

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* be-
: cause 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 review⁶ (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 training 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, inter-governmental 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*.

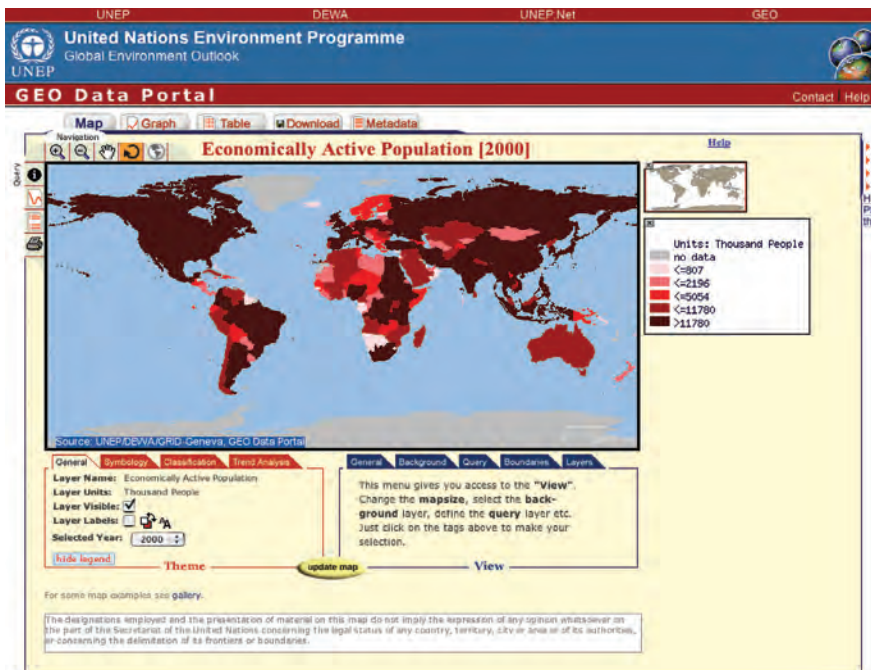
Notably, of the 18 DWG members for *GEO-5*, only four had been part of the previous one for *GEO-4*. Even more surprisingly, only one member of *GEO-6*'s DWG had been part of the *GEO-5* DWG, meaning that minimal first-hand knowledge of past DWG processes remained for *GEO-6*. Perhaps this is because 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 time⁸

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

	<i>GEO-1</i>	<i>GEO-2000</i>	<i>GEO-3</i>	<i>GEO-4</i>	<i>GEO-5</i>	<i>GEO-6</i>
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, fresh-water, 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-6s*, 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	Authors meetings	Editing
Decide on analytical framework	Advisory group meetings	Preparation of maps & graphics
Prepare report outline	Consultations with governments and other stakeholders	Design & layout
Draw up process time frame and milestones	Underlying database development	Proofreading
Prepare methodology guidelines & data provision to author teams	Chapter drafting	Translation
Identify & enlist participants and agree respective tasks	Chapter review	Printing and publishing
Calculate budget and secure funding	Chapter revision	
Agree and sign contracts	Preparation of front & end matter	
	Compilation of full report	
	Report sign-off	
	Preparation of spin-off products	

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.

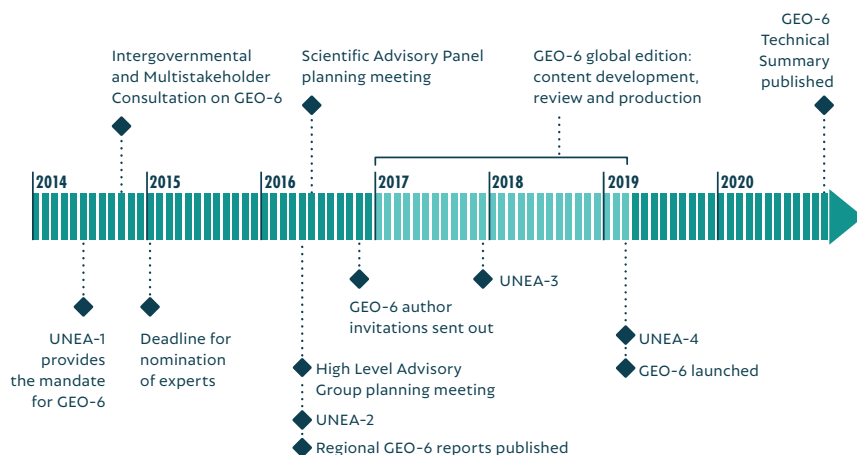
The First Expert Group meeting on *GEO-5* was held in October 2009 to take a first cut at planning the next report and using the lessons learned from *GEO-4* as a starting point. An Expert Working Group Meeting in January 2010 made further preparations for the IGMSC in March 2010, which subsequently 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

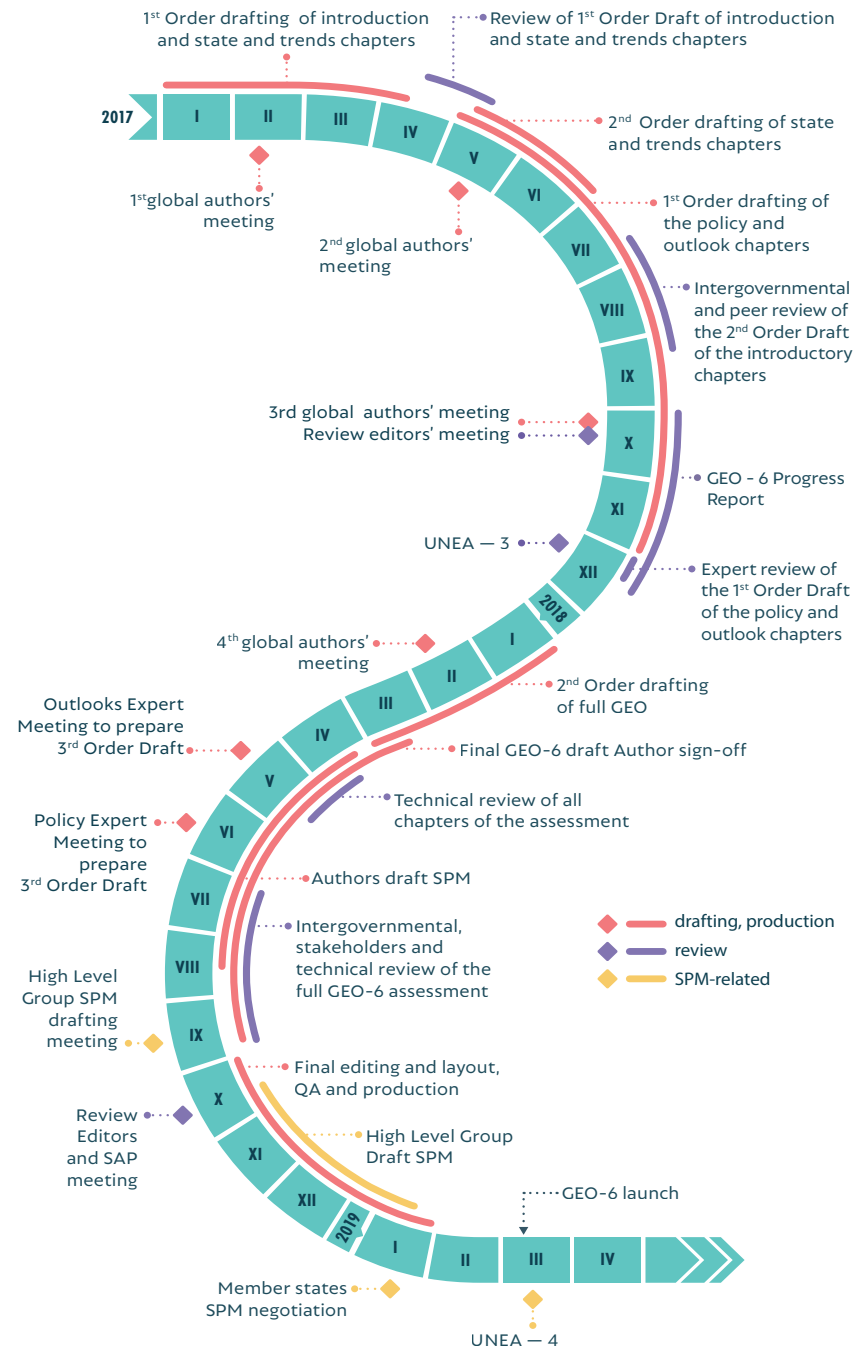
groups met virtually, often on a monthly basis. Towards the end, the High-Level Group assisted with the formulation of the SPM, and the Scientific Advisory Panel issued a statement confirming the scientific credibility of the report. Continuing the enhanced review processes introduced in *GEO-4*, the 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	<i>Evaluation Report of Global Environment Outlook -1 and -2 Processes</i> (Attere, 2000)	<i>Global Environment Outlook: User Profile and Impact Study</i> (UNEP, 2004b)
Stated purpose of evaluation	To establish if the GEO project achieved its objectives To contribute to an improved GEO in the future 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 Interviews with UNEP staff and others 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 UNEP staffing issues, budget and involvement of other UNEP divisions Role of CCs and other UN agencies Capacity-building needs Data issues Reactions of different regions to <i>GEO-2000</i> launches	A qualitative, and where possible a quantitative, profile of users of the <i>GEO-2000</i> and <i>GEO-1</i> reports, including a typology of users How readers were using the GEO reports 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 <i>GEO-2000</i> 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	<i>SWOT Analysis and evaluation of the GEO-3 process from the perspective of GEO collaborating centres</i> (UNEP, 2004d)	<i>Use of the GEO-3 Report: user feedback analysis and the GEO website statistics</i> (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 Users of GEO-3 How readers have used the report Users' views, opinions and requests relating to GEO-3 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 Performance of GEO CCs and the CC network UNEP's performance in coordination and management Assessment and reporting methods Capacity issues	User affiliations and geographic distribution Ratings for chapters and various report attributes, such as structure and readability Most useful report components, such as global and regional coverage Policy significance 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 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	<i>Findings of the GEO-4 Self Assessment Survey</i> (IUCN and UNEP, 2008)	<i>Review of the Initial Impact of the GEO-4 Report</i> (IUCN and UNEP, 2009)
Stated purpose of evaluation	To capture the lessons from participants of the process towards the preparation of <i>GEO-4</i>	To inform the GC and provide information and lessons towards design options for <i>GEO-5</i>
Methodology	Self-assessment survey questionnaire completed by <i>GEO-4</i> 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 <i>GEO-4</i> use and referencing and a desk study
What aspects of the GEO process were assessed?	Relevance, effectiveness and efficiency, and added value of the <i>GEO-4</i> assessment process 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 <i>GEO-4</i> Report and SDM reached their intended target groups The actual use of these products in relation to the intent 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 evaluations¹¹ of GEO-5 and GEO-6

Evaluation components	<i>Terminal Evaluation of the Project Fifth Global Environmental Outlook: Integrated Environmental Assessment</i> (Rowe et al., 2014)	<i>Mid-Term Evaluation of the UN Environment Project: Global and Regional Integrated Environmental Assessments (GEO-6)</i> (UNEP, 2018b)
Stated purpose of evaluation	To provide evidence of results to meet accountability requirements of UNEP's evaluation policy 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 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 Achievement of outputs Attainment of objectives and planned results Sustainability and replication Efficiency Project implementation and management, including financial management Stakeholder participation Monitoring and evaluation	Strategic relevance Project design Effectiveness of report content and project management Financial management Efficiency Monitoring and reporting Sustainability 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.
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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 sub-global 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.

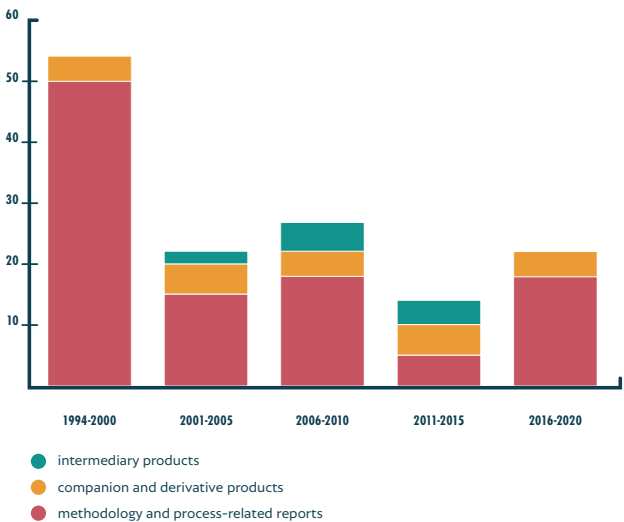
Table 7.8.1 offers a brief typology for these products, including their approximate numbers through *GEO-6*. Each of the three product categories is subsequently described, with a few examples illustrating their function in the overall GEO process.

Table 7.8.1. Typology of additional GEO Products

<i>Product type</i>	<i>Subtypes</i>	<i>Reports identified</i>
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	<i>GEO Year Books</i> and <i>UNEP Year Books</i>	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's 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 up¹² 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).

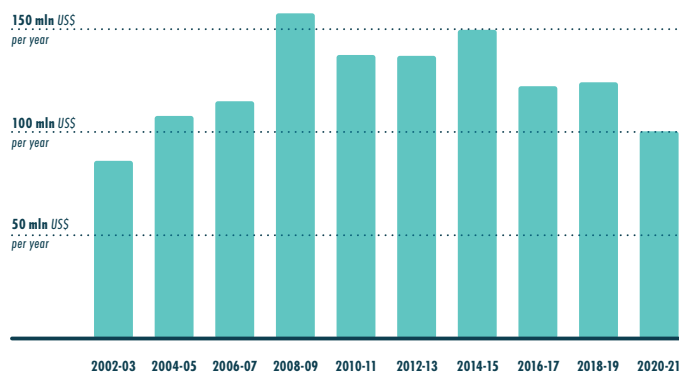
The Environment Fund is provided directly by member states and is the core source of flexible funds, currently comprising around 15 per cent of UNEP's total income. Unlike the UN Regular Budget, where member state payments are mandatory and assessed on the basis of their economic capacity, the Environment 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 <i>GEO-2000</i> , 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 <i>GEO-3</i> ; 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 <i>GEO-5</i> process; translation of <i>GEO-5</i> 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

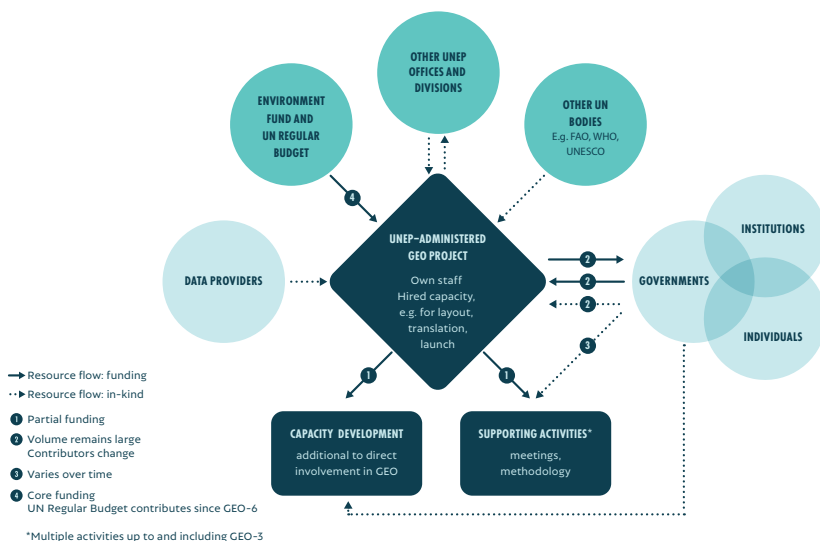
Note: Some donations included in-kind contributions

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 short-fall	Shortfall
		Environ-ment Fund	UN Regular Budget	Addition-al donor funding			
	million US\$						per cent of projected costs
<i>GEO-1</i>	?	?	0	?	?	?	?
<i>GEO-2000</i>	5.10 [#]	2.94	0	2.16	?	?	?
<i>GEO-3</i>	5.14	3.24	0	1.52	4.75	0.38	7
<i>GEO-4</i>	6.00	?	0	?	?	?	?
<i>GEO-5</i>	7.58	1.54	0	4.43	5.97	1.61	21
<i>GEO-6 estimate A^{##}</i>	10.15	?	0.69	2.20	?	2.47	24
<i>GEO-6 estimate B^{##}</i>	13.60	?	?	?	?	2.69*	?
<i>GEO-6 estimate C^{##}</i>	4.92	0.58	0.89	2.08	3.55	1.37	28
<i>GEO-6 estimate D^{##}</i>	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.

¹⁶ Following recognition and use of *GEO-5* at Rio+20 in 2012, and supported by the Convention of 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 per cent of the total estimated cost of the global *GEO-6* during 2018-19. It was still to be secured in the Regular Budget for 2020-21 (US\$300,600, slightly more than the overfunding provided from other sources but do not include UNEP staff

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-6A' and 'GEO-6B' 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:

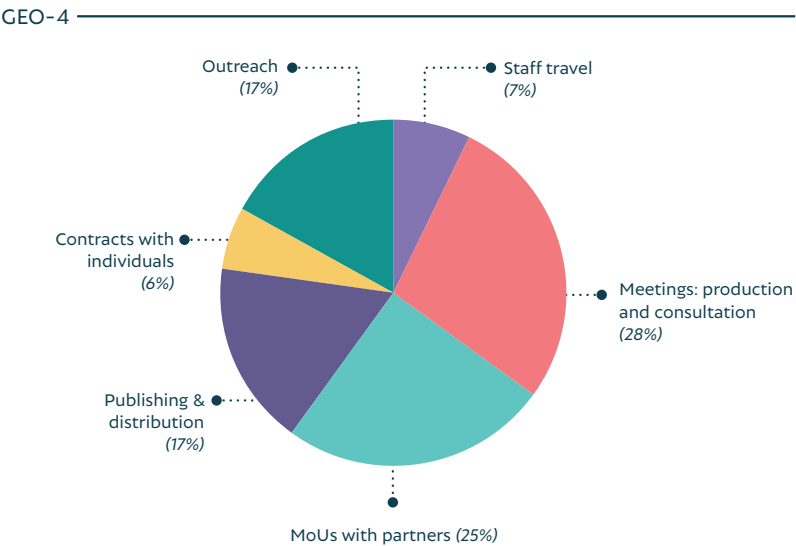
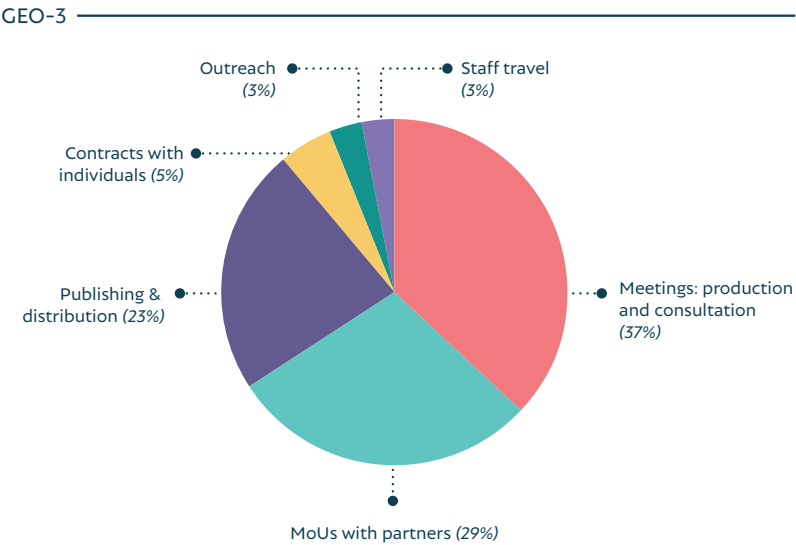
- The overall budget for the Millennium Ecosystem Assessment carried out from 2001-2005 was approximately US\$24 million (MEA, 2005)
- Thnts, which are funded through a trust fund, were calculated in 2006 to cost approximately US\$5 million a year, or US\$20 million per edition (UNEP, 2006b). Each edition, 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.



Note: Costs for UNEP staff (except travel), capacity-building and the GEO Data Portal are not included in either of the above charts.

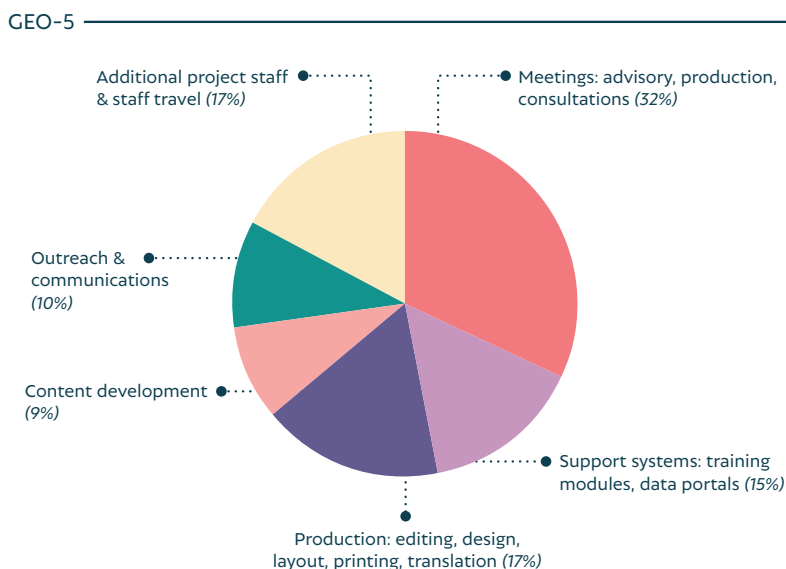
Source of data: (GC/UNEP, 2009b)

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.