Decision 24/2 also requested the ED to present the findings of the fourth GEO report to the GC at its tenth special session to "facilitate consideration of the findings and their potential implications, for example for the strategic direction of the programme of work of the United Nations Environment Programme and for the performance of the functions of the United Nations Environment Programme in the United Nations system and in the provision of services to Member States of the United Nations" (GC/UNEP, 2007 Decision 24/2, paragraph 7). This was not the first time, nor would it be the last, that governments urged the ED to take GEO findings into account in developing and implementing management actions and programmes.[3] In making this request, it is clear that governments expected the global GEO reports to also serve as signposts setting priorities and guiding the allocation of resources for UNEP's programme itself.

Having reiterated the need for cooperation on data and indicators and encouraged the use of communication technologies in several previous sessions, Decision 25/2 of **UNEP's GC-25/GMEF** of February 2009 requested the ED "to make scientific data, meta-data and standards from assessments available in an open-access electronic format so that future assessments can be based on past work and can be useful as a baseline for modeling and predictive analysis" (GC/UNEP, 2009c Decision 25/2, part II, paragraph 5). But the GC's vision went far beyond this by also requesting the ED "to elaborate further on the requirements for a migration to targeted assessments on thematic priority areas supported by a UNEP-Live enabling framework" (GC/UNEP, 2009c Decision 25/2, part III, paragraph 14).[4] Thus appeared the first hint of a GC-mandated online assessment and reporting system that could have great importance for the GEO process of the future.

[3] See, for example, Decision 19/3 of 1997 (GC/UNEP, 1997), relating to GEO-1 and Decision 20/1 of 1999 (GC/UNEP, 1999), relating to GEO-2000.

[4] This was further described as "A framework where decision makers have easy access to assessment findings, syntheses, summaries and technical briefs" (GC/UNEP, 2009c Decision 25/2, part III, paragraph 14).

Several other substantive requests appeared in the same decision. Despite having urged governments to provide additional funding for capacity building in earlier decisions (such as in GC/UNEP, 2003b Decision 22/1) and welcomed UNEP's efforts to build regional and national capacities, Decision 25/2 encouraged the ED to "include as a priority capacity building for developing countries as a component of the assessment processes" (GC/UNEP, 2009c Decision 25/2, part III, paragraph 10).

The ED was also requested to "undertake a coherent set of integrated and thematic…assessments, including a comprehensive integrated global assessment, the fifth report in the Global Environment Outlook series, GEO-5, which should also inform, as appropriate, the strategic directions of the United Nations Environment Programme" (GC/UNEP, 2009c Decision 25/2, part III, paragraph 11). This was a re-affirmation of the previous GC decision (GC/UNEP, 2007 Decision 24/2) that the results of the global GEO should feed directly into UNEP's Programme of Work and help set related priorities – but which the UNEP Secretariat still had not implemented.

A specific new focus for the fifth global GEO report emerged through the request for UNEP's ED to "strengthen the policy relevance of GEO-5 by including an analysis of appropriate policy options and their indicative costs and benefits to speed up realization of the internationally agreed goals and targets, and also to inform relevant global processes and meetings where progress towards these agreed goals and targets will be discussed " (GC/UNEP, 2009c Decision 25/2, part III, paragraph 12). While offering policy options had been part-and-parcel of previous global GEO reports, the Secretariat was now asked to analyse and cost those options and cite their potential benefits.

These paragraphs of Decision 25/2 maintained the greater involvement of governments in the GEO process while the requirement to conduct policy analysis on their behalf indicated their continuing high aspirations for the global process and report at five-year intervals. At the same time, the plan for going forward with UNEP-Live signalled that the GC understood that an underpinning and long-term system was essential to support the host of modular assessments and products they were requesting and a demand for greater transparency in this realm.

Emphasizing the value of integrated environmental assessments as "sources of information for national and international policy processes to strengthen the scientific basis of environmental management and decision-making," **UNEP's GC-26/GMEF** of February 2011 called on the ED in Decision 26/2 to "assist countries in capacity development, in line with the Bali Strategic

Plan as appropriate, through…notably the customization of global methodologies to other scales of implementation such as the national and city levels, to assist countries in building their capacity in the use of national and local data and to support countries in identifying key environmental policy issues that require scientific research" (GC/UNEP, 2011 Decision 26/2, paragraph 2b). This decision opened the door to adapting global methodologies for environmental assessment and reporting to the national and local level, reflecting multiple calls for national- and local-level GEO reports to be developed.

Part II, *Future Assessment of Environmental Change over the Period 2012-13*, included a request to finalize *GEO-5* and its summary for policymakers "in time to feed into the United Nations Conference on Sustainable Development in 2012" (GC/UNEP, 2011 Decision 26/2, paragraph 3d).

However, it was in part IV of Decision 26/2 that the future UNEP-Live system was fully elaborated. Under paragraph 11, the ED was requested to:

a "…present the pilot proof-of-concept phase of a UNEP-Live platform… to the Governing Council at its twelfth special session, in 2012;

b …mobilize partnerships and institutional and technical networks in the non-governmental and private sectors to provide technical assistance for the development of the UNEP-Live platform;

c …work with countries and relevant regional and thematic networks to agree on a set of priority environmental data and indicators to be shared within UNEP-live;

d …present a detailed set of requirements and costing of resources needed for the development of a more elaborate version of the UNEP-Live platform to the Governing Council at its twenty-seventh session, in 2013" (GC/UNEP, 2011 Decision 26/2, paragraph 11).

Thus did UNEP's governing body re-affirm its confidence in the GEO framework, process and product at the global level and offer strong support for these being replicated at national and local levels. It also mandated the development of (or at least a plan for) an underpinning, long-term system for handling data and information relevant to producing a multiplicity of integrated global and thematic assessments. It is hard to imagine a more sweeping endorsement for what by now had become known as UNEP's 'flagship product'. But what the GC may not have realized was that the financial resources to keep expanding the GEO process and panoply of products – particularly the development of a UNEP-Live system – would present an undeniable challenge for an organization working under a

new 'matrix management' approach, and where internal competition for budgetary resources was becoming fiercer with each biennial programme cycle. Despite this clear and resounding mandate, few of UNEP's divisions were willing to help row the GEO boat with the same intensity as the Division of Early Warning and Assessment, which had the main responsibility for organizing and maintaining GEO from the 1990s.

**UNEP's 27th GC/GMEF**, held in February 2013, was the first GC meeting to take place under 'universal membership' and saw its formal retitling as the 'first universal session.' It was also the first meeting after the launch of GEO-5 in 2012.

Preambular paragraphs of Decision 27/11 on the *State of the environment and contribution of the United Nations Environment Programme to meeting substantive environmental challenges* recognized the benefits of and gaps in global environment assessment processes and welcomed the publication of *GEO-5* and its summary for policymakers, several spin-off publications and processes and the progress made on the prototype proof-of-concept for UNEP-Live (UNEP, 2013d). This was recognized as "an initiative to significantly enhance the efficiency and cost-effectiveness of the future approach to keeping the world environment situation under review, including capacity-building and technology support for developing countries and countries with economies in transition to improve their data collection and assessment efforts and ensure that data collected and information generated are made available to policy makers and the public" (UNEP, 2013d Decision 27/11, preambular paragraph).

Under part I, *Assessments*, the decision made a number of process-related requests, including for the ED "to review best practices and develop a set of transparent procedures, particularly with regard to administrative processes, the selection of participants, the inclusion of diverging view points, as well as government and peer reviews to support a wide range of environmental assessments that United Nations Environment Programme conducts" (UNEP, 2013d Decision 27/11, part I, paragraph 1). It also requested that UNEP "continues to build on the capacities developed during the GEO-5 process and other thematic and integrated assessments at the national, regional and global levels" (UNEP, 2013d Decision 27/11, part I, paragraph 2).

Part II of Decision 27/11 welcomed "the enhanced policy relevance of the Global Environment Outlook as a result of its identifying policy options" (UNEP, 2013d, p. 2013 Decision 27/11, part II, paragraph 1) and invited governments to "use the findings of GEO-5…and its summary for policy makers

to facilitate informed policy decision-making at all levels" (UNEP, 2013d Decision 27/11, part II, paragraph 2). In addition, and again on a process-related note, it requested the ED, "in close collaboration with other United Nations agencies, funds and programmes, the private sector and civil society, to convene an intergovernmental and multi-stakeholder consultation as soon as practicable and before mid-2014 to determine the objectives, scope and process for the next Global Environment Outlook assessment, taking into account progress made with UNEP-Live..." (UNEP, 2013d Decision 27/11, part II, paragraph 4).

In part III of Decision 27/11, *Strengthening sustainable development*, the ED was further requested in "building on the Global Environment Outlook, to continue work at the national, regional and global levels to promote the science-policy interface through inclusive, scientifically sound, evidence-based and transparent thematic and integrated assessments, taking into consideration diverse knowledge systems, as well as access to reliable, relevant and timely data and information, and making such data and information available to UNEP-Live for access by policy makers and the public" (UNEP, 2013d Decision 27/11, part III, paragraph 1).

Finally, under part IV of Decision 27/11, *UNEP-Live*, the ED was asked to "implement the next phase of UNEP-Live during the 2014–2015 biennium as an open platform" and to "undertake and encourage capacity-building activities to ensure that developing countries and countries with economies in transition are able to work with UNEP-Live and contribute to scientifically sound evidence-based environmental assessment processes" (UNEP, 2013d Decision 27/11, Part IV, paragraphs 1 and 2). It also invited "Member States, major groups and stakeholders and United Nations agencies, funds and programmes to engage in the development of UNEP-Live and in particular the implementation of online state-of-environment reporting capabilities by increasingly sharing relevant data, information and indicators through open platforms" (UNEP, 2013d Decision 27/11, part IV, paragraph 3). In paragraph 4 "the donor community, other sources and Governments" were (again) invited to "provide funding to support the full and effective implementation of technology support and capacity-building programmes to support environmental monitoring and data and information management needs of developing countries and countries with economies in transition" (UNEP, 2013d Decision 27/11, part IV, paragraph 4).

Taken together, the 2013 decisions and directions for UNEP's assessment programme probably constitute the lengthiest and most detailed set of instructions ever handed down for the GEO process by one of UNEP's GC meetings. In line with previous directives, it mandated the continued

development of UNEP-Live and related capacity building, asking for governments' and other support, but as always without offering any real assurance that such support would actually materialize.

The first true **United Nations Environment Assembly (UNEA)** was held 23-27 June 2014. **UNEA-1**, as it was styled, included Resolution (previously Decision) 1/4 on the *Science-policy interface*. Within Resolution 1/4, and on the topic of assessments, UNEP's ED was requested, "within the programme of work and budget, to undertake the preparation of the sixth Global Environment Outlook (GEO-6), supported by UNEP Live, with the scope, objectives and procedures of GEO-6 to be defined by a transparent global intergovernmental and multi-stakeholder consultation..., resulting in a scientifically credible, peer-reviewed GEO-6 and its accompanying summary for policymakers, to be endorsed by the United Nations Environment Assembly no later than 2018" (UNEP, 2014b Resolution 1/4, paragraph 8). Perhaps the most interesting aspect to note in this part of Resolution 1/4 was the explicit confirmation of the marriage between GEO(-6) and UNEP-Live.

The ED was further requested to "consult with all United Nations Environment Programme regions regarding their priorities to be taken up in the global assessment" and to "strengthen the policy relevance of Global Environment Outlook reports by measuring the progress towards the achievement of the previously agreed global environmental goals and targets and to inform relevant global processes and meetings" (UNEP, 2014b Decision 1/4, paragraphs 9 and 11). Although this was similar to the request for *GEO-5*, it would obviously need to be refocused for *GEO-6* to include the 2030 Sustainable Development Goals agreed in 2015. And, perhaps in direct response to paragraph 9, work on the global *GEO-6* was preceded by a full set of regional *GEO-6* reports published in 2016.

Having been aware of, and agreed with, the ongoing development of UNEP-Live since 2011, UNEA now asked the ED "to prepare...a long-term plan for the development and use of UNEP Live, with particular reference to its contribution to future Global Environment Outlook reports, future assessment modalities, stakeholder engagement, institutional networking and partnership activities, content development, technology support and capacity-building, in particular for developing countries...and to present the plan to the United Nations Environment Assembly at its second session" (UNEP, 2014b decision 1/4, paragraph 13). Since most if not all of these expectations for UNEP-Live had already been articulated for earlier meetings and implementation was underway, this latest request was perhaps a bit redundant.

Finally, the ED was also requested yet again to "undertake, at the request of member States, capacity-building and technology support activities for developing countries and countries with economies in transition to improve their data collection management and assessment, including strengthening indigenous and local knowledge systems and practices" (UNEP, 2014b Decision 1/4, paragraph 14). Echoing previous GCs, governments and others were once again invited to "provide financial support…so that developing countries can engage effectively and take advantage of the benefits of platforms such as UNEP Live" (UNEP, 2014b Decision 1/4, paragraph 15).

When comparing Resolution 1/4 of 2014 with Decision 27/11 of 2013 (and even Decisions 26/2 of 2011 and 25/2 of 2009), one can sense a sort of GEO-related decision fatigue. The GC had already stated and re-stated several times what it wished to see stemming from the GEO process and products. With the go-ahead given for *GEO-6*, it may have been shifting its attention to the promised underpinning system UNEP-Live. In any case, the high tide had now passed, as would be confirmed at UNEA-2 when the shortest decision relating to the GEO process in two decades would be issued.

**UNEA-2** was held in May 2016. The 2030 Agenda for Sustainable Development took pride of place in this session, potentially providing further guidance and impetus for UNEP's flagship assessment process.

This is clear from Resolution 2/5, *Delivering on the 2030 Agenda for Sustainable Development*:

- part IV emphasized that UNEP "has an important role in the follow-up to and review of progress in implementing the environmental dimension of sustainable development…as a contribution to the Global Sustainable Development Report, and to the annual Sustainable Development Goals progress report" (UNEP, 2016g Decision 2/5, paragraph 15)
- part V "Requests the Executive Director to strengthen the science-policy interface regarding the environmental dimension of the 2030 Agenda for Sustainable Development, by…Continuing to provide policy-relevant information, including the Global Environment Outlook assessments, to track progress regarding the environmental dimension of the Sustainable Development Goals and targets, as well as information on trends in global sustainability, and to present them to the High-Level Political Forum on Sustainable Development to support informed decision-making with regard to strengthening implementation" (UNEP, 2016g Decision 2/5, paragraph 18)

- part VI, *Assessments and early warning*, requests the ED to "ensure that the Global Environment Outlook process, products and thematic assessments, which include assessments of the state of, the trends in and the outlook for the environment, and cover the internationally agreed environmental goals, take into account the 2030 Agenda for Sustainable Development, in particular the Sustainable Development Goals and targets" (UNEP, 2016g Decision 2/5, paragraph 19)
- finally, part VII "Requests the Executive Director to ensure that UNEP Live, which already covers the internationally agreed environmental goals, provides credible, up-to-date information to support the follow-up and review of progress towards the achievement of the Sustainable Development Goals, at all levels, by establishing a long-term plan for the maintenance of the programme and the relevance of its content and ensuring good traceability of the data and information made accessible through it" (UNEP, 2016g Decision 2/5, paragraph 21).

The resolution very clearly shows the high priority being accorded to the new sustainable development agenda among member-states and the Secretariat, but also the sense that, while GEO clearly has an associated role, it is just one of many means for tracking the ultimate goal of environmental sustainability, rather than an end in itself.

At **UNEA-3**, held in December 2017, the ED submitted a report on progress in preparing the sixth Global Environment Outlook, stating that delivery of *GEO-6* and its accompanying summary for policymakers was planned for the fourth session of the Environment Assembly (UNEP, 2017b). It recognized that this date change (from 2018 to 2019) would require an amendment to Resolution 1/4 of UNEA-1. Member states duly agreed on Decision 3/1, requesting the ED to issue *GEO-6* at least three months before UNEA-4, to schedule the negotiations on the summary for policymakers at least six weeks in advance of UNEA-4 and to present *GEO-6* and its accompanying summary for policymakers for consideration and possible endorsement by UNEA-4 (UNEP, 2017b).

Recalling some relevant organizational responsibilities, including UNEP's mandate from 1972 to keep the world environmental situation under review (UNGA, 1972) and its role in tracking progress on SDG indicators (UNEP, 2016g), **UNEA-4** of March 2019 welcomed with appreciation *GEO-6* and its summary for policymakers and (for the first time ever) also recorded its appreciation to all who had contributed to the compilation and publication of the report (UNEP, 2019j). In line with previous decisions on GEO, it requested continuing collaboration with multiple entities and the

prioritization of a long-term data strategy to support, inter alia, the future GEO process. Most notably, it requested the ED to "prioritize…the preparation of an options document on the future of the Global Environment Outlook process, in broad consultation with Member States, stakeholders and the custodians of other global environmental assessment processes" (UNEP, 2019j paragraph 6). The document preparation should be overseen and managed by a steering committee whose members would be nominated by Member States or members of the specialized agencies and approved by the Committee of Permanent Representatives. "The options document is to be submitted by the steering committee to the Environment Assembly for consideration at its fifth session, to inform a decision on the future form and function of the Global Environment Outlook" (UNEP, 2019l paragraph 6).

The Steering Committee was set up and started its work in 2019 (UNEP, 2019a), but subsequent progress was considerably delayed and eventually ran into the complications of the COVID-19 era. The International Institute for Sustainable Development had been commissioned in 2020 by the Steering Committee and UNEP to prepare a background paper to support the consultative process. The Steering Committee produced its own summary of the draft background document and both documents were put forward in a multi-stakeholder consultation that ran for a month towards the end of 2020. Both documents were then finalized based on the consultation results and made available to UNEA-5 in early February 2021 (IISD, 2021; UNEP, 2020d). The Steering Committee continued the process during 2021, prepared a draft feasibility study on financial, administrative and collaborative options for the future GEOs and presented it in another month-long multi-stakeholder consultation in late 2021. The document was finalized and made available to the second session of UNEA-5 in 2022 along with the multi-stakeholder consultation results (UNEP, 2022i, 2022h).

The process culminated in a draft resolution on the Future of the Global Environment Outlook being submitted on 26 February for consideration by the resumed session of UNEA-5. The resolution (UNEP/EA.5/Res.3) was adopted during the closing plenary of UNEA-5 on 2 March 2022. It decides that:

- "the core function of the Global Environment Outlook process should be to undertake, every four years, an intergovernmental, expert-led, global authoritative assessment with regional specificities that assesses and tracks trends, evaluates the effectiveness of the global policy response, evaluates future perspectives for all five environmental themes addressed in previous Global Environment Outlook assessments, and evaluates the drivers of environmental change and the

interactions across these environmental themes, while benefitting from but not duplicating existing assessments, and supplemented, as needed, by Global Environment Outlook thematic assessments at the request of the Environment Assembly, to fill knowledge gaps" (UNEP, 2022b paragraph 5)

- "the seventh edition of the Global Environment Outlook... [is] to be submitted for endorsement by the Environment Assembly...no sooner than 2025" (UNEP, 2022b paragraph 6)
- "the Global Environment Outlook process should identify intergovernmentally defined needs and terms for the provision of support for capacity-building, knowledge generation and policymaking and...should provide support services for addressing those needs, in partnership with relevant institutions as appropriate" (UNEP, 2022b paragraph 7)
- "the summaries for policymakers of Global Environment Outlook assessments should continue to be based on transparent and inclusive clearance and scoping procedures, through an intergovernmental review process" (UNEP, 2022b paragraph 8)

Thus, the resolution effectively maintains course as developed during *GEO-5* and *GEO-6* and mandates *GEO-7*.

## Final Comments on the Trend of GC/UNEA Decisions Relevant to GEO

Historically, there has been an evolution in GEO-related decisions by UNEP's GC (and more recently, the UNEA) from simply ordaining this ongoing, regular integrated environment assessment reporting process to increasingly prescriptive and process-controlling guidance, in terms of content, governments' roles, diversifying products and an intended data support system (UNEP-Live). However, the resources that UNEP's governing body repeatedly suggested be made available have rarely been commensurate with the ever-expanding GEO mandate as given by successive GCs/UNEAs (Chapter 7.9). Thus some of the most far-reaching ambitions for the process remain to be attained. Given the shift in focus to other priorities such as the SDGs in the last few years, it is not certain that the loftiest proposals of the UNEA for the ongoing GEO process, and the wide range of related products of multiple types and at multiple levels, will be achieved in the years ahead (Chapter 11).

# Annex II: GEO Collaborating Centres and other Contributing Institutions listed in GEO reports

Named as a GEO Collaborating Centre in the GEO report

Acknowledged as an associated/specialized/contributing institution or partner in the GEO report

| ACRONYM OR ABBREVIATION (if any) | FULL NAME AND LOCATION | ROLE IN GEO (GLOBAL/ REGIONAL) | WHICH GEO/S? | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 |
| **AGU** | Arabian Gulf University, Bahrain | **R** | | | | | | |
| **AIT** | Asian Institute of Technology, Thailand | **R** | | | | | | |
| **BCAS** | Bangladesh Centre for Advanced Studies, Bangladesh | **R** | | | | | | |
| **CEDARE** | Centre for Environment and Development for the Arab Region and Europe, Egypt | **R** | | | | | | ◆ |
| **CEU** | Central European University, Hungary | **R** | | | | | | |
| **CIAT** | Centro Internacional de Agricultura Tropical, Colombia | **R** | | | | | | |
| **Colmex** | El Colegio de México, Mexico | **R** | | | | | | |
| **ICAIR/GRID Christchurch*** | International Centre for Antarctic Information and Research/ Gateway Antarctica/Global Resource Information Database in Christchurch, New Zealand | **R** | | | | | | |
| **IIED** | International Institute for Environment and Development, UK | **G** | | | | | | |
| **IISD** | International Institute for Sustainable Development, Canada | **G/R** | | | | | | |
| **IRF** | Island Resources Foundation, US Virgin Islands | **R** | | | | | | |
| **MSU** | Moscow State University, Russia | **R** | | | | | | |

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| **NEPA/SEPA** | National Environment Protection Agency/ State Environmental Protection Administration, China | **R** | ■ | ■ | ■ | ■ | | | |
| **NESDA** | Network for Environment and Sustainable Development, Ivory Coast | **R** | ■ | ■ | ■ | ■ | ■ | | |
| **NIES** | National Institute for Environmental Studies, Japan | **G/R** | ■ | ■ | ■ | ■ | ■ | | |
| **NINA** | Norwegian Institute for Nature Research, Norway | **R?** | ■ | | | | | | |
| **REC** | Regional Environment Centre for Central and Eastern Europe, Hungary | **R** | ■ | ■ | ■ | ■ | | | |
| **RIVM/MNP/PBL** | National Institute of Public Health and the Environment/Netherlands Environment Assessment Agency, Netherlands | **G/R** | ■ | ■ | ■ | ■ | ■ | ■ | ◆ |
| **RSS Jordan** | Royal Scientific Society, Jordan | **R** | ■ | | | | | | |
| **SARDC** | Southern African Research and Documentation Centre/Musokotwane Environment Resource Centre for Southern Africa, Zimbabwe | **R** | ■ | ■ | ■ | ■ | ■ | | |
| **SEI** | Stockholm Environment Institute, branches in Sweden, USA, Thailand and UK | **G** | ■ | ■ | ■ | ■ | ■ | | |
| **TEI** | Thailand Environment Institute, Thailand | **R** | ■ | ■ | ■ | ■ | | | |
| **TERI** | Tata Energy Research Institute/ The Energy and Resources Institute, India | **R** | ■ | ■ | ■ | ■ | ■ | | |
| | University of Chile, Sustainable Development Programme and Centre for Public Policy Analysis, Chile | **R** | ■ | ■ | ■ | ■ | | | |
| **WRI** | World Resources Institute, USA | **G** | ■ | ■ | ■ | ■ | ■ | | |
| | Wuppertal Institute for Climate, Environment and Energy, Germany | **G** | ■ | | | | | | |
| **ACTS** | African Centre for Technology Studies, Kenya | **R** | | ■ | | | | | |
| **ACSAD** | Arab Centre for the `study or Arid Zones and Drylands, Syria | **R** | | ■ | ■ | ■ | ■ | | |
| **ALDA** | Asociatión Latinoamericoana de Derecho Ambiental, México | **R** | | ■ | | | | | |

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| **CEC of NAAEC** | Commission for Environmental Cooperation of the North American Agreement for Environmental Cooperation, Canada | **R** | | | | | | | |
| | Earth Council, Costa Rica | **G** | | | | | | | |
| **EEA** | European Environment Agency, Denmark | **R** | | | | | | | |
| **GRID Arendal*** | Global Resource Information Database in Arendal, Norway | **G** | | | | | | ◆ | ◆ |
| **GRID Geneva*** | Global Resource Information Database in Geneva, Switzerland | **G** | | | | | | | |
| **GRID Sioux Falls*** | Global Resource Information Database in Sioux Falls, USA | **G** | | | | | | | |
| **IBAMA** | Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis, Brazil | **R** | | | | | | | |
| **IOC** | Indian Ocean Commission, Mauritius | **R** | | | | | | | |
| **NEMA** | National Environment Management Authority, Uganda | **R** | | | | | | | |
| **OdD-UCR** | Development Observatory, University of Costa Rica, Costa Rica | **R** | | | | | | | |
| **SCOPE of ICSU** | Scientific Committee on Problems of the Environment of the International Council for Science, France | **G** | | | | | | | |
| **SPREP** | South Pacific Regional Environment Programme, Samoa | **R** | | | | | | | |
| **UWICED** | University of the West Indies, Centre for Environment and Development, Jamaica | **R** | | | | | | | |
| **WCMC*** | World Conservation Monitoring Centre, UK | **G** | | | | | | ◆ | ◆ |
| **ADIE** | Association pour le Developpement de l'Information Environmentale, Gabon | **R** | | | | | | | |
| **ICIS** | International Centre for Integrative Studies, The Netherlands | **G** | | | | | | | |
| **IGCI** | International Global Change Institute, New Zealand | **G** | | | | | | | |
| **IUCN** | The World Conservation Union, Switzerland + branches in Cameroon and Thailand | **G** | | | | | | | |

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| **RING** | The Regional and International Networking Group, Alliance of Policy Research Organizations of IIED, UK | **G** | | | | | | |
| **SIC** | Scientific Information Centre, Turkmenistan | **R** | | | | | | |
| **AFI** | African Futures Institute, South Africa | **R** | | | | | | |
| **AFRI** | Arab Forest and Range Institute, Syria | **R** | | | | | | |
| **AGEDI** | Abu Dhabi Global Environmental Data Initiative, Abu Dhabi | **R** | | | | | | |
| **API** | Arab Planning Institute, Kuwait | **R** | | | | | | |
| **AUB** | American University of Beirut, Lebanon | **R** | | | | | | |
| **CIEM** | Centro des Investigationes de la Economia Mundial, Cuba | **G?** | | | | | | |
| **CIESIN** | Center for International Earth Science Information Network, Columbia University, USA | **G** | | | | | | |
| **CLAES** | Centro Latino Americano de Ecologia Social, Uruguay | **R** | | | | | | |
| **DA** | Development Alternatives, India | **R** | | | | | | |
| **IGES** | Institute for Global Environmental Strategies, Japan | **G** | | | | | | |
| **ISRIC** | International Soil Reference and Information Centre, The Nether-lands | **G** | | | | | | |
| **KISR** | Kuwait Institute for Scientific Research, Kuwait | **R** | | | | | | |
| | The Macaulay Institute, UK | **G** | | | | | | |
| | Universidad del Pacifico, Peru | **R** | | | | | | |
| | University of Denver, USA | **R?** | | | | | | |
| | University of Kassel, Germany | **G** | | | | | | |
| **USP** | The University of the South Pacific, Fiji | **R** | | | | | | |
| **UNU-IAS** | Institute For The Advanced Study Of Sustainability of the United Nations University | **G** | | | | | | |
| | Alexandria University, Egypt | **R** | | | | | | |
| **ACB** | ASEAN Centre for Biodiversity, Philippines | **R** | | | | | | |
| **CSE** | Center de Suivi Ecologique, Senegal | **R** | | | | | | |

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| | Columbia University, USA | **R?** | | | | | | |
| **COSTAATT** | College of Science, Technology and Applied Arts of Trinidad and Tobago, Trinidad and Tobago | **R** | | | | | | |
| **GIZ** | Deutsch Gesellschaft für Internationale Zusammenarbeit, Uzbekistan | **R** | | | | | | |
| **DIVERSITAS** | International Programme of Biodiversity Science, France | **G** | | | | | | |
| **ESSP** | Earth System Science Partnership, France | **G** | | | | | | |
| **ETH ZURICH** | Institute für Umweltentscheidungen, Switzerland | **G** | | | | | | |
| | Higher Institute for Water Management, Syria | **R** | | | | | | |
| | Interdisciplinary Environment Laboratory of the Federal University of Rio de Janeiro, Brazil | **R** | | | | | | |
| **ICLEI** | Local Governments for Sustainability, Germany/Canada | **G** | | | | | | |
| | Indiana University, USA | **G?** | | | | | | |
| | Institute Oswaldo Cruz, Brazil | **R** | | | | | | |
| | Institute for Sustainable Development, Colombia | **G?** | | | | | | |
| **CIDES** | International Center for Sustainable Development, Panama | **G?** | | | | | | |
| **IWMI SE ASIA** | International Water Management Institute – Southeast Asia, Lao PDR | **R** | | | | | | |
| **INTA** | National Institute of Agricultural Technology, Argentina | **R** | | | | | | |
| **PERSGA** | Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden, Saudi Arabia | **R** | | | | | | |
| **RCEES** | Research Center for Eco-Environmental Science of the Chinese Academy of Sciences, China | **R** | | | | | | |
| | Secretariat of the UN Convention on Biological Diversity, Canada* | **G** | | | | | | |
| | Secretariat of the UN Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Germany* | **G** | | | | | | |

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| | Secretariat of the UN-REDD Programme, Switzerland* | G | | | | | | |
| SEMARNAT | Secretaria de Media Ambiente y Recursos Naturales, México | R? | | | | | | |
| TCF | The Cropper Foundation, Trinidad and Tobago | G | | | | | | |
| | Tishreen University, Syria | R | | | | | | |
| UNAM | Universidad Nacional Autónoma de México, Mexico | R | | | | | | |
| UOB | University of Bahrain, Bahrain | R | | | | | | |
| | University of Technology, Iran | R | | | | | | |
| U of T | Faculty of Forestry, University of Toronto, Canada | R? | | | | | | |
| | Charles University, Czech Republic | ? | | | | | | |
| CAS | Chinese Academy of Sciences, China | ? | | | | | | ◆ |
| | Clean Air in London, UK | ? | | | | | | |
| | Colorado State University, USA | ? | | | | | | |
| | Environment and Climate Change, Canada | ? | | | | | | |
| ESA | European Space Agency | ? | | | | | | ◆ |
| | Forest Peoples Programme, UK | ? | | | | | | |
| | Freie Universitat Berlin, Germany | ? | | | | | | ◆ |
| | Indian Institute of Science, India | ? | | | | | | |
| | Institut des Géosciences de l'Environnement, France | ? | | | | | | |
| | King Abdulaziz University, Saudi Arabia | ? | | | | | | |
| | Korea Environment Institute, Republic of Korea | ? | | | | | | |
| MIT | Massachusetts Institute of Technology, USA | ? | | | | | | ◆ |
| | Michigan Technological University, USA | ? | | | | | | |
| | National Institute of Science and Technology for Climate Change, Brazil | ? | | | | | | |
| | National Water Research Centre, Egypt | ? | | | | | | |
| | Peking University, China | ? | | | | | | |
| | Spanish National Research Council, Spain | ? | | | | | | |

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| | Tokyo Institute of Technology, Japan | ? | | | | | | |
| | United Nations Foundation, USA | ? | | | | | | |
| | Università di Roma "Tor Vergata", Italy | ? | | | | | | |
| | Université Nangui Abrogoua, Côte d'Ivoire | ? | | | | | | |
| | School of Public Policy, University of Maryland, USA | ? | | | | | | |
| | University of Michigan, USA | ? | | | | | | |
| | University of São Paulo, Brazil | ? | | | | | | |
| | University of Tehran, Iran | ? | | | | | | |
| | University of Warwick and HEART, UK | ? | | | | | | |
| | University of York, UK | ? | | | | | | |
| | University of Zimbabwe, Zimbabwe | ? | | | | | | |
| | WECF International, Germany | ? | | | | | | |
| | World Environment Center, USA | ? | | | | | | |
| | World Water Council, France | ? | | | | | | |

In addition, the following government offices were cited as 'Contributing Institutions' in GEO-6:
Department of Environment, Iran
Embassy of the Federative Republic of Brazil, Brazil
General Authority for Meteorology and Environment Protection, Saudi Arabia
Ministry for Ecological and Inclusive Transition of France, France
Ministry for the Environment, France
Ministry of Climate and Environment, Norway
Ministry of Environment and Forestry, Indonesia
Ministry of Environment and Natural Resources, Mexico
Ministry of Ecology and Forest, Madagascar
Ministry of Environment, Land and Sea, Italy
Ministry of Environment, Forests and Climate Change, India
Ministry of Environment, Jordan
Ministry of Environment, Protection of Nature and Sustainable Development, Cameroon
Ministry of Natural Resources, Energy and Environment, Malawi
Ministry of Environment and Sustainable Development, Argentina
Office of Natural Resources and Environmental Policy and Planning, Thailand
Swiss Federal Office for the Environment, Switzerland
U.S. Department of State, USA
U.S. Forest Service, USA

NOTES: * denotes close affiliation with UNEP

◆ These institutes are listed in the Acknowledgements at the front of the GEO report whereas the rest of the partner institutions are listed as Contributors at the back of the report

# Annex III: Structure of GEOs-1 to 6 Reports

**GEO-1**, **GEO-2000**, and **GEO-3**'s main chapters are divided according to each 'Chapter' (1 – 5).

**GEO-4** is divided according to each 'Section' (A – F).

**GEO-5** is divided according to each 'Part' (1 – 3).

**GEO-6** is divided according to each 'Part' (A – C), which are subdivided into 'Chapters' (1 – 25).

**Note:** All GEO reports include reference lists at the end of Chapters and/or subchapters. These have not been included in the table below.

| GEO reports | Main chapters | | Subchapters |
|---|---|---|---|
| GEO-1 | Front matter | | Acknowledgements |
| | | | Table of Contents |
| | | | Foreword |
| | | | Executive Summary |
| | Chapter 1 | The Global Environment Outlook Process | A New Era in Environmental Assessment |
| | | | The Global Environment Outlook Project |
| | | | Overview of Remaining Chapters |
| | Chapter 2 | Regional Perspectives | Africa |
| | | | Asia and the Pacific |
| | | | Europe and CIS Countries |
| | | | Latin America and the Caribbean |
| | | | North America |
| | | | West Asia |
| | | | Polar Regions |

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| **GEO-1** | **Chapter 3** | **Policy Responses and Directions** | Current Changes in Approaches to Environmental Policy |
| | | | Summary of Regional Policy Responses |
| | | | Africa |
| | | | Asia and the Pacific |
| | | | Europe and CIS Countries |
| | | | Latin America and the Caribbean |
| | | | North America |
| | | | West Asia |
| | | | Polar Regions |
| | **Chapter 4** | **Looking to the Future** | The General Setting |
| | | | Forces Driving Change |
| | | | Climate Change and Acidification |
| | | | Use of Land |
| | | | Pressures on Natural Habitat |
| | | | Human Health |
| | | | Alternative Policies |
| | **End matter** | | Acronyms |
| | | | Collaborating Centres |
| | | | International GEO Consultations |
| | | | Contributors and Reviewers |
| **GEO-2000** | **Front matter** | | Acknowledgements |
| | | | Contents |
| | | | Foreword |
| | | | The GEO Project |
| | | | The Data Issue |
| | | | Synthesis |
| | | | The GEO-2000 Regions |
| | **Chapter 1** | **Global Perspectives** | Social and Economic Background |
| | | | The Key Drivers |
| | | | Areas of Danger and Opportunity |
| | | | Responses |
| | | | Conclusions |
| | **Chapter 2** | **The State of the Environment** | Global and Regional Synthesis |
| | | | Africa |
| | | | Asia and the Pacific |
| | | | Europe and Central Asia |
| | | | Latin America and the Caribbean |

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| **GEO-2000** | **Chapter 2** | **The State of the Environment** | North America |
| | | | West Asia |
| | | | The Polar Regions |
| | **Chapter 3** | **Policy Responses** | Global and Regional Synthesis |
| | | | Africa |
| | | | Asia and the Pacific |
| | | | Europe and Central Asia |
| | | | Latin America and the Caribbean |
| | | | North America |
| | | | West Asia |
| | | | The Polar Regions |
| | **Chapter 4** | **Future Perspectives** | Future Perspectives |
| | | | The Alternative Policy Studies |
| | **Chapter 5** | **Outlook and Recommendations** | Outlook for the 21st Century |
| | | | Recommendations for Action |
| | **End matter** | | Acronyms and Abbreviations |
| | | | Collaborating and Associated Centres |
| | | | Contributors |
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| **GEO-3** | **Front matter** | | Acknowledgements |
| | | | Contents |
| | | | Foreword |
| | | | Preface |
| | | | The GEO Project |
| | | | Synthesis |
| | | | The GEO-3 Regions |
| | **Chapter 1** | **Integrating Environment and Development: 1972-2002** | |
| | **Chapter 2** | **State of the Environment and Policy Retrospective: 1972-2002** | Socio-economic Background |
| | | | Land |
| | | | Forests |
| | | | Biodiversity |
| | | | Freshwater |
| | | | Coastal and marine areas |

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| **GEO-3** | **Chapter 2** | **State of the Environment and Policy Retrospective: 1972-2002** | Atmosphere |
| | | | Urban areas |
| | | | Disasters |
| | | | Conclusions |
| | **Chapter 3** | **Human Vulnerability to Environmental Change** | |
| | **Chapter 4** | **Outlook: 2002-32** | Driving forces |
| | | | A tale of four futures |
| | | | Environmental implications |
| | | | Lessons from the future |
| | | | Technical annex |
| | **Chapter 5** | **Options for Action** | |
| | **End matter** | | Acronyms and Abbreviations |
| | | | Collaborating Centres |
| | | | Contributors |
| | | | Index |
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| | | | Preface |
| | | | Reader's Guide |
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| | **Section B** | **State-and-Trends of the Environment: 1987-2007** | Atmosphere |
| | | | Land |
| | | | Water |
| | | | Biodiversity |
| | **Section C** | **Regional Perspectives: 1987-2007** | Sustaining a Common Future |
| | **Section D** | **Human Dimensions of Environmental Change** | Vulnerability of People and the Environment: Challenges and Opportunities |
| | | | Interlinkages: Governance for Sustainability |
| | **Section E** | **The Outlook – Towards 2015 and Beyond** | The Future Today |
| | **Section F** | **Sustaining Our Common Future** | From the Periphery to the Core of Decision Making – Options for Action |

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| **GEO-4** | **End matter** | | The GEO-4 Process |
| | | | Acronyms and Abbreviations |
| | | | Contributors |
| | | | Glossary |
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| **GEO-5** | **Front matter** | | Acknowledgements |
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| | | | Foreword |
| | | | Preface |
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| | **Part 1** | **State and Trends of the Environment** | Drivers |
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| | | | Water |
| | | | Biodiversity |
| | | | Chemicals and Waste |
| | | | An Earth System Perspective |
| | | | Review of Data Needs |
| | **Part 2** | **Policy Options** | Africa |
| | | | Asia and the Pacific |
| | | | Europe |
| | | | Latin America and the Caribbean |
| | | | North America |
| | | | West Asia |
| | | | Regional Summary |
| | **Part 3** | **Global Responses** | Scenarios and Sustainability Transformation |
| | | | Global Responses |
| | **End matter** | | The GEO-5 Process |
| | | | Acronyms and Abbreviations |
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| | | | Glossary |
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| | | | Foreword [by UN Secretary General] |
| | | | Foreword [by Acting Executive Director, UN Environment] |

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| **GEO-6** | **Front matter** | | Co-Chairs' Foreword |
| | | | Co-Chairs' Message |
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| | **Chapter 1** | **Introduction and Context** | GEO-6 healthy planet, healthy people – humanity's transformative challenge |
| | | | UNEP's flagship assessment to deliver the environmental dimension of the 2030 agenda |
| | | | GEO-6 in a changing global context |
| | | | Environmental governance |
| | | | The environmental dimension of the sustainable development goals, global environmental governance and multi-lateral environmental agreements |
| | | | GEO-6 in the context of other environmental assessments |
| | | | GEO-6 approach, theory of change and structure |
| | **Chapter 2** | **Drivers of Environmental Change** | Executive summary |
| | | | Introduction and context |
| | | | Changes since the last assessment |
| | | | Population |
| | | | Urbanization |
| | | | Economic development |
| | | | Technology, innovation, and global sustainability |
| | | | Climate change |
| | | | Unravelling drivers and their interactions |
| | **Chapter 3** | **The Current State of our Data and Knowledge** | Executive summary |
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| | | | The demand for environmental statistics and data |
| | | | History of environmental statistics |
| | | | Better data for a healthy planet with healthy people |
| | | | Gender and social-environment intersectionality |
| | | | Equity and human-environment interactions |
| | | | Existing data systems |
| | | | Conclusion |

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| GEO-6 | Chapter 4 | Cross-cutting Issues | Executive summary |
| | | | Introduction |
| | | | People and livelihoods |
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| | | | Pressures: emissions |
| | | | State: atmosphere composition and climate |
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| | | | Response: policies and governance |
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| | | | Further assessments since the fifth global environmental outlook (GEO-5) |
| | | | Drivers |
| | | | Pressures |
| | | | Global state and trends of biodiversity |
| | | | Impacts on the world's biomes |
| | | | Responses |
| | | | Conclusion |
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| | | | Introduction |
| | | | Pressures |
| | | | State |
| | | | Impacts |
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| | | | Conclusion |
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| | | | Land resources and the sustainable development goals |
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| | | | Drivers and pressures |
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| | Chapter 9 | Freshwater | Executive summary |
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| | | | Pressures on freshwater |
| | | | Water and land use |
| | | | Global state and trends of freshwater |
| | | | Water quality |
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| | | | Water infrastructure |
| | | | Impacts |
| | | | Policy responses |
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| | | | Policy instruments |
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| | | | Policy design |
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| | | | Effectiveness of international and multilevel governance |
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| | | | Discussion and conclusions |
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| GEO-6 | Chapter 13 | Biodiversity Policy | Introduction |
| | | | Key policies and governance approaches |
| | | | Indicators: Biodiversity policy |
| | | | Conclusions |
| | Chapter 14 | Oceans and Coastal Policy | Executive summary |
| | | | Introduction |
| | | | Key policies and governance approaches |
| | | | Indicators |
| | | | Discussion and conclusions |
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| | | | Key policies and governance approaches |
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| | | | Introduction |
| | | | Key policies and governance approaches |
| | | | Indicators (link to SDGs and MEAs) |
| | | | Discussion and conclusions |
| | Chapter 17 | Systemic Policy Approaches for Cross-cutting Issues | Executive summary |
| | | | Cross-cutting policy issues and systemic change |
| | | | Key actors, policies and governance approaches |
| | | | Adapting socioeconomic systems to be more resilient to climate change |
| | | | Creating a sustainable agrifood system |
| | | | Indicators |
| | | | Decarbonizing energy systems |
| | | | Towards a more circular economy |
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| | | | Connections to future policy |
| | | | Gaps in knowledge |
| | | | Key Lessons from the analysis |
| | Part C | Outlooks and Pathways to a Healthy Planet with Healthy People | |
| | Chapter 19 | Outlooks in GEO-6 | Executive summary |

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| **GEO-6** | **Chapter 19** | **Outlooks in GEO-6** | Introduction |
| | | | Important elements of future-oriented environmental outlooks |
| | | | A new framework for combining top-down and bottom-up analysis methods |
| | | | The role of scale |
| | | | Roadmap for Part C of GEO-6 |
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| | | | The environmental dimension of SDGs |
| | | | An integrated view on the SDGs |
| | | | A long-term vision: selected targets and indicators |
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| | | | Introduction |
| | | | Global environmental scenarios |
| | | | The achievement of SDGs and related MEAs in trend scenarios |
| | | | Are we achieving the targets? |
| | **Chapter 22** | **Pathways Toward Sustainable Development** | Executive summary |
| | | | Introduction |
| | | | Pathways definition |
| | | | Pathways towards achieving the targets |
| | | | An integrated approach |
| | | | Conclusions and recommendations |
| | **Chapter 23** | **Bottom-up Initiatives and Participatory Approaches for Outlooks** | Executive summary |
| | | | Introduction |
| | | | Integrating global assessments and bottom-up analyses |
| | | | Sub-global assessments in a multilevel context |
| | | | Bottom-up futures based on existing local practices |
| | | | Methodological rationale and approach |
| | | | GEO-6 participatory initiatives |
| | | | GEO-6 Regional Assessments |
| | | | Findings from a bottom-up approach |
| | | | GEO Regional Assessment synthesis |

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| GEO-6 | Chapter 23 | Bottom-up Initiatives and Participatory Approaches for Outlooks | Regional outlook interventions and bottom-up initiatives |
| | | | Enabling conditions for transformations |
| | | | Key messages |
| | | | Key interventions and a critical need to recognize distributive justice given global inequities and inequality |
| | Chapter 24 | The Way Forward | Executive summary |
| | | | Approaches for environmental policy: strategic and transformative |
| | | | Transformative change |
| | | | Building blocks for transformation |
| | | | Healthy planet, healthy people: challenge and opportunity |
| | Part D | Remaining Data and Knowledge Gaps | |
| | Chapter 25 | Future Data and Knowledge Needs | Executive summary |
| | | | Introduction |
| | | | Emerging tools for environmental assessment |
| | | | Environmental monitoring for the future |
| | | | Conclusion: challenges, gaps and opportunities |
| | End matter | Annexes | Annex 1-1: Mission of the sixth Global Environment Outlook |
| | | | Annex 1-2: Range of integrated environmental assessments which the sixth Global Environment Outlook draws from |
| | | | Annex 1-3: Theory of Change for the Sixth Global Environment Outlook (GEO-6) |
| | | | Annex 1-4: Structure and rationale for confidence statements used in the sixth Global Environment Outlook |
| | | | Annex 4-1: Towards monitoring the environmental dimension of the SDGs |
| | | | Annex 6-1: The principal biodiversity-related conventions |
| | | | Annex 9-1: Water contaminants and occurrences |

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| **GEO-6** | **End matter** | **Annexes** | Annex 13-1: Biodiversity conservation and International Environmental Agreements (IEAs) |
| | | | Annex 13-2: Overview of key policy developments and governance responses at a global level |
| | | | Annex 23-1: Bottom-up Initiative platforms and results |
| | | **The GEO-6 Process** | Objectives, Scope and Process |
| | | | Appendix |
| | | | Acronyms and Abbreviations |
| | | | Contributors |
| | | | Glossary |

# Annex IV: GEO-related Reports[1]

| | Publi-cation Year | Responsible Entity | Pages | Scope | Language Versions (A/C/E/F/R/S/other) |
|---|---|---|---|---|---|
| ***Global Assessment Reports*** | | | | | |
| ***Comprehensive assessments*** | | | | | |
| Global Environment Outlook-1 (GEO-1): For life on earth | 1997 | UNEP | 264 | global | C/E |
| Global Environment Outlook-2000 (GEO-2000): UNEP's Millennium Report on the Environment | 1999 | UNEP | 398 | global | A/C/E/F/R/S/Portu-guese |
| Global Environment Outlook-3 (GEO-3): Past, present and future perspectives | 2002 | UNEP | 425 | global | A/C/E/F/R/S |
| Global Environment Outlook-4 (GEO-4): Environment for development | 2007 | UNEP | 540 | global | A/C/E/F/R/S |
| Global Environment Outlook-5 (GEO-5): Environment for the future we want | 2012 | UNEP | 525 | global | C/E/R/S |
| Global Environment Outlook-6 (GEO-6): Healthy planet, healthy people | 2019 | UNEP | 745 | global | A/C/E/R |
| | | | | | |
| ***Global assessments closely related to GEO for specific themes or specific audiences*** | | | | | |
| Pachamama: our Earth, our Future | 1999 | UNEP | 96 | global | A/C/E/F/S/Danish/Italian/ Japanese/Korean/Por-tuguese/Thai |

[1] This list should be considered a minimum of the known GEO-related reports. It is based on reports that were either mentioned to the authors, present in their archives or identified on-line through wedocs.unep.org, worldcat.org and general search engines. Searches were concluded on 1 August 2021.

| | | | | | |
|---|---|---|---|---|---|
| Global Deserts Outlook | 2006 | UNEP | 164 | global | E |
| Global Outlook for Ice and Snow | 2007 | UNEP | 235 | global | E |
| GEO-5 for Local Government: solving global problems locally | 2012 | UNEP, ICLEI | 36 | global | E |
| GEO-5 for Youth: Acting for a Better World | 2013 | UNEP | 140 | global | C/E |
| GEO-5 for Business: impacts of a changing environment on the corporate sector | 2013 | UNEP | 65 | global | C/E |
| Global Gender and Environment Outlook 2016 (GGEO) | 2016 | UNEP | 242 | global | E |
| GEO-6 for Business (as a series of six 'briefs') | 2021- | UNEP | | global | E |
| GEO for Cities | 2021. | UNEP and UN Habitat | 144 | global | E |
| GEO-6 for Youth | 2021 | UNEP | 244 | global | E |
| | | | | | |
| ***Companion and Derivative Products*** | | | | | |
| ***Summaries, global*** | | | | | |
| Global Environment Outlook: an Overview | 1997 | UNEP | 16 | global | E |
| GEO-2000 Overview | 1999 | UNEP | 16 | global | A/C/E/F/R/S/Japanese/Norwegian |
| Global Environment Outlook: Prospectus | 2000 | UNEP | 8 | global | E |
| Change and Challenge: A State of the Environment Briefing for the Global Environment Facility | 2002 | UNEP | 24 | global | E |

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| GEO-3 Synthesis. Past, present and future perspectives | 2002 | UNEP | 16 | global | A/C/E/F/R/S |
| GEO-4 Summary for Decision Makers | 2007 | UNEP | 36 | global | A/C/E/F/R/S |
| GEO-5 Summary for Policy Makers | 2012 | UNEP | 18 | global | A/C/E/F/R/S |
| Summary of the sixth Global Environment Outlook GEO-6 Regional Assessments: Key Findings and Policy Messages | 2016 | UNEP | 26 | global and regional | E |
| GEO-6 Summary for Policy Makers | 2019 | UNEP | 25 | global | A/C/E/F/R/S/Czech/ German/Italian/ Japanese |
| GEO-6 Technical Summary | 2020 | UNEP | 106 | global | E |
| GEO for Cities Executive Summary | 2021 | UNEP and UN Habitat | 6 | global | E |
| | | | | | |
| ***Data and Indicators Publications*** | | | | | |
| Global Environment Outlook-3 Data Compendium | 2002 | UNEP | Print + CDROM | global | E |
| Vital GEO Graphics | 2009 | UNEP, GRID-Arendal | 78 | global | E |
| Keeping Track of our Changing Environment: from Rio to Rio+20 (1992-2012) | 2011 | UNEP | 99 | global | E |
| Measuring Progress: Environment Goals and Gaps | 2012 | UNEP | 37 | global | E |
| Keeping Track of Our Changing Environment in Asia and the Pacific: from Rio to Rio+20 (1992-2012) | 2014 | UNEP | 149 | regional | E |
| Measuring Progress: towards achieving the environmental dimension of the SDGs | 2019 | UNEP | 129 | global and regional | E |

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|---|---|---|---|---|---|
| ***Methodology and Process-related Products*** | | | | | |
| ***Guides and Training and Capacity Building Manuals*** | | | | | |
| Guidelines for the production of UNEP's Millennium Global Environment Outlook report (GEO-2) | 1997 | UNEP | n.a. | global | E |
| Capacity Building for Integrated Environment Assessment and Reporting: Training Manual | 1999 | UNEP, IISD, Ecologistics International Ltd. | 147 | global | E |
| Capacity Building for Integrated Environment Assessment and Reporting: Training Manual. Second edition | 2000 | IISD, UNEP | 156 | global | E |
| Pachamama: Guia del maestro/Pachamama Teacher's Guide | 2002 | UNEP | 107 | global | E/S |
| Methodology for the Preparation of GEO Cities Reports: Application Manual Version 2 / Metodologia para la elaboracion de los Informes GEO Ciudades version 2 | 2004 | UNEP | 144 | global | E/S |
| GEO for Youth in Latin America and the Caribbean - A capacity building manual / Manual de Capacitacion | 2004 | UNEP, CCA, CYEN | 117 | regional | S |
| Africa Environment Outlook Environment Information System (AEO-EIS): User Manual | 2005 | UNEP | 91 | regional | E |
| GEO Methodology for City Environment Assessment: Working Manual [China] | 2005 | UNEP | 89 | national | C |
| Training Manual on Integrated Environmental Assessment and Reporting in Africa | 2006 | UNEP | 188 | regional | E |
| GEO Resource Book: a training manual on IEA and Reporting | 2007 | IISD, UNEP | 399 | global | E/S |
| GEO Resource Book. A training manual on integrated environment assessment and reporting. Module overviews | 2007 | UNEP, IISD | 24 | regional | E |

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|---|---|---|---|---|---|
| Integrated Environment Assessment Manual for the Arab Region | n.a. | UNEP, IISD | 418 | regional | A/E |
| Methodology for the Preparation of GEO Cities Reports: Application Manual Version 3 / Metodologia para la elaboracion de los Informes GEO Ciudades version 3 | 2008 | UNEP, Consorcia Parceria 21 | 200 (E) 185 (S) | global | E/S |
| A Training Manual on Integrated Environmental Assessment and Reporting (summary brochure) | 2009 | UNEP, IISD | 28 | global | E |
| GEO Health: a Methodology for Integrated Health and Environment Assessment (a focus on Latin America and the Caribbean) | 2009 | UNEP, PAHO/WHO | 89 (E) 109 (S) | regional | E/S |
| Methodology for GEO for Youth in LAC / Metodologia GEO Juvenil para ALC | 2009 | UNEP, Comité Ambiental Juvenil-Peru, Organizacion de Lideres Aplicados al Servicio | n.a. | regional | E/S |
| Methodology for the Preparation of GEO Cities Reports: Training Manual Version 3 | 2009 | UNEP | 200 | global | E/S |
| GEO Cities Manual / Guidelines for Integrated Environment Assessment of Urban Areas: working manual Arab Region | 2009 | UNEP, Environmental Center for Arab Towns | 163 | regional | A/E |
| IEA Training Manual Volume Two Themes: Vulnerability and Impact Assessment for Adaptation to Climate Change | 2010 | UNEP, IISD, UNITAR | 58 | global | E |
| Trainers' Guide to: Training Manual on Integrated Environmental Assessment and Reporting in Africa | 2010 | UNEP | 29 | regional | E/F |
| Ejemplas de Buenas Practicas de evaluaciones ambientales integ- rales en América Latina y Caribe | 2010 | UNEP | 91 | regional | S (original) E (text, no graphs) |
| IEA Training Manual Volume Two: Climate Change Vulnerability and Impact Assessment in Cities | 2011 | UNEP | 87 | global | E |

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|---|---|---|---|---|---|
| Africa Environment Outlook 3: Authors' Guide | 2011 | UNEP | 29 | regional | E |
| GEO Cities Manual - Guidelines for Integrated Environmental Assessment of Urban Areas (for the EECCA region) | 2012 | UNEP, Zoi Environment Network | 62 | regional | E |
| Guidelines for Assimilating Gender into Integrated Environment Assessments | 2017 | UNEP | 7 | global | E |
| Guidelines for Conducting Integrated Environmental Assessments | 2019 | UNEP | 154 | global | E |
| | | | | | |
| ***Technical Reports*** | | | | | |
| An Overview of Environmental Indicators: State of the Art and Perspectives | 1994 | UNEP, RIVM | 72 | global | E |
| Scanning the Global Environment: a framework and methodology for integrated environmental reporting and assessment | 1995 | UNEP, RIVM | 58 | global | E |
| Towards reference values for global environmental reporting | 1996 | TNO on behalf of RIVM | n.a. | global | E |
| State of the Environment Reporting: Source Book of Methods and Approaches | 1996 | UNEP, Logos: Environment Canada, RIVM | 135 | global | E |
| Global Assessment of Land Vulnerability to Water Erosion on a ½ degree by ½ degree Grid | 1996 | ISRIC, Logos of UNEP, RIVM | 16 | global | E |
| A Qualitative Assessment of Water Erosion Risk using 1:5 M SOTER Data. An application for Northern Argentina, South-East Brazil and Uruguay | 1996 | ISRIC, Logos of UNEP, RIVM | 18 | sub-regional | E |
| The Impact of Land Degradation of Food Productivity. Case studies of Uruguay, Argentina and Kenya. Vol 1: Main Report | 1997 | ISRIC, Logos of UNEP, RIVM | 44 | sub-regional | E |

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|---|---|---|---|---|---|
| The Impact of Land Degradation of Food Productivity. Case studies of Uruguay, Argentina and Kenya. Vol 2: Appendices | 1997 | ISRIC, Logos of UNEP, RIVM | 38 | sub-regional | E |
| Environmental Reporting in Central and Eastern Europe: a Review of Selected Publications and Frameworks | 1997 | UNEP, CEU | n.a. | sub-regional | E |
| Spatial data sets for environmental assessment: towards bridging the data gap | 1997 | UNEP | 66 | global | E |
| Global Scenario Group: First Meeting Report, and the Sustainability Transition: Beyond Conventional Development | 1997 | SEI, UNEP | 14+ annexes | global | E |
| The Future of the Global Environment: A Model-based Analysis Supporting UNEP's First Global Environment Outlook | 1997 | RIVM, UNEP | 154 | global | E |
| Selected Examples of the Use of Remote Sensing Imagery for Environmental Assessment | 1997 | USGS, UNEP | n.a. | global | E |
| Scanning Subsidies and Policy Trends in Europe and Central Asia | 1998 | UNEP | 35 | regional | E |
| A contribution to UNEP's strategy for monitoring and assessment | 1998 | RIVM | 86 | global | E |
| Research contributions for assessment of the state and evolution of the global environment (GEO). DG XII/RIVM workshop - 15/16 September 1998 | 1998 | RIVM | 43 | global | E |
| Bending the Curve: Toward Global Sustainability | 1998 | SEI, UNEP | 144 | global | E |
| Data issues of global environmental reporting; Experiences from GEO-2000 | 1999 | UNEP, RIVM | 53 | global | E |
| Global assessment of acidification and eutrophication of natu-ral ecosystems. Carried out in the framework of UNEP's second Global Environment Assessment | 1999 | UNEP, RIVM | 64 | global | E |

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|---|---|---|---|---|---|
| Emerging environmental issues for the 21st century : a study for GEO-2000 | 1999 | UNEP | 27 | global | E |
| Early Warning of Selected Emerging Environmental Issues in Africa: change and correlation from a geographic perspective | 1999 | UNEP | 34 | regional | E |
| GEO-2000 Alternative Policy Study for Europe and Central Asia | 1999 | UNEP, RIVM | 128 | regional | E |
| GEO-2000 Alternative Policy Studies for West Asia | 1999 | UNEP | 13 | regional | E |
| An Assessment of Risks and Threats to Human Health Associated with the Degradation of Ecosystems | 2000 | UNEP | n.a. | global | E |
| Regional Scenarios for Environmental Sustainability: A Review of the Literature | 2000 | UNEP | n.a. | global | E |
| Regional storylines: Africa. Input for GEO-3 regional workshop on scenario development | 2000 | unpublished | 1 | regional | E |
| Asia and the Pacific scenarios: Policy Reform Scenario; Great Transition Scenario; Fortress World Scenario. Input for GEO-3 | 2000 | unpublished | 3 | regional | E |
| Building blocks for European elaboration of GEO-3 scenarios. Working paper for the UNEP meeting in Cambridge, UK, on the GEO-3 outlook chapter, September 2000 | 2000 | RIVM, ICIS | 24 | regional | E |
| Scenarios in Latin America and the Caribbean (Cambridge outcome). Scenario 1: Conventional Development | unpublished | unpublished | 1 | regional | E |
| Scenarios for North America. Background paper for GEO-3 Outlook | unpublished | SEI - Boston | | regional | E |
| Descriptions of selected global models for scenario studies on environmentally sustainable development | 2000 | RIVM, ICIS, OECD, UNDESA | 55 | global | E |

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|---|---|---|---|---|---|
| Insights for the Third Global Environment Outlook from related global scenario analyses: Working Paper for GEO-3 | 2000 | RIVM | 67 | global | E |
| GEO-3 Scenarios: Preliminary Framework. Discussion paper for the GEO-3 meeting held (in Cambridge UK) 11-15 Sept. 2000 | 2000 | SEI - Boston | 27 + annex | global | E |
| Illustrative scenarios for GEO-3: scale and type of impacts | 2000 | RIVM | 49 | global | E |
| Four Scenarios for Europe based on UNEP's third GEO | 2003 | UNEP, RIVM | 31 | regional | E |
| Assessing Human Vulnerability to Environmental Change: concepts, issues, methods and case studies (a study conducted within the framework of the GEO-3 report) | 2003 | UNEP | 57 | global | E |
| Global Environment Outlook Scenario Framework: Background Paper for UNEP's Third Global Environment Outlook Report (GEO-3) | 2004 | UNEP, SEI | 104 | global | E |
| GEO-3 Scenarios 2002-2032: quantification and analysis of environmental impacts | 2004 | UNEP, RIVM | 216 | global | E |
| Mainstreaming Gender in Environmental Assessment and Early Warning | 2005 | UNEP | 82 | global | E |
| Vulnerability of People and the Environment: challenges and opportunities (Background report on Chapter 7 of the fourth Global Environment Outlook (GEO-4)) | 2009 | UNEP, PBL | 100 | global | E |
| Environment for development: policy lessons from global environmental assessments. Report for UNEP | 2009 | PBL | 31 | global | E |
| The State of Environment: Information Networking in Rwanda | 2010 | REMA, UNEP, GRID-Arendal | 45 | national | E |

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|---|---|---|---|---|---|
| The Future of Global Environmental Assessment Making (FOGEAM): Reflecting on past experiences to inform future choices | 2014 | MCC | 151 | global | E |
| Strengthening the Science-Policy Interface: a Gap Analysis | 2017 | UNEP | 134 | global | E |
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| ***Meeting Reports***[1] | | | | | |
| First International Expert Meeting on the Global Environment Outlook Process, 27 February- 2 March, 1995, Cali, Colombia | 1995 | UNEP | 40 | global | E |
| Report of the Meeting on Integrated Environmental Assessment/Global Environment Outlook (IEA/GEO) Core Data Working Group, 22-23 January 1996 | 1996 | UNEP | 67 | global | E |
| Report of the UNEP/RIVM/PE Workshop on Global and Regional Food Production and Land Use and the Long-term Impact of Degradation of Land and Water Resources, Bilthoven, The Netherlands, 20-22 May 1996 | 1996 | UNEP, RIVM, PE | 57 | global | E |
| Report of the Inaugural Meeting of UNEP's GEO Collaborating Centre Network. Groningen, The Netherlands, 3-5 March 1997 | 1997 | UNEP | 107 | global | E |
| Report of the GEO-2 Planning Meeting with UNEP's GEO Collaborating Centres. Beijing, China, 19-23 May 1997 | 1997 | UNEP | 73 | global | E |
| Report of the First Meeting of the Global Modeling Forum for Sustainable Development, organised and sponsored by UNDPCSD, UNEP, UNU and RIVM, Bilthoven, The Netherlands, 23-24 May 1996 | 1997 | UNDPCSD, UNEP, UNU, RIVM | n.a. | global | E |

[1] The authors found multiple references to other meetings held between 2000 and 2017 but very few of these were written up in meeting reports. Those without meeting reports are not included in this Annex.

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|---|---|---|---|---|---|
| Report of Regional Consultations held for UNEP's First Global Environment Outlook | 1997 | UNEP | 134 | global | E |
| First Meeting of the Steering Group for the GEO International Policy Working Group. Tokyo, Japan. 9-11 March 1998 | 1998 | UNEP | n.a. | global | E |
| First GEO-2 Drafting Meeting with Collaborating Centres. Manama, Bahrain, 15-20 November 1997 | 1998 | UNEP | 110 | global | E |
| Second GEO-2 Drafting Meeting with GEO Collaborating Centres (fourth major GEO-2 production meeting). Brasilia, Brasil, 2-6 February 1998 | 1998 | UNEP | n.a. | global | E |
| GEO-3 Start-up Meeting | 2000 | UNEP | n.a. | global | E |
| First GEO-3 Coordination Meeting for Mainland Africa and Western Indian Ocean Small Island Developing States (SIDS) | 2000 | UNEP | n.a. | regional | E |
| GEO Africa Data Portal Workshop and AEO Data Working Group Meeting, 17-20 November 2003, UNEP, Nairobi | 2003 | UNEP | 11 | regional | E |
| Vulnerability and Human Well-being. Report of a workshop in preparation of GEO-4 | 2005 | RIVM/PBL, CEMEDE | 56 | global | E |
| First Authors Meeting for the Sixth Global Environment Outlook: Provisional Agenda. 20-24 February 2017, Frascati, Italy | 2017 | UNEP | n.a. | global | E |
| Outcome of the First Face to Face Authors Meeting of the Sixth Global Environment Outlook Global Assessment, European Space Research Institute, 20-24 February, 2017, Frascati, Italy | 2017 | UNEP | 5 | global | E |
| Second face to face authors meeting of the sixth Global Environment Outlook global assessment, 22-26 May 2017, Bangkok, Thailand | 2017 | UNEP | 4 | global | E |

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|---|---|---|---|---|---|
| First GEO-6 Innovative Scenarios and Policy Pathways Stakeholder Visioning Workshop, 25 May 2017, Bangkok, Thailand. Summary Report | 2017 | UNEP | 20 | global | E |
| Third Authors Meeting for the Sixth Global Environment Outlook, 9-14 October 2017, Guangzhou, China. Provisional Agenda | 2017 | UNEP | 15 | global | E |
| Outcomes document from third face to face authors meeting of the sixth Global Environment Outlook global assessment, 9-13 October 2017, Guangzhou, China | 2017 | UNEP | 8 | global | E |
| Outcomes Document of the fourth authors meeting of the Global Environment Outlook, Singapore, February 19-23, 2018 | 2018 | UNEP | 9 | global | E |
| Fourth GEO-6 Innovative Scenarios and Policy Pathways Stakeholder Visioning Workshop, 21 February 2018, Singapore. Summary Report | 2018 | UNEP | 19 | global | E |
| Fifth face to face meeting of the Outlooks authors for the sixth Global Environment Outlook, 28-30 May 2018, The Hague, The Netherlands. Provisional Agenda | 2018 | UNEP | 4 | global | E |
| Joint Scientific Advisory Panel and Review Editors Meeting for the Sixth Global Environment Outlook, 7-11 October 2018, Cairo, Egypt. Provisional Agenda | 2018 | UNEP | 7 | global | E |
| Joint Scientific Advisory Panel (SAP) and Review Editors (RE) Meeting for the Sixth Global Environment Outlook - Outcome Document | 2018 | UNEP | 9 | global | E |
| Member State Meeting on the draft Summary for Policymakers of the sixth Global Environment Outlook, 21-24 January 2019. Provisional Agenda | 2019 | UNEP | 4 | global | E |
| Inception Meeting for Global Environment Outlook (GEO) for Cities, 13-14 May 2019, Arendal, Norway. Provisional Agenda | 2019 | UNEP | n.a. | global | E |

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| ***Evaluation Reports*** | | | | | |
| Evaluation report of Global Environment Outlook -1 and -2 Processes | 2000 | UNEP Evaluation and Oversight Unit | 39 | global | E |
| Global Environment Outlook: User Profile and Impact Study | 2004 | UNEP | 88 | global | E |
| SWOT Analysis and Evaluation of the GEO-3 Process from the Perspective of GEO Collaborating Centres | 2004 | UNEP | 68 | global | E |
| Use of the GEO-3 Report: User Feedback Analysis and the GEO Web Site Statistics | 2004 | UNEP | 17 | global | E |
| Findings of the GEO-4 Self-Assessment Survey | 2008 | UNEP, IUCN | 46 | global | E |
| Review of the initial impact of the GEO-4 report | 2009 | UNEP, IUCN | 118 | global | E |
| Terminal evaluation of the South-South Network of GEO Collaborating Centres for integrated environmental assessment and reporting to support policy formulation and informed decision-making processes at national, regional and global levels | 2010 | Evaluation Office, UNEP | 72 | global | E |
| Terminal Evaluation of the Project Fifth Global Environmental Outlook: Integrated Environmental Assessment | 2014 | Evaluation Office, UNEP | 183 | global | E |
| Mid-Term Evaluation of the UN Environment Project: Global and Regional Integrated Environmental Assessments ("GEO-6") | 2018 | Evaluation Office, UNEP | 51 | global, regional | E |
| | | | | | |
| ***GEO-related Intermediary Products*** [2] | | | | | |
| GEO Year Book 2003 | 2004 | UNEP | 76 | global | A/C/E/F/R/S |

[2] From 2016 UNEP has produced an annual Frontiers report. The ED's preface in the first edition states "Over the past 10 years, UNEP has endeavoured to identify and highlight emerging issues of global concern through the UNEP Year Book series. This new UNEP Frontiers report advances this work, signalling environmental issues and solutions for effective and timely responses." In addition to published reports listed here, there have been numerous on-line newsletters prepared by UNEP to keep stakeholders informed about GEO-related activities during the preparation of global reports. Relating to GEO-6, for example, 'GEO Matters' was initiated in September 2015 and was available on a monthly basis between February 2017 and January 2020.

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|---|---|---|---|---|---|
| GEO Year Book 2004/5: an overview of our changing environment | 2005 | UNEP | 98 | global | E |
| GEO Year Book 2006: an overview of our changing environment | 2006 | UNEP | 84 | global | E |
| GEO Year Book 2007: an overview of our changing environment | 2007 | UNEP | 86 | global | E |
| GEO Year Book 2008: an overview of our changing environment | 2008 | UNEP | 50 | global | C/E/F/S/R |
| UNEP Year Book 2009: new science and developments in our changing environment | 2009 | UNEP | 64 | global | A/C/E/F/R/S |
| UNEP Year Book 2010: new science and developments in our changing environment | 2010 | UNEP | 66 | global | A/C/E/F/R/S |
| UNEP Year Book 2011: Emerging issues in our global environment | 2011 | UNEP | 80 | global | E/F/S |
| UNEP Year Book 2012: Emerging issues in our global environment | 2012 | UNEP | 68 | global | E/F/S |
| UNEP Year Book 2013: Emerging issues in our global environment | 2013 | UNEP | 68 | global | E |
| UNEP Year Book 2014: Emerging issues in our global environment | 2014 | UNEP | 68 | global | E |
| | | | | | |
| ***Regional GEO reports*** | | | | | |
| **Africa** Environment Outlook. Integrated Environmental Assessment Reporting: An Update | 2001 | UNEP | 14 | regional | E |
| **Africa** Environment Outlook: Past, Present and Future Perspectives (AEO-1) | 2002 | UNEP | 432 | regional | E |

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|---|---|---|---|---|---|
| **Africa** Environment Outlook: Policy Actions and Recommendations for a Sustainable Future | 2002 | UNEP, AMCEN | 22 | regional | E/F |
| **Africa** Environment Outlook Case Studies: Human Vulnerability due to Environmental Change in Africa. Executive Summary | 2003 | UNEP | 12 | regional | E |
| **Africa** Environment Outlook Case Studies: Human Vulnerability due to Environmental Change in Africa | 2004 | UNEP | 208 | regional | E |
| **Africa** Environment Outlook for Youth: Our Region - Our Life | 2005 | UNEP | 106 | regional | E |
| **Africa** Environment Tracking: Issues and Developments | 2005 | UNEP | 54 | regional | E |
| **Africa** Environment Outlook (AEO)-2: Our Environment, Our Wealth | 2006 | UNEP | 576 | regional | E |
| **Africa** Environment Outlook (AEO)-2: Our Environment, Our Wealth - Executive Summary | 2006 | UNEP | 36 | regional | E |
| **Africa** Environment Outlook 3: Our Environment, Our Health | 2013 | UNEP | 242 | regional | E |
| **Africa** Environment Outlook (AEO)-3 Summary for Policy Makers | 2013 | UNEP | 40 | regional | E |
| GEO-6 Regional Assessment for **Africa** | 2016 | UNEP | 215 | regional | E/F |
| GEO for Youth **Africa** - a wealth of green opportunities | 2019 | UNEP, AMCEN, CEDARE | 85 | regional | E |
| | | | | | |
| **Asia - Pacific** Environment Outlook 1 | 1997 | UNEP | 62 | regional | E |
| **Asia - Pacific** Environment Outlook 2 | 2001 | UNEP | 149 | regional | E |
| GEO-6 Regional Assessment for **Asia and the Pacific** | 2016 | UNEP | 226 | regional | E |
| Global Environment Outlook for Youth **Asia and the Pacific** | 2019 | UNEP | 110 | regional | E |

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|---|---|---|---|---|---|
| GEO-6 for Industry in **Asia and the Pacific** | 2019 | UNEP | 86 | regional | E |
| | | | | | |
| GEO-6 Assessment for the **pan-European Region** / *GEO-6 Doklad ob Ocenke pan-Evropeeiskomu Regionu* | 2016 | UNEP | 376 (E)<br>464 (R) | regional | E/R |
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| GEO for **Latin America and the Caribbean** 1 / *GEO América Latina y el Caribe (ALC) Perspectivas del Medio Ambiente 2000* | 2000 | UNEP | 114 | regional | E/S |
| GEO for Youth in **Latin America and the Caribbean** - "open your eyes to the environment" - *GEO Juvenil para América Latina y el Caribe: abre tus ojos al Medio Ambiente* | 2001 | UNEP | 121 | regional | E/S |
| GEO **Latin America and the Caribbean** 2003 / *GEO América Latina y el Caribe Perspectivas del Medio Ambiente 2003.* | 2003 | UNEP | 279 (E)<br>281 (S) | regional | E/S |
| Environmental Integrated Assessments for Cities in **Latin America and the Caribbean**: GEO Cities Project | 2005 | UNEP ROLAC | 36 | regional | E/S |
| GEO Health: seeking integrated tools and solutions for Environment and Health Problems in **LAC** / *GEO Salud ALC: en busqueda de herramintas y soluciones integrales a los problemas de medio ambiente y salud* | 2006 | UNEP, PAHO, FIOCRUZ | 32 | regional | E/S |
| GEO LAC 3 **Latin America and the Caribbean**: Environment Outlook / *GEO ALC 3 Perspectivas Medio Ambiente: América Latina Caribe* | 2010 | UNEP | 380 | regional | E/S |
| Proyecto GEO Ciudades 10 Anos | 2012 | UNEP | 149 | regional | S |
| GEO-5 Policy Options for **Latin America and the Caribbean** with nine thematic brochures | 2012 | UNEP | 6/brochure | regional | E/S |

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| GEO-6 Regional Assessment for **Latin America and the Caribbean**/ *GEO-6 Evaluacion Regional para America Latina y el Caribe / GEO-6 Avaliacao Regional da America Latina e do Caribe* | 2016 | UNEP | 264/ 264/ 279 | regional | E/S/Portuguese |
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| **North America's** Environment: A Thirty-Year State of the Environment and Policy Retrospective | 2002 | UNEP | 228 | regional | E |
| **North American** Environmental Outlook to 2030 | 2010 | Commission for Environmental Cooperation | 84 | regional | E |
| GEO-6 Regional Assessment for **North America**/ *GEO-6 Evaluation Régionale pour l'Amérique du Nord* | 2016 | UNEP | 325 (E) 363 (F) | regional | E/F |
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| Environment Outlook for the **Arab Region**: environment for development and human well-being **(N. Africa & W. Asia)** | 2010 | UNEP | 471 | regional | E |
| GEO-6 Regional Assessment for **West Asia** | 2016 | UNEP | 156 | regional | E |
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| ***Sub-regional GEO reports*** | | | | | |
| **Western Indian Ocean** Environment Outlook | 1999 | UNEP | 89 | ocean(s) region | E/F |
| **Atlantic and Indian Oceans** Environment Outlook | 2005 | UNEP | 84 | ocean(s) region | E |
| **Lake Victoria Basin** Environment Outlook: Environment for Development | 2006 | UNEP, Pan African START Secretariat | 70 | sub-regional | E |
| **Southern Africa** Environment Outlook | 2008 | SADC, SARDC, UNEP | 196 | sub-regional | E |

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| **Western Indian Ocean** State of the Coast | 2015 | UNEP Nairobi Convention | 546 | sub-regional | E |
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| **Pacific Islands** Environment Outlook | 1999 | UNEP | 76 | sub-regional | E |
| Children of the Monsoon: **South Asia**: State of the Environment 2002 The Youth Version | 2002 | UNEP RRC.AP, Development Alternatives, SACEP, NORAD | 101 | sub-regional | E |
| GEO on **Central Asian Sub-region** for the period 1972-2002 | 2003? | n.a. | n.a. | sub-regional | E/R |
| **Pacific** Environment Outlook | 2005 | UNEP | 91 | ocean(s) region | E |
| Sub-regional Integrated Environment Assessment: **Central Asia** | 2007 | ISDC, SIC, UNEP | 160 | sub-regional | E/R |
| **Greater Mekong** Environment Outlook (GMEO) | 2007 | n.a. | 122 | sub-regional | E |
| **South Asia** Environment Outlook 2009 | 2010 | UNEP, SAARC, DA | 136 | sub-regional | E |
| **Pacific** ECCO[3] | 2012 | SPREP | 266 | ocean(s) region | E |
| **South Asia** Environment Outlook 2014 | 2014 | UNEP, SAARC, DA | 202 | sub-regional | E |
| **China-ASEAN** Environment Outlook 1: Towards Green Development | 2017 | China-ASEAN Environmental Cooperation Centre | 231+ | sub-regional | E |
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| **Caucasus** Environment Outlook | 2002 | UNEP | 117 | sub-regional | E |

[3] ECCO = Environment and Climate Change Outlook

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| **Carpathians** Environment Outlook | 2007 | UNEP | 232 | sub-regional | E |
| **Caspian Sea** State of the Environment 2010 | 2010 | GRID-Arendal, CEP | 104 | sub-regional | E |
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| **Caribbean** Environment Outlook | 1999 | UNEP | 74 | sub-regional | E |
| GEO **Andino** 2003: Perspectivas del Medio Ambiente | 2003 | UNEP, Secretaria General de la Comunidad Andino | 190 | sub-regional | S |
| GEO Juvenil **Centroamericano** - Perspectivas del Medio Ambiente 2005 (Juventud Unida para el Desarrollo Sostenible) | 2005 | UNEP, Club de Jovenes Ambientalistas | 146 | sub-regional | S |
| **Caribbean** Environment Outlook: Special Edition for the International Meeting for the 10-year Review of the Barbados Programme of Action | 2005 | UNEP | 114 | sub-regional | E |
| GEO **Centroamérica** 2004: Perspectivas del Medio Ambiente | 2006 | UNEP, Comision Centroamericana de Ambiente y Desarrollo | 208 | sub-regional | S |
| GEO **MERCOSUR**: Integracion, Comercio y Ambiente en el Mercosur | 2008 | UNEP, Mercosur, CLAES | 188 | sub-regional | S |
| GEO for Youth of the **Caribbean** - a vision for change! | 2008 | UNEP, CCA, CYEN | 80 | sub-regional | E |
| GEO **Amazonia**: Environment Outlook in Amazonia / *Perspectivas del Medio Ambiente en* ***la Amazonia*** *(GEO Amazonia)* | 2009 | UNEP, Amazon Cooperation Treaty Organization, Universidad del Pacifico | 168 (E)<br>323 (S) | sub-regional | E/S |
| GEO **Titicaca**: Perspectivas del Medio Ambiente en el Sistema Hidrico Titicaca-Desaguadero- Poopo-Salar de Coipasa (TDPS) | 2011 | UNEP | 184 | sub-regional | S |

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| GEO Small Island Developing States Outlook | 2014 | UNEP | 62 | global/ regional | E/F |
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| ***National (and sub-national) GEO reports[4]*** | | | | | |
| **Benin** Rapport integré sur l'Etat de l'Environnment au Benin | 2002 | Agence Béninoise pour l'Environnement | 187 | | F |
| Rapport sur l'état de l'environnement au **Burkina Faso** 2002 | 2004 | Ministère de l'Environnement et du Cadre de Vie | 199 | | F |
| **Egypt** State of the Environment Report | 2016 | Ministry of Environment - Arab Republic of Egypt, Egyptian Environmental Affairs Agency | 288 | national | E |
| **Ethiopia** Environment Outlook: Environment for Development | 2007 | Federal Environmental Protection Authority - Ethiopia | 159 | national | E |
| **Ghana** State of the Environment Report | 2004 | n.a. | n.a. | national | E |
| **Ghana** State of the Environment Report | 2017 | Environmental Protection Agency of Ghana | 412 | national | E |
| **Kenya** State of the Environment and Outlook 2010 - supporting the Delivery of Vision 2030 (full report plus SDM) | 2011 | NEMA, UNEP | 210 + 48 | national | E |
| **Malawi** State of Environment and Outlook Report: Environment for Sustainable Economic Growth | 2010 | Ministry of Natural Resources, Energy and Environment Malawi | 302 | national | E |
| Etat de l'Environnement du Maroc (**Morocco**) | 2010 | Département de l'Environnement du Maroc | 51 | national | F |

[4] Grouped by region and country, in alphabetical order. National reports are placed with their region according to the UNEP regional breakdown at the time of publication.

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| 3me Rapport sur l'Etat de l'Environnement du Maroc 2015 (**Morocco**) | 2015 | Chargé Environment | 187 | national | F |
| **Rwanda** state of environment and outlook: Our Environment for Economic Development | 2010 | UNEP, REMA | 149 | national | E |
| **Rwanda** State of Environment and Outlook 2015 - greening agriculture with resource efficient, low carbon and climate resilient practices | 2015 | REMA, Sida | 244 | national | E |
| Rapport sur l'Etat de l'Environment au **Sénégal** edition 2005 | 2005 | Ministére de l'Environnement et de la Protection de la Nature - Senegal, Le Centre de Suivi Ecologique | 214 | national | F |
| Rapport sur l'Etat de l'Environnment au **Sénégal** edition 2010 | 2010 | Ministére de l'Environnement et de la Protection de la Nature - Senegal, Le Centre de Suivi Ecologique | 268 | national | F |
| Rapport sur l'Etat de l'Environnment au **Sénégal** edition 2015 | 2015 | Ministére de l'Environnement et de la Protection de la Nature - Senegal, Le Centre de Suivi Ecologique | 199 | national | F |
| State of the Environment in **South Africa**: an overview | 1999 | Department of Environmental Affairs and Tourism - RSA | 42 | national | E/Afrikaans/Tswana/Xhosa/Zulu |
| **South Africa** environment outlook: a report on the state of the environment | 2007 | Department of Environmental Affairs and Tourism - RSA | 392 | national | E |
| 2nd **South Africa** Environment Outlook - a report on the state of environment (executive summary) | 2016 | Department of Environmental Affairs and Tourism – RSA | 60 | national | E |

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| **North West Province** (RSA) Environment Outlook | 2008 | North-West (South Africa) Department of Agriculture, Conservation and Environment - Mmabatho | n.a. | provincial | E |
| **North West Province** (RSA) Environment Outlook | 2018 | North-West (South Africa) Department of Agriculture, Conservation and Environment - Mmabatho | 160 | provincial | E |
| **Western Cape** (RSA) Environment Outlook | 2013 | Western Cape Department of Environmental Affairs and Development Planning | n.a. | provincial | E |
| **Western Cape** (RSA) Environment Outlook | 2018 | Western Cape Department of Environmental Affairs and Development Planning | 24 | provincial | E |
| **Gauteng** (RSA) provincial State of the Environment Outlook report | 2011 | Gauteng Department of Agriculture and Rural Development | 135 | provincial | E |
| **South Sudan**: First State of Environment and Outlook Report | 2018 | UNEP, Ministry of Environment - South Sudan | 329 | National | E |
| **Swaziland** State of the Environment Report | 2012/13 | Swaziland Environmental Authority | 334 | national | E |
| National State of the Environment Report for **Uganda** 2014 - "harnessing our environment as infrastructure for livelihood and development" | 2016 | NEMA, UNDP? | 204 | national | E |
| **Uganda** State of the Environment Report 2016-17 - restoring the environment for livelihood improvement and sustainable economic development | 2017 | NEMA, UNDP? | 195 | national | E |

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| **Zambia** Environment Outlook Report - 3 | 2008 | Environmental Council of Zambia | 173 | national | E |
| **Zimbabwe** Environment Outlook: our environment, everybody's responsibility (3rd Zimbabwe State of the Environment Report) | 2010 | Zimbabwe MENR | ??? | national | E |
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| **Bangladesh** ECCO 2012 | 2013 | Ministry of Environment and Forests, Department of Environment - Bangladesh | 162 | national | E |
| **Bhutan** State of the Environment Report 2001 | 2001 | UNEP | 134 | national | E |
| **Bhutan** Environment Outlook (BEO) 2008 | 2008 | Bhutan National Environmental Commission | 112 | national | E |
| **Bhutan** State of Environment (Environment Outlook) 2016 | 2016 | Bhutan National Environmental Commission | 136 | national | E |
| **Cambodia** Environment Outlook | 2009 | Ministry of Environment - Cambodia, UNEP RRC.AP | 106 | national | E |
| **India** State of the Environment 2001 | 2001 | UNEP, TERI, SACEP | 175 | national | E |
| State of the Environment **Iran** 2005/06 | 2005, 2006 | Department of Environment - Iran, UNEP, SBU | 137 (abridged) | national | Persian/E (abridged version) |
| Democratic People's Republic of **Korea**: state of environment | 2003 | UNEP, UNDP | 91 | national | E |
| Democratic People's Republic of **Korea** ECCO | 2012 | Ministry of Land and Environment Protection – DPRK | 136 | national | E |

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| **Fiji's** State of the Environment Report | 2013 | SPREP | 159 | national | E |
| **Kyrgyz Republic** Environment Outlook | 2009 | UNEP, State Agency for Environmental Protection and Forestry - Kyrgyzstan | 203 | national | E/R in one volume |
| **Lao** Environment Outlook 2012 | 2012 | Ministry of Environment and Natural Resources - Lao PDR | 90 | national | E |
| Republic of the **Marshall Islands** State of Environment | 2016 | SPREP | 145 | national | E |
| Federated States of **Micronesia** State of the Environment 2018 | 2018 | SPREP | 157 | national | E |
| **Mongolia**: State of Environment 2002 | 2002 | UNEP, Ministry of Nature and Environment - Mongolia | 96 | national | E |
| ECCO of **Pakistan** | 2013 | UNEP, University of Peshawar, Ministry of Climate Change - Pakistan | 257 | national | E |
| **Samoa** 2013 State of the Environment Report | 2013 | Ministry of Natural Resources and Environment – Samoa | 147 | national | E |
| **Solomon Islands** State of the Environment Report 2019 | 2019 | SPREP | 132 | national | E |
| **Sri Lanka** Environment Outlook (SLEO) 2009 | 2009 | Ministry of Environment and Natural Resources – Sri Lanka, UNEP | 9 | national | E |
| **Tonga** State of the Environment Report 2018 | 2018 | SPREP | 145 | national | E |
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| GEO **Argentina** 2004: Perspectives del Medio Ambiente | 2004 | UNEP, SAyDS | 273 | national | S |

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|---|---|---|---|---|---|
| GEO Juvenil **Argentina** - sembrando futuro | 2002 | UNEP, Fundacion Ecologica Universal | 124 | national | S |
| GEO **Bahamas** 2005: State of the Environment | 2005 | BEST | 64 | national | E |
| The Government of **Barbados** State of Environment Report 2000 - GEO Barbados | 2001 | UNEP, Ministry of Physical Development and Environment - Barbedos | 112 | national | E |
| GEO **Belize** 2010 Environment Outlook | 2010 | Land and Surveys Department - Ministry of Natural Resources and the Environment | 144 | national | E |
| GEO **Belize** 2010 Environment Outlook | 2010 | Belize, Land information Centre, University of Belize, UNEP | 144 | national | E |
| GEO-Brasil Environment Outlook / Perspectivas do Meio Ambiente no **Brasil** | 2002 | UNEP, Ministro do Meio Ambiente - Brasil, Brasilian Institute of the Environment and Renewable Natural Resources | 449 | national | E/Portuguese |
| GEO Juvenil **Brasil** - expressando impressoes por todo o pais | 2007 | UNEP, Interagir | 284 | national | Portuguese |
| GEO **Brasil**: Recursos Hidricos - componente da serie de Relatorios sobre o Estado e Perspectivas do Medio Ambiente | 2007 | Agencia Nacional de Aguas | 264 | national | Portuguese |
| GEO **Chile** Estado del Medio Ambiente en Chile - 1999 | 2000 | Universidad de Chile | 423 | national | S |
| GEO **Chile** Estado del Medio Ambiente en Chile - 2002 | 2002 | Universidad de Chile | 458 | national | S |
| GEO **Chile** Estado del Medio Ambiente en Chile - 2005 | 2006 | Universidad de Chile | 371 | national | S |
| GEO **Chile** Estado del Medio Ambiente en Chile - 2008 | 2010 | Universidad de Chile | 508 | national | S |

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| GEO Juvenil **Chile** 2009 | 2010 | UNEP, CONOMA, SUR | 182 | national | S |
| **Colombia** Estado de los Recursos Naturales y del Ambiente 2000-2001 | 2000-01 | Contraloria General de la Republica | 292 | national | S |
| GEO Juvenil **Colombia**: perspectivas por un nuevo sentir de nuestro ambiente | 2009 | UNEP, OJA | 145 | national | S |
| GEO **Costa Rica**: Una perspectiva sobre medio ambiente 2002 | 2002 | Ministeria del Ambiente y Energia – Costa Rica, UNEP | 162 | national | S |
| Panorama Ambiental de **Cuba** 2000 | 2001 | Centro de Informacion, Gestion y Educacion, EDA | 111 | national | S |
| GEO Juvenil **Cuba** | 2006 | UNEP, CITMA, BTJ | 165 | national | S |
| GEO **Cuba**: Evaluacion del Medio Ambiente Cubano | 2009 | Agencia de Medio Ambiente, CITMA, UNEP | 293 | national | S |
| GEO **Dominican Republic** 2010 / GEO Republicana Dominica - perspectivas del medio ambiente - "Volvamos al Verde" | 2010 | UNEP, Universidad Autonoma de Santo Domingo, Centro para el Desarrollo y Agropecuario y Forestal, Inc., Ministerio Medio Ambiente - Republicana Dominica | 208 | national | S |
| GEO **Ecuador** 2008: informe sobre el estado del medio ambiente | 2008 | Facultad Latinoamericana de Ciencias Sociales, Ministerio del Ambiente - Ecuador, UNEP | 192 | national | S |
| GEO **El Salvador**: informe nacional del estado del medio ambiente | 2002 | UNEP, Ministerio de Medio Ambiente y Recursos Naturales - El Salvador | 110 | national | S |

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| GEO **Guatemala**: Informe Nacional del Estado del Ambiente | 2003 | UNEP, Ministerio de Medio Ambiente y Recursos Naturales - Guatemala | 224 | national | S |
| GEO **Guatemala**: Informe Ambiental del Estado | 2009 | UNEP, Ministerio de Medio Ambiente y Recursos Naturales - Guatemala Universidad Rafael Landivar | 286 | national | S |
| GEO **Haiti**: state of the environment report 2010 / *Etat et Perspectives de l'Environnement* | 2010 | UNEP, Ministere de l'Environnement - Haiti, UNIQ | 188 | national | E/F |
| GEO **Honduras** 2005: Informe del Estado y Perspectivas del Ambiente | 2005 | UNEP, Secretaria de Recursos Naturales y Ambiente. | 171 | national | S |
| GEO **Mexico** 2004: Perspectivas del Medio Ambiente en Mexcio | 2004+ | UNEP, Secretaria dle Medio Ambiente y Recursos Naturales | 323 | national | S |
| GEO Juvenil **Mexico**: propuestas frescas para el Medio Ambiente | 2004 | UNEP, Secretaria de Medio Ambiente y Recursos Naturales, IMJ, RAJ | 136 | national | S |
| Informe del Estado Ambiental en **Nicaragua** | 2001 | UNEP, Ministerio del Ambiente y los Recursos Naturales - Nicaragua | 119 | national | S |
| Estado del Ambiente en **Nicaragua** 2003 • II Informe GEO | 2004 | UNEP Ministerio del Ambiente y los Recursos Naturales - Nicaragua, Segundo Proyecto de Desarrollo de Municipios Rurales | 178 | national | S |
| **Panama** Informe Ambiental 1999 | 1999 | Autoridad Nacional del Ambiente | 100 | national | S |
| GEO **Panama** 2004: Informe del Estado del Ambiente | 2004 | Autoridad Nacional del Ambiente | 175 | national | S |

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| GEO **Panama** 2009: Informe del Estado del Ambiente | 2009 | Autoridad Nacional del Ambiente | 155 | national | S |
| GEO **Panama** 2014: Informe del Estado del Ambiente | 2014 | Autoridad Nacional del Ambiente | 167 | national | S |
| GEO Juvenil **Panama** 2010 | 2011 | UNEP, Autoridad Nacional del Ambiente, Asociacion Panama Verde | 219 | national | S |
| GEO Juvenil **Paraguay** | n.a. | n.a. | n.a. | national | S |
| GEO **Peru**: Informe Nacional sobre el Estado del Medio Ambiente | 2001 | Consejo Nacional del Ambiente - Peru | 226 | national | S |
| GEO Juvenil **Peru** - "dejando huella" | 2002 | UNEP, Consejo Nacional del Ambiente – Peru, Grupo Saywite, CAJU-Peru | 118 | national | S |
| GEO **Peru** 2002-2004: Informe Nacional sobre el Estado del Medio Ambiente | 2006 | n.a. | 294 | national | S |
| GEO **Saint Lucia** 2006 | 2006 | UNEP, Ministry of Physical Development, Environment and Housing – Saint Lucia | 50 | national | S |
| GEO Juvenil **Uruguay** | 2003 | UNEP, Mercosur | 128 | national | S |
| GEO **Uruguay** 2008: Informe del Estado del Ambiente | 2008 | UNEP, Centro Latino Americana de Ecologia Social, Direccion Nacional de Medio Ambiente | 350 | national | S |
| **Uruguay** 2009 - Medio Ambiente desafíos y politicos publicas; material de difusion para el debate y la participacion en torno a las politicas publicas. | 2009 | UNEP, UNDP, Programa de Desarrollo Local - ART | 40 | national | S |

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| GEO **Venezuela** 2010: Perspectivas del Medio Ambiente en Venezuela | 2010 | UNEP, Ministerio del Poder Popular Para el Ambiente, Instituto Forestal Latino-americano | 226 | national | S |
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| State of the Environment in the Kingdom of **Bahrain** | 2009 | Public Commission for the Protection of Marine Resources, Environment and Wildlife - Bahrain | 131 | national | A/E |
| **Iraq** State of the Environment | 2013 | Ministry of Environment – Iraq | 226 | national | A/E |
| State of the Environment Report in **Jordan** | 2009 | Ministry of Environment – Jordan | 46 | national | A/E |
| **Jordan**'s State of Environment Second Report 2016 | 2016 | Ministry of Environment – Jordan | 416 | national | A/E |
| 2001 **Lebanon** State of the Environment Report | 2001 | Ministry of Environment, LEDO, ECODIT | 240 | national | E |
| State and Trends of the **Lebanese** Environment | 2011 | Ministry of Environment, UNDP, ECODIT | 355 | national | E |
| **Saudi Arabia** State of the Environment (2017): responsibilities and achievements | 2017 | General Authority for Meteorology and Environmental Protection - the Kingdom of Saudi Arabis | 53 | national | A/E |
| **United Arab Emirates** State of Environment | 2015 | Ministry of Environment and Water - UAE | 36[5] | national | A/E |
| **Abu Dhabi** State of Environment Report (I) | 2006 | Environmental Agency of Abu Dhabi | n.a. | sub-national | E |

[5] English summary

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| **Abu Dhabi** State of Environment Report (II) | 2008 or 2009 | Environmental Agency of Abu Dhabi | n.a | sub-national | E |
| **Abu Dhabi** State of Environment Report (III) 2017 | 2017 | Environmental Agency of Abu Dhabi | 188 | sub-national | E |
| **Yemen** State of the Environment reports | 2001 | n.a. | n.a. | national | A |
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| ***Local GEO reports*** | | | | | |
| City of **Nairobi** Environment Outlook Report (CNEOR) (Kenya) | 2009 | Nairobi City Council, UNEP, UN-Habitat, Kenyatta University | 92 | local | E |
| **Kigali** State of Environment and Outlook Report (Rwanda) | 2013 | REMA | 159 | local | E |
| GEO-Ville Région de **Dakar** (Sénégal) | 2009 | Institut Africain de Gestion Urbaine | 151 | local | E |
| **Jo'burg** (Johannesburg) State of the Environment Report 2003 (South Africa) | 2003 | n.a. | 74 | local | E |
| **Dar Es Salaam** City Environment Outlook (Tanzania) | 2011 | n.a. | n.a. | local | E |
| **Lusaka** City State of Environment Outlook Report (Zambia) | 2008 | Lusaka City Council, Environmental Council – Zambia | 106 | local | E |
| **Livingstone District** State of the Environment Outlook Report (Zambia) | 2008 | Livingstone City Council, Environmental Council - Zambia | 97 | local | E |
| **Kabwe District** State of the Environment Outlook Report (Zambia) | 2010 | Kabwe Municipal Council, Environmental Council - Zambia | 53 | local | E |
| **Kitwe District** State of the Environment Outlook Report (Zambia) | 2010 | Kitwe City Council, Environmental Council - Zambia | 88 | local | E |

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| **Dhaka City** State of the Environment 2005 (Bangladesh) | 2005? | n.a. | n.a. | local | E |
| **Thimphu City** State of the Environment (Bhutan) | 2007 (and 2008?) | n.a. | n.a. | local | E |
| **Shenzhen** Environment Outlook SZEO 2007 (China) | 2007 | UNEP, Peking University | 185 | local | E |
| **Kathmandu Valley** Environment Outlook (KVEO) (Nepal) | Jan. 2007 | ICIMOD, Ministry of Environment, Science and Technology - Nepal, UNEP | 152 | sub-national | E |
| **Bangkok** Assessment Report on Climate Change 2009 (Thailand) | 2009 | BLA, GLF, UNEP | 90 | local | E |
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| GEO **Yerevan** Assessment of the Local Environmental Conditions 2004-6 (summary version) (Armenia) | 2007 | GRID-Arendal, UNEP National Committee | 34 | local | E/R |
| GEO **Alaverdi**: Environment and Urban Development (Armenia) | 2009 | GRID-Arendal/OSCE | 74 | local | Armenian/E/R |
| GEO **Gyumri** (Armenia) | 2009 | GRID-Arendal/OSCE | 66 | local | Armenian/E/R |
| GEO **Hrazdan** (Armenia) | 2009 | GRID-Arendal/OSCE | 40 | local | Armenian/E/R |
| GEO **Lake Sevan** (Armenia) (Integrated Assessment of the Lake Sevan Environmental Conditions (GEO - Lake Sevan)) | 2011 | n.a. | 100 | local | Armenian/E/R |
| **Novopolotsk** (Belarus) | 2012 | ENVSEC, Zoi Environment Network, GRID-Arendal | 140 | local | R |
| GEO-Cities **Tbilisi**: an integrated environmental assessment of state and trends for Georgia's capital city (Georgia) | 2011 | OSCE, UNEP via the "ENVSEC" project | 102 | local | E/Georgian |
| GEO-**Vitoria Gasteiz**: Informe Diagnostico Ambiental y de Sostenibilidad (Spain) | 2009 | UNEP, Centro de Estudios Ambientales. | 274 | local | S |

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| GEO **Donetsk** (Ukraine) (The Land of our Concern; based on materials from SoE reports in Donetsk Oblast 2007-9) | 2010 | Ministry of Environmental Protection - Ukraine, GRID-Arendal | 118 | local | E |
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| GEO **Buenos Aires** (Argentina) | 2003 | IMAE, USAL, UNEP | 210 | local | S |
| GEO **Cordoba** (Argentina) | 2010 | UNEP, la Municipalidad de Córdoba, UNC | 194 | local | S |
| GEO **Rosario** (Argentina) | 2008 | UNEP, IGC, Gobierno de la Provincia de Santa Fe | 206 | local | S |
| GEO **San Miguel de Tucuman** (Argentina) | 2007 | UNEP, Universidad Nacional de Tucumán and la Municipalidad de San Miguel de Tucumán | 249 | local | S |
| GEO **Cobija** (Bolivia) | 2008 | UNEP, Gobierno Municipal de Cobija, HERENCIA | 109 | local | S |
| GEO **El Alto** (Bolivia) | 2008 | UNEP, el Gobierno Municipal de El Alto, PRODENA, LIDEMA | 130 | local | S |
| GEO **Beberibe** (Brasil) | 2010 | UNEP, ONU-Habitat, IBAM, ISER, Ministério do Meio Ambiente e Ministério das Cidades - Brasil | 160 | local | Portuguese |
| GEO **Goias** (Brasil) | 2002 | UNEP, Ministra do Meio Ambiente - Brasil, IBAMA, Governador do Estado de Goiás, Agência Ambiental de Goiás, CEBRAC | 251 | local | Portuguese |
| GEO **Manaus** (Brasil) | 2002 | UNEP, Ministério do Meio Ambiente - Brasil, SEDEMA | 188 | local | Portuguese |

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| GEO **Maraba** (Brasil) | 2010 | UNEP, ONU-Habitat, IBAM, ISER, Ministério do Meio Ambiente e Ministério das Cidades - Brasil | 134 | local | Portuguese |
| GEO **Pirahnas** (Brasil) | 2010 | UNEP, ONU-Habitat, IBAM, ISER, Ministério do Meio Ambiente e Ministério das Cidades - Brasil | 191 | local | Portuguese |
| GEO **Ponta Pora** (Brasil) | 2010 | UNEP, ONU-Habitat, IBAM, ISER, Ministério do Meio Ambiente e Ministério das Cidades - Brasil | 160 | local | Portuguese |
| GEO **Rio de Janeiro** (Brasil) | 2002 | UNEP, Ministério do Meio Ambiente - Brasil | 193 | local | Portuguese |
| GEO **San Paulo** (Brasil) | 2004 | PMSP, UNEP | 204 | local | Portuguese |
| GEO **San Paulo** 2009 (Brasil) | 2009 | PMSP, CEM | 150 | local | Portuguese |
| GEO **Saude Cidade de Sao Paolo** (Brasil) | 2008 | UNEP, Sao Paolo, Funda-cao Oswaldo Cruz | 100 | local | Portuguese |
| GEO Health - City of **Sao Paolo**: summary of lessons learned (Brasil) | 2008 | Government - Sao Paolo, Fundacao Oswaldo Cruz | 48 | local | E/Portuguese |
| GEO **Copiapo** (Chile) | 2009 | UNEP | 113 | local | S |
| GEO **Puerto Montt** (Chile) | 2010 | UNEP, la Municipalidad de Puerto Montt, la Universi-dad Austral de Chile, Sede Puerto Montt | 147 | local | S |
| GEO **Santiago** (Chile) | 2003 | UNEP, Pontificia Universi-dad Catolica de Chile | 143 | local | S |
| GEO **Bogota** (Colombia) | 2003 | UNEP, DAMA | 179 | local | S |

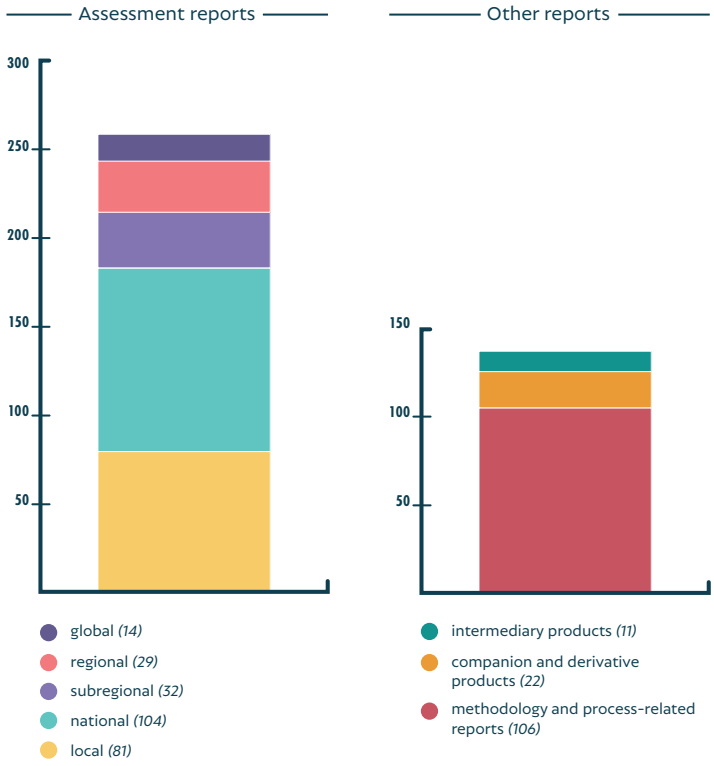
| | | | | | |
|---|---|---|---|---|---|
| GEO **Cartagena** (Colombia) | 2009 | UNEP, la Alcaldía de Cartagena de Indias, el Establecimiento Público Ambiental de Cartagena, el Observatorio del Caribe Colombiano | 172 | local | S |
| GEO **Gran Area Metropolitana (GAM) del Valle Central**e de Costa Rica | 2006 | MIVAH, MINAE, UNEP | 266 | local | S |
| GEO **Cienfuegos** (Cuba) | 2007 | UNEP | 153 | local | S |
| GEO **Holguin** (Cuba) | 2008 | CITMA, UNEP | 208 | local | S |
| GEO **La Habana** (Cuba) | 2004 | CITMA, UNEP | 183 | local | S |
| GEO **Santa Clara** (Cuba) | 2008 | CITMA, UNEP | 148 | local | S |
| GEO **Santo Domingo** (Dominicana Republica) | 2007 | CONAU, UASD, UNEP | 225 | local | S |
| GEO **Esmeraldas** (Ecuador) | 2008 | UNEP, Municipalidad de Esmeraldas, FUNDAMYF | 111 | local | S |
| GEO **Loja** (Ecuador) | 2008 | UNEP, la Municipalidad de Loja, Naturaleza, Cultura Internacional | 191 | local | S |
| ECCO Distrito Metropolitana de **Quito** (Ecuador) | 2011 | UNEP, el Fondo Ambiental del Municipio del Distrito Metropolitano de Quito, FLACSO | 364 | local | S |
| ECCO **Quito** (Ecuador) | 2011 | UNEP, The Environmental Fund of the Municipality of Quito, FLACSO | 62 | local | E |

| | | | | | |
|---|---|---|---|---|---|
| GEO **San Salvador** (El Salvador) | 2008 | UNEP, la Alcaldía Municipal de San Salvador, Banco Mundial, SACDEL | 277 | local | S |
| GEO **Georgetown**: Urban Environment Outlook 2009 (Guyana) | 2010 | UNEP, Georgetown City Council | 94 | local | E |
| GEO **Ciudad de Guatemala** (Guatemala) | 2008 | Municipalidad de Guatemala, UNEP | 121 | local | S |
| ECCO **Ciudad de Aguascalientes** (México) | 2013 | SEMADESU | 379 | local | S |
| GEO **Ciudad de México** (México) | 2003 | UNEP, el Centro de Investigación en Geografía y Geomática "Ing. Jorge L. Tamayo" A.C. | 152 | local | S |
| GEO **Playa del Carmen** (México) | 2008 | UNEP, el H. Ayuntamiento del Municipio de Solidaridad, Planeta Limpio, A.C. | 234 | local | S |
| GEO **Querétaro** (México) | 2008 | UNEP, SEDESU, CONCYTEQ | 155 | local | S |
| GEO **Ciudad de Panama** (Panama) | 2007 | UNEP, la Universidad de Panamá, el Municipio de Panamá | 195 | local | S |
| GEO **Asuncion** (Paraguay) | 2008 | SEAM, la Municipalidad de Asunción, UNEP | 217 | local | S |
| GEO **Arequipa** (Peru) | 2005 | UNEP | 142 | local | S |
| GEO **Chiclayo** (Peru) | 2008 | UNEP, CONAM, Gobierno Provincial de Chiclayo, USS | 155 | local | S |
| GEO **Lima y Callao** (Peru) | 2005 | UNEP, CONAM, Municipalidad Metropolitana de Lima, Municipalidad Provincial del Callao, GEA | 238 | local | S |

| | | | | | |
|---|---|---|---|---|---|
| ECCO **Trujillo** (Peru) | 2011 | UNEP, MPT, SEGAT, UCV | 181 | local | S |
| GEO **Canelones** (Uruguay) | 2009 | UNEP, MVOTMA, CLAES | 181 | local | S |
| ECCO **Canelones** (Uruguay) | 2011 | UNEP | 103 | local | S |
| GEO **Carmelo** (Uruguay) | 2011 | UNEP, Intendencia de Colonia, CIEDUR | 105 | local | S |
| GEO **Colonia** del Sacramento; (Uruguay) | 2009 | UNEP, Intendencia Municipal de Colonia, CIEDUR | 143 | local | S |
| ECCO **Colonia** del Sacramento (Uruguay) | 2011 | UNEP, Intendencia de Colonia, CIEDUR | 48 | local | S |
| GEO **Montevideo** (Uruguay) | 2004 | UNEP, UNDP, GAM | 195 | local | S |
| GEO Localidades des urbanas de **Rivera** (Uruguay) | 2009 | UNEP, CEUTA, Programa de Desarrollo Local ART | 172 | local | S |
| GEO **Rosario** (Uruguay) | 2011 | UNEP, Intendencia de Colonia, CIEDUR | 58 | local | S |
| | | | | | |
| Rapid Environmental Assessment of the Urban Community of **AlFayha'**, Lebanon (Lebanon) | 2009 | UNEP | 112 | local | E |
| GEO-**Sana'a** (Yemen) | 2010 | UNEP, Yemen EPA | 143 | local | A |

Of the 399 GEO-related reports listed in this Annex, two-thirds are environment assessment reports. This is depicted in Figure A.IV.1

**Figure A.IV.1 GEO-related reports, 1994–2020**




Specifically on the latter category, research for this book identified 260 sub-global assessment reports in the style of GEO, excluding language versions and separately published summaries. Their closeness to GEO methodology and the GEO process varies. Broadly speaking, three categories can be distinguished, as follows:

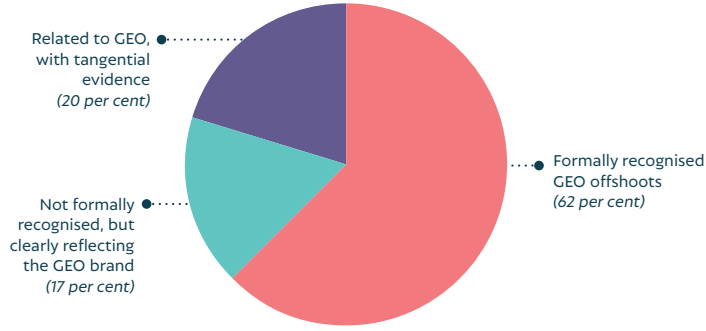
1. **Formally recognized GEO offshoots.** Indicated by title, mandate, and/or acknowledgement. This category amounts to almost two-thirds of the sub-global assessments identified for this book. Good examples are *GEO CentroAmerica 2004* (UNEP & CCAD, 2005); *GEO for SIDS* (UNEP, 2014); *GEO Shenzhen* (Peking University & UNEP, 2007).
2. **Not formally recognized as a GEO**, but clearly reflecting the brand. The brand is identifiable by the assessment's comprehensive thematic coverage, DPSIR structure, and an explicit outlook component.

Good examples in this category are the *Malawi State of the Environment and Outlook Report (MoNREEoM, 2010)* and the *2010 edition of State and Trends of the Lebanese Environment (LMoE et al., 2011)*.

3. **Related to GEO,** through tangential evidence. The evidence could be apparent from acknowledgement, press release or letter of transmittal, the list of contributors or associated methodology write-ups. Good and interesting examples in this category are the *Ghana State of the Environment Report 2016* (EPAoG & MoESTIoG, 2017); and the *Greater Mekong Environment Outlook* (UNEP, 2007).

As shown in Figure A.IV.2, approximately sixty per cent of the sub-global GEO-related assessments identified for this book fall in the first category, namely formally recognized GEO offshoots.

**Figure A.IV.2: Sub-global GEO-related assessments, 1995–2020, by degree of closeness to GEO**



# Annex V: Abbreviations

| | |
|---|---|
| ACB | ASEAN Centre for Biodiversity, Philippines |
| ACSAD | The Arab Centre for the Studies of Arid Zones and Drylands, Syria |
| ACTS | African Centre for Technology Studies, Kenya |
| ADB | Asian Development Bank |
| ADIE | Association pour le Developpement de l'Information Environnementale, Gabon |
| AEIN | African Environmental Information Network |
| AEO | Africa Environment Outlook |
| AFI | African Futures Institute, South Africa |
| AFRI | Arab Forest and Range Institute, Syria |
| AGEDI | Abu Dhabi Global Environmental Data Initiative, Abu Dhabi |
| AGU | Arabian Gulf University, Bahrain |
| AIT | Asian Institute of Technology, Thailand |
| ALDA | Asociatión Latinoamericana de Derecho Ambiental, Mexico |
| AMCEN | African Ministerial Conference on the Environment |
| AMDIG | Assessment Methodologies, Data and Information Working Group |
| API | Arab Planning Institute, Kuwait |
| ASEAN | Association of Southeast Asian Nations |
| AUB | American University of Beirut |
| BCAS | Bangladesh Centre for Advanced Studies |
| CAS | Chinese Academy of Sciences |
| CAS Earth | The Big Earth Data Science Engineering Project |
| CCAC | Climate and Clean Air Coalition |
| CCs | GEO Collaborating Centres |
| CEC | Commission for Environmental Cooperation of the North American Agreement for Environmental Cooperation |
| CEDARE | Centre for Environment and Development for the Arab Region and Europe, Egypt |
| CEU | Central European University |
| CIAT | Centro Internacional de Agricultura Tropical, Colombia |
| CIDES | Centro Internacional para el Desarrollo Sostenible, Panama |

| | |
|---|---|
| CIEM | Centro des Investigationes de la Economia Mundial, Cuba |
| CIESIN | Center for International Earth Science Information Network, Columbia University, USA |
| CLAES | Centro Latino Americano de Ecologia Social, Uruguay |
| Colmex | El Colegio de México, Mexico |
| COSTAATT | College of Science, Technology and Applied Arts of Trinidad and Tobago |
| CPR | UNEP Committee of Permanent Representatives |
| CSD | UN Commission on Sustainable Development |
| CSE | Centre for Science and Environment, India |
| CSE | Centre de Suivi Ecologique, Senegal |
| DA | Development Alternatives, India |
| DEATSA | Department of Environmental Affairs and Tourism of South Africa |
| DEVPO | Division of Environment of Vice President's Office of Republic of Tanzania |
| DEWA | Division of Early Warning and Assessment of UNEP |
| DIVERSITAS | International Programme of Biodiversity Science |
| DNV | Det Norske Veritas |
| DPSIR | Driving forces-Pressures-State-Impacts-Responses |
| DWG | Data Working Group |
| EAI | Environmental Assessment Institute, Denmark |
| ECCO | Environment and Climate Change Outlook |
| ECZ | Environmental Council of Zambia |
| ED | UNEP Executive Director |
| EEA | European Environment Agency |
| EEAA | Egyptian Environmental Affairs Agency, Ministry of Environment |
| EMFCJ | Environmental Management Framework for the City of Johannesburg |
| ENRIN | Environment and Natural Resources Information Network |
| EOAR | Environment Outlook for the Arab Region |
| ESA | European Space Agency |
| ESCWA | UN Economic and Social Commission for West Asia |
| ESSP | Earth System Science Partnership |
| ETH ZURICH | Swiss Federal Institute of Technology (Eidgenössische Technische Hochschule) |
| FAO | Food and Agriculture Organization of the UN |
| FEPAE | Federal Environmental Protection Authority of Ethiopia |
| FOGEAM | Future of Global Environmental Assessment Making |

| | |
|---|---|
| GC[1] | Governing Council of UNEP |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GEMS | Global Environment Monitoring System |
| GEO | Global Environment Outlook |
| GESAMP | Group of Experts on the Scientific Aspects of Marine Environmental Protection |
| GIS | Geographic Information System |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| GJ-MERCOSUR | Grupo de Jóvenes en el MERCOSUR |
| GLOBIO | Global Biodiversity Model for policy support |
| GMEF | Global Ministerial Environment Forum of UNEP |
| GRID | Global Resource Information Database |
| HDI | Human Development Index |
| HEI | Human Environment Index |
| HLG | High-level Intergovernmental and Stakeholder Advisory Group/ High-level Intergovernmental Advisory Panel |
| HWB | Human Well-being |
| IAASTD | International Assessment of Agricultural Knowledge, Science and Technology for Development |
| IAGU | Institut Africain de Gestion Urbaine, Senegal |
| IAMC | Integrated Assessment Modelling Consortium |
| IBAMA | Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis, Brazil |
| ICAIR | International Centre for Antarctic Information and Research/Gateway Antarctica, Christchurch, New Zealand |
| ICIS | International Centre for Integrative Studies, The Netherlands |
| ICLEI | Local Governments for Sustainability |
| ICSU | International Council for Science |
| IEA | Integrated Environmental Assessment |
| IEA | International Energy Agency |
| IGCI | International Global Change Institute, New Zealand |
| IGES | Institute for Global Environmental Strategies, Japan |
| IGMSC | Global Intergovernmental and Multi-stakeholder Consultation |
| IIED | International Institute for Environment and Development |

[1] Functions of the UNEP Governing Council have been taken over by the UN Environment Assembly

| | |
|---|---|
| IISD | International Institute for Sustainable Development |
| IMF | International Monetary Fund |
| INTA | National Institute of Agricultural Technology, Argentina |
| IOC | Indian Ocean Commission, Mauritius |
| IPBES | Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services |
| IPCC | Intergovernmental Panel on Climate Change |
| IRF | Island Resources Foundation, Virgin Islands |
| IRP | International Resource Panel |
| ISRIC | International Soil Reference and Information Centre |
| IUCN | The World Conservation Union |
| IWMI | International Water Management Institute |
| KEO | Carpathians Environment Outlook |
| KISR | Kuwait Institute for Scientific Research |
| KMC | Kabwe Municipal Council |
| LAC | Latin America and the Caribbean |
| LRTAP | Long-Range Transboundary Air Pollution |
| MA | Millennium Ecosystem Assessment |
| MCC | Mercator Research Institute on Global Commons and Climate Change, Germany |
| MDGs | Millennium Development Goals |
| MEAs | Multilateral Environmental Agreements |
| MEPNS | Ministère de l'Environnement et de la Protection de la Nature de Senegal |
| MERCOSUR | Mercado Común del Sur (Southern Common Market) |
| MESDM | Ministry of Environment and Sustainable Development of Mauritius |
| MIT | Massachusetts Institute of Technology, USA |
| MNP[2] | Environmental Assessment Agency, The Netherlands |
| MoE(s) | Ministry(ies) of Environment |
| MOENRM | Ministry of Environment and Natural Resources Management, Government of the Republic of Zimbabwe |
| MOESS | Ministry of Environment of South Sudan |
| MoU | Memorandum of Understanding |

[2] RIVM, MNP and PBL are interface organisations in the Netherlands that were successively tasked with the role of being the sole, integrated and independent environment assessment agency in support of government policy. From the early 1990s onwards, they successively served as a collaborating centre to what became the Global Environment Outlook.

| | |
|---|---|
| MSTET | Ministry of Science, Technology and Energy of Thailand |
| MSU | Moscow State University |
| NAAEC | North American Agreement on Environmental Cooperation |
| NAFTA | North American Free Trade Agreement |
| NEBT | National Environment Board Thailand |
| NEMA | National Environment Management Authority, Uganda |
| NEPA/SEPA | National Environment Protection Agency/ State Environmental Protection Administration, China[3] |
| NESDA | Network for Environment and Sustainable Development, Ivory Coast |
| NGO | Non-governmental organisation |
| NIES | National Institute for Environmental Studies, Japan |
| NINA | Norwegian Institute for Nature Research |
| NORAD | Norwegian Agency for Development Cooperation |
| OAU | Organisation of African Unity |
| OdD-UCR | Development Observatory, University of Costa Rica |
| OECD | Organisation for Economic Cooperation and Development |
| OPS/OMS | Organización Panamericana de la Salud /Organización Mundial de la Salud (WHO) |
| PBL[2] | PBL Netherlands Environmental Assessment Agency |
| PCBs | Polychlorinated biphenyls |
| PCI | Peace Child International |
| PERSGA | Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden, Saudi Arabia |
| PNUMA | ONU Programa para el Medio Ambiente (United Nations Environment Programme) |
| PoW | Programme of Work (of UNEP) |
| PSR | Pressure-State-Response |
| RCEES | Research Center for Eco-Environmental Science of the Chinese Academy of Sciences |
| REC | Regional Environment Centre for Central and Eastern Europe |
| RING | The Regional and International Networking Group, Alliance of Policy Research Organizations of IIED, UK |
| RIVM[2] | National Institute for Public Health and the Environment, The Netherlands |
| RSS Jordan | Royal Scientific Society, Jordan |

[3] Currently Ministry of Ecology and Environment

| | |
|---|---|
| SAARC | South Asian Association for Regional Cooperation |
| SADC | Southern African Development Community |
| SAP | Scientific Advisory Panel |
| SARDC | Southern African Research and Documentation Centre/Musokotwane Environment Resource Centre for Southern Africa, Zimbabwe |
| SCOPE of ICSU | Scientific Committee on Problems of the Environment of the International Council for Science |
| SDGs | Sustainable Development Goals |
| SEI | Stockholm Environment Institute; branches in Sweden, Thailand, UK and USA |
| SEMARNAT | Secretario de Media Ambiente y Recursos Naturales, Mexico |
| SIC | Scientific Information Centre, Turkmenistan |
| SIDS | Small Island Developing States |
| SoE | State of the Environment |
| SPREP | South Pacific Regional Environment Programme, Samoa |
| SWOT | Strengths, Weaknesses, Opportunities and Threats |
| TCF | The Cropper Foundation, Trinidad and Tobago |
| TEI | Thailand Environment Institute |
| TERI | Tata Energy Research Institute/The Energy and Resources Institute, India |
| TIAS | The Integrated Assessment Society |
| ToC | Theory of Change |
| U of T | University of Toronto |
| UN ESCAP | UN Economic and Social Commission for Asia and the Pacific |
| UNAM | Universidad Nacional Autónoma de México |
| UNCCD | UN Convention to Combat Desertification |
| UNCED | UN Conference on Environment and Development |
| UNCSD | UN Commission on Sustainable Development |
| UNDA | UN Development Account |
| UNDESA | UN Department of Economic and Social Affairs |
| UNDP | UN Development Programme |
| UNEA | UN Environment Assembly |
| UNECE | UN Economic Commission for Europe |
| UNED-UK | UN Environment and Development - UK Committee |
| UNEP | United Nations Environment Programme |
| UNESCO | UN Educational, Scientific and Cultural Organization |
| UNFIP | UN Fund for International Partnerships |

| | |
|---|---|
| UNGA | UN General Assembly |
| UNIC | UN Information Centre |
| UNICEF | UN Children's Fund |
| UNON | United Nations Office at Nairobi |
| UNU-IAS | Institute for the Advanced Study of Sustainability of the United Nations University |
| UNWWAP | UN World Water Assessment Programme |
| UOB | University of Bahrain |
| USP | The University of the South Pacific, Fiji |
| UWICED | University of the West Indies, Centre for Environment and Development, Jamaica |
| WBCSD | World Business Council for Sustainable Development |
| WCED | World Commission on Environment and Development |
| WCMC | World Conservation Monitoring Centre |
| WHO | World Health Organization |
| WMO | World Meteorological Organization |
| WRI | World Resources Institute |
| WSSD | World Summit on Sustainable Development |

# Annex VI: List of Interviews

The vast majority of the interviews were conducted by skype; a few others by telephone, zoom or in person.

| | Inteviewee name | Affiliations at the time of involvement in GEO | Positions and/or Roles in relation to GEO | Approximate years of involvement in GEO | Interview date | Interviewers |
|---|---|---|---|---|---|---|
| 1. | Adel Farid Abdel-Kader | UNEP/Regional Office for West Asia, Bahrain | Regional Coordinator. Member of OWG for GEO-5 | 2001-2014 | 12/12/2016 | RW and NM |
| | | Centre for Environment and Development for the Arab Region and Europe, Egypt* | GEO Focal Point | 1996-2000 | | |
| 2. | Ahmed Abdelrehim | Centre for Environment and Development for the Arab Region and Europe, Egypt* | Regional Programme Director | 1997-present | 23/08/2017 | RW and NM |
| 3. | Asma Ali Abahussain | University of Bahrain, Bahrain | Professor of Earth Sciences and Environment. Author, co-author or reviewer for most GEOs starting GEO-1; member of SAP for GEO-5 and GEO-6 and DWG for GEO-5 | 2018-present | 22/08/2017 | RW and NM |
| | | Arabian Gulf University, Bahrain* | | 1997-2018 | | |
| 4. | Joseph Alcamo | UNEP Headquarters, Kenya | Chief Scientist. Member of SAP for GEO-5 | 2009-2013 | 16/11/2017 | MC and NM |
| | | University of Kassel, Germany* | Professor and Director of Center for Environmental Systems Research | 1996-2008 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. | Joseph Alcamo | National Institute of Public Health and the Environment (RIVM), The Netherlands* | Project Leader for IMAGE | 1992-1996 | | |
| 5. | Jane Barr | Commission for Environmental Cooperation (of North America), Canada* | Author, Coordinating Lead Author, Contributor and Independent Expert to GEO | 1998-2012 | 26/10/2017 | LP and NM |
| | | International Institute for Sustainable Development, Canada | Associate, Measurement and Assessment Program | 2002-2010 | | |
| 6. | Tore J. Brevik | UNEP Headquarters, Division of Communications and Public Information, Kenya | Director and Spokesperson | 1997-2002 | 14/03/2017 | MC and NM |
| 7. | Munyaradzi Chenje | UNEP/DEWA Headquarters, Kenya | Programme Officer; Regional Coordinator; Head of GEO Team | 2000-2007 | 16/04/2018 | LP and NM |
| | | Southern African Research and Documentation Centre, Zimbabwe* | GEO Focal Point | 1997-2000 | | |
| 8. | Martijn Dadema | Government of The Netherlands | Deputy Permanent Representative to UNEP. Chair of IGMSC and Alternate on HLG for GEO-5 | 2007-2010 | 02/12/2019 | JB, MC and NM |
| 9. | Felix Dodds | Stakeholder Forum, United Kingdom | Executive Director. Member of OWG for GEO-4 | 1992-2012 | 13/03/2017 | MC and NM |
| 10. | Elizabeth Dowdeswell | UNEP Headquarters, Kenya | UN Under-Secretary-General and UNEP Executive Director | 1993-1998 | 15/03/2017 | JB |
| 11. | Nicolai Dronin | Moscow State University, Russia* | Head of Laboratory of Geographical Faculty | 1997-present | 20/12/2016 | RW and NM |
| 12. | Idunn Eidheim | Ministry of Environment, Norway | Co-chair of IGMSC for GEO-6; member of HLG for GEO-4 and GEO-5 | 2000-2014 | 13/12/2017 | RW and NM |
| 13. | R. Norberto Fernandez | UNEP/DEWA Headquarters and Regional Office for Latin America and the Caribbean, Mexico | Programme Officer; Regional Coordinator | 1996-2007 | 18/01/2017 | RW and NM |

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|---|---|---|---|---|---|---|
| 14. | Rosario Gómez | University of the Pacific, Peru* | Contributor to GEO-Peru, GEO-Cities, GEO-Andes, GEOs-Latin America and the Caribbean 1 and 2, GEO-4; member of DWG for GEO-6 and HLG for GEO-5 | 2000-present | 03/10/2017 | LP and NM |
| 15. | Edgar Gutiérrez-Espeleta | The Development Observatory at the University of Costa Rica* | Director | 1998-2002 | 25/03/2017 | LP and NM |
| | | Minister of Environment and Energy of Costa Rica | President of United Nations Environment Assembly Member of HLG for GEO-6 | 2014-2018 | | |
| 16. | Allen L. Hammond | World Resources Institute, USA* | Director of Resource and Environmental Information Program; Editor-in-Chief of the World Resources Report | 1996-2000<br>1990-1995 | 17/03/2017 | LP and NM |
| 17. | Jason R. Jabbour | UNEP/DEWA Headquarters, Kenya and Regional Office for North America, USA | Programme Officer | 2007-present | 23/05/2018 | MC and NM |
| 18. | Michael Keating | Independent, Canada | Environment Writer; GEO Consultant and Editor. Contributor to GEO capacity building | 2000-2007 | 27/03/2017 | LP and NM |
| 19. | Peter Noel King | Institute for Global Environmental Studies, Japan* | Senior Policy Advisor | 2003-present | 29/05/2017 | LP and NM |
| 20. | Ninni Lundblad | Swedish Environmental Protection Agency | GEO Focal Point | 2005-2012 | 14/03/2018 | RW and NM |
| 21. | Clever Mafuta | GRID-Arendal, Norway* | Africa Coordinator | 2010-present | 08/12/2016 | RW and NM |
| | | Southern African Research and Documentation Centre, Zimbabwe* | Contributor to GEO starting with GEO-1 | 1997-2010 | | |
| 22. | Graciela Metternicht | UNEP/DEWA/Regional Office for Latin America and the Caribbean, Panama | Regional Coordinator. Member of DWG for GEO-6 and OWG for GEO-5 | 2008-2012 | 25/01/2017 | MC and NM |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | University of New South Wales, Australia | Member of DWG for GEO-6 | 2012 to present | | |
| 23. | Ruben Mnatsakanian | Central European University, Hungary* | Professor and Head of Department of Environ-mental Sciences and Policy | 1996-2012 | 06/10/2017 | LP and NM |
| 24. | Jennifer Mohamed-Katerere | Independent and India Musokotwane Environment Resource Centre for Southern Africa, Zimbabwe | Coordinating/Lead Author for GEO-4, GEO-5 and GEO Year Book 2007; Contributing author for GEO-2000 | 2000-2012 | 04/12/2017 | LP and NM |
| 25. | Helen Mountford | Organization for Economic Cooperation and Development (OECD), France | Deputy Director of Environment | 1997-2014 | 09/02/2017 | JB and NM |
| 26. | Jacques-André Ndione | Centre de Suivi Ecologique, Sénégal* | Head of Research Development Programme | 2005-2019 | 24/01/2018 | RW and NM |
| 27. | Nicolas Perritaz | International Affairs Division, Federal Office for the Environment, Switzerland | Senior Policy Advisor. Co-chair of DWG for GEO-6; member of SAP for GEO-5 | 2002-present | 17/10/2017 | RW and NM |
| 28. | Paul D. Raskin | Tellus Institute* and Stockholm Environment Institute* USA | President of Tellus Institute | 1995-2002 | 28/02/2017 | LP and NM |
| 29. | Frits Schlingemann | UNEP Regional Office for Europe, Switzerland | Director and Regional Representative | 1996-2010 | 16/02/2017 | RW and NM |
| | | UNEP Headquarters, Kenya | Assistant to the Executive Director and Director of the Policy Division | 1994-1996 | | |
| 30. | Ashbindu Singh | UNEP/DEWA Regional Office for North America, USA | Regional Coordinator. Member of DWG and OWG for GEO-5 | 1996-2013 | 15/02/2018 | MC and NM |
| | | GRID-Sioux Falls, USA | Director | 1996-2013 | | |
| 31. | Leena Srivastava | The Energy and Resources Institute, India* | Dean, Director and Vice- Chancellor. Contributed to GEO-1, GEO-2000 and GEO-5 | 1997-2012 | 23/11/2017 | MC and NM |
| 32. | Anna Stabrawa | UNEP/DEWA Regional Office for Asia and the Pacific, Thailand | Regional Coordinator for GEO-5 and Asia and Pacific GEOs. Member of OWG for GEO-5 | 2008-2013 | 12/09/2017 | RW and NM |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | UNEP Headquarters, Kenya | Programme Officer for GEO-2000 and GEO-3 | 1999-2007 | | |
| 33. | David Stanners | European Environment Agency, Denmark* | Head of Integrated Assessment and International Cooperation. Advisor and contributor to GEO-1 to GEO-6;. Coordinator between global GEOs and regular European environmental assessment reports | 1995-2018 | 09/03/2017 | RW and NM |
| 34. | Klaus Töpfer | UNEP Headquarters, Kenya | UN Undersecretary General and UNEP Executive Director | 1998-2006 | 23/03/2017 | MC |
| 35. | Veerle Vandeweerd | UNEP/DEWA Headquarters, Kenya | Head of GEO Team. Initiator of GEO. Head of Global Environment Monitoring System. | 1995-1999 | 23/08/2017 | JB and NM |
| 36. | Jaap van Woerden | UNEP/DEWA Regional office for Europe, including GRID-Geneva facility, Switzerland | GEO Data Coordinator. Member of DWG for GEO-5 | 2002-2014 | 20/03/2020 | JB |
| 37. | Kakuko Yoshida | UNEP/DEWA Regional Office for Latin America and the Caribbean, Mexico and Panama | Programme Officer and acting Regional Coordinator | 2000-2008 | 02/05/2018 | LP and NM |
| 38. | Kaveh Zahedi | UNEP/DEWA Regional Office for Latin America and the Caribbean, Mexico | Regional Coordinator for GEO-3, GEO-LAC and others | 1999-2004 | 04/04/2017 | RW and NM |
| | | UNEP/DEWA Headquarters, Kenya | Environmental Affairs Officer for GEO-1, GEO-2000, GEO-Pacific and others | 1995-1999 | | |
| 39. | Jinhua Zhang | UNEP/DEWA Headquarters, Kenya and Regional Office for Asia and the Pacific, Thailand | Programme Officer and Regional Coordinator. Member of OWG for GEO-5 | 2000-present | 13/02/2020 | MC and NM |
| 40. | Waleed Khalil Zubari | Arabian Gulf University, Bahrain* | GEO Focal Point, Lead and Contributing Author. | 1998-present | 24/07/2017 | MC and NM |

* - GEO Collaborating Centre

DEWA – Division of Early Warning and Assessment (present-day Science Division)

DWG - Assessment Methodology, Data and Indicators Working Group (GEO-6); Data and Indicators Working Group (GEO-5); Data Working Group (GEOs 1-4)

HLG - High-Level Intergovernmental and Stakeholder Advisory Group (GEO-6); High-Level Intergovernmental Advisory Panel (GEO-5); High-level Consultative Group (GEO-4)

IGMSC - Global Intergovernmental and Multi-stakeholder Consultation

OWG - Outreach Working Group (GEO-4 and GEO-5)

SAP - Scientific Advisory Panel (GEO-6); Science and Policy Advisory Board (GEO-5)

UNEP – United Nations Environment Programme

Interviewer initials: JB - Jan Bakkes, MC - Marion Cheatle, NM - Nora Mžavanadze, LP - László Pintér and RW – Ronald G. Witt.

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## H

How do we take stock of the state and changing trends of the world's environment, and distill lessons from policy experiences? Amongst the myriad detailed narratives about the condition of the planet, the periodic Global Environment Outlook (GEO) —published by the United Nations Environment Programme—stands out as the most ambitious. For nearly three decades, the GEO project has not only delivered iconic global assessment reports, but the many contributors have also inspired hundreds of similar processes, worldwide, from regional to local levels. This book provides an inside account of the evolution of the GEO project from its earliest days.

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***Veerle Vandeweerd**, Initiator of GEO and Head of GEO team 1995–1999*

"This book settles a historical debt on the history of integrated environmental assessments."

***Edgar Gutiérrez-Espeleta**, Director of the Development Observatory, University of Costa Rica (GEO Collaborating Centre 1998-2002); Minister of Environment and Energy, Costa Rica 2014-2018; President of United Nations Environment Assembly 2016-2017; Member of High Level Inter-Governmental and Stakeholder Advisory Group for GEO-6*

"This book presents a fascinating and intimate account of what it took to create and operate one of the most comprehensive and inclusive assessment processes for keeping the world's environment under review."

***Kaveh Zahedi**, GEO Headquarters Team, 1995–1999; UNEP Regional Coordination for GEO-3, GEO-LAC and other assessments, 1999–2004*

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