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Background Paper for the Intergovernmental and Multi-stakeholder Consultation on the Sixth UNEP Global Environment Outlook (GEO-6)

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ABSTRACT

Charting alternative policy pathways and their likely implications through a multi-stakeholder process can be a useful exercise in addressing the challenges of re-orienting contemporary Global Environmental Assessments (GEAs) from a dominant focus on problem analysis to solution strategies. The development of such pathways will benefit from continuous monitoring of key policy indicators that help evaluate the status of policy-goal attainment, and from retrospective appraisals of specific policies at various scales. Investments into building social science policy assessment capacity in the mid- to long-term could therefore enhance the saliency and impact of future GEAs. Given the limited resources of any GEA process and the need to ensure their scientific credibility, careful choices need to be made in specifying the mandated scope and objectives of emerging GEAs.

It's been nearly 40 years since the first large-scale scientific assessment of global and environmental scope was initiated. Global environmental assessments (GEAs) have arguably become one of the most systematic, deliberative, comprehensive and integrative modalities for assembling, synthesizing and organizing scientific information. More importantly, GEAs have been seen by many to be very useful and deeply influential tools for catalysing cooperation at the science-policy interface, and arriving at consensual evidence-based knowledge to inform policy discourses and decision-making.

Nevertheless, GEAs have shared a complex and sometimes uneasy coexistence with policy-making systems and international governance regimes, where scientific debates and political ones, not surprisingly, often overlap and clash. Balancing the imperatives of legitimacy, saliency and scientific credibility has proven to be a continuous challenge for GEAs. The practice of conducting GEAs has also given rise to various structural and normative obstacles, including but not limited to, the objective treatment and integration of divergent viewpoints, complex issues of scale and cross-scale interaction (in social, political and natural systems), fair and inclusive stakeholder engagement, and the management of an increasingly vast and fragmented landscape of often uncertain information and data across disparate knowledge systems.

Amidst the evolving political and institutional contexts that GEAs are embedded in, and a broadening of knowledge needs, including a push towards solution-oriented enterprises, the GEA practice finds itself at crossroads. Today, a growing number of actors at the science-policy interface, and within the GEA community, are calling for reforms and questioning whether certain GEA modalities remain fit for purpose. Four decades offers a good vantage point to reflect on the evolving character, dominant focus and shifting orientation of contemporary assessments.

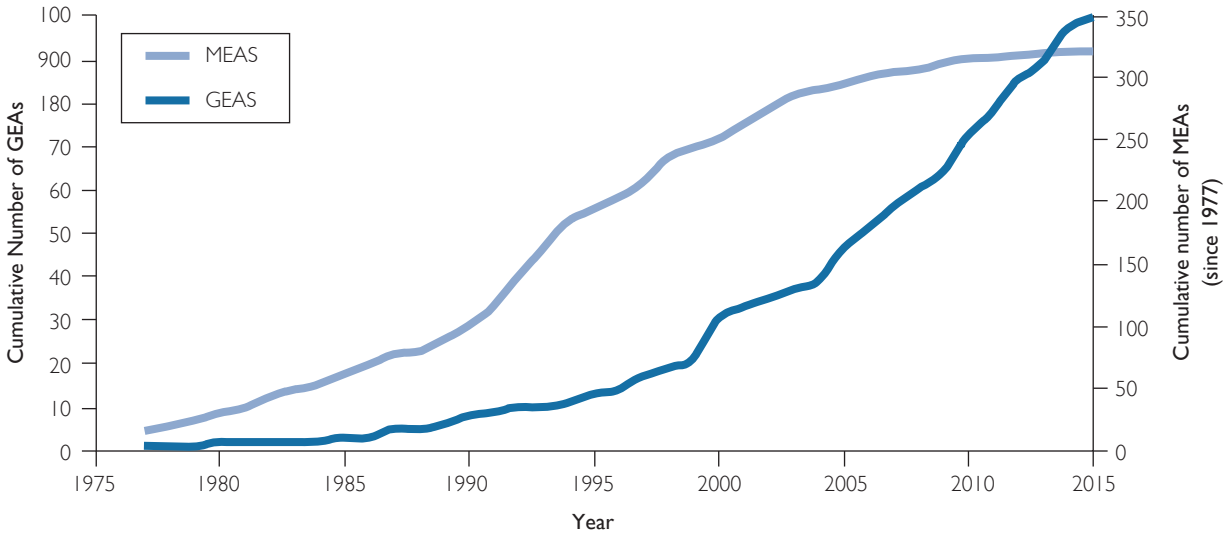

Figure 1 - *Constitution of the institutionalized global environmental policy discourse domain: Cumulative number of Multilateral Environmental Agreements and completed GEAs since the late 1970s.*

A retrospective analysis of international scientific assessments reveals that the genesis of GEAs is closely and significantly connected to the birth of environmental multilateralism. Figure 1 shows the cumulative growth in adopted Multilateral Environmental Agreements (MEAs) and completed GEAs beginning in late 1970s. It also reveals the more recent and rapid proliferation of GEAs, where more than 60% of all large-scale assessments produced to date have occurred in the last ten years. Taken together, GEAs and MEAs have opened a new space for global environmental policy discourse.

This background paper, produced as input to the GEO-6 Intergovernmental and Multi-stakeholder Consultation, aims at discussing how the opportunities offered by this global discourse may be harnessed more effectively in the future by adapting GEA processes. The basis for this paper is the work-in-progress under the MCC- led FOGEAM collaborative research initiative and its preliminary findings, empirical observations and conceptual arguments which we hope will inform the deliberations on the preparatory design phase and scoping of GEO-6. Here, we present a summary of five key messages that shed light on the emerging challenges facing contemporary GEAs and discuss potential response strategies. A concluding section offers some final reflections on options for the scope and objectives of GEO-6.

1. Major changes from assembling knowledge to managing complexity, and the shift to solution oriented GEAs

Over the past three decades, GEAs have experienced a number of significant changes, including a discernible rise in epistemic and process complexity. As a result, they have also become more comprehensive and elaborate. Another important change is the increasingly prominent shift in GEAs, from problem- towards solution-orientated enterprises.

Several indicators illustrate the increasing epistemic and process complexity of GEAs. Figure 1 documents the dramatic rise in number of references and source materials used in the the five successive iterations of the GEO and IPCC reports, revealing six and 10-fold increases respectively, from the first reports to the most recent. Citation analyses reveal an exponential increase in the underlying peer-reviewed literature on the topic of climate change . Partly as a response to this challenge of an increasing body of knowledge, the number of authors and expert contributors of large-scale GEAs has also risen consistently (Figure 2). In addition, the length of large-scale GEA reports (including GEO) has increased linearly over time. The IPCC assessment reports exhibit a nearly five-fold increase in the combined total (WGI, II, and III) page count, with the First Assessment Report (FAR) featuring 911 pages, and the most recent iteration (AR5) at 4,300.

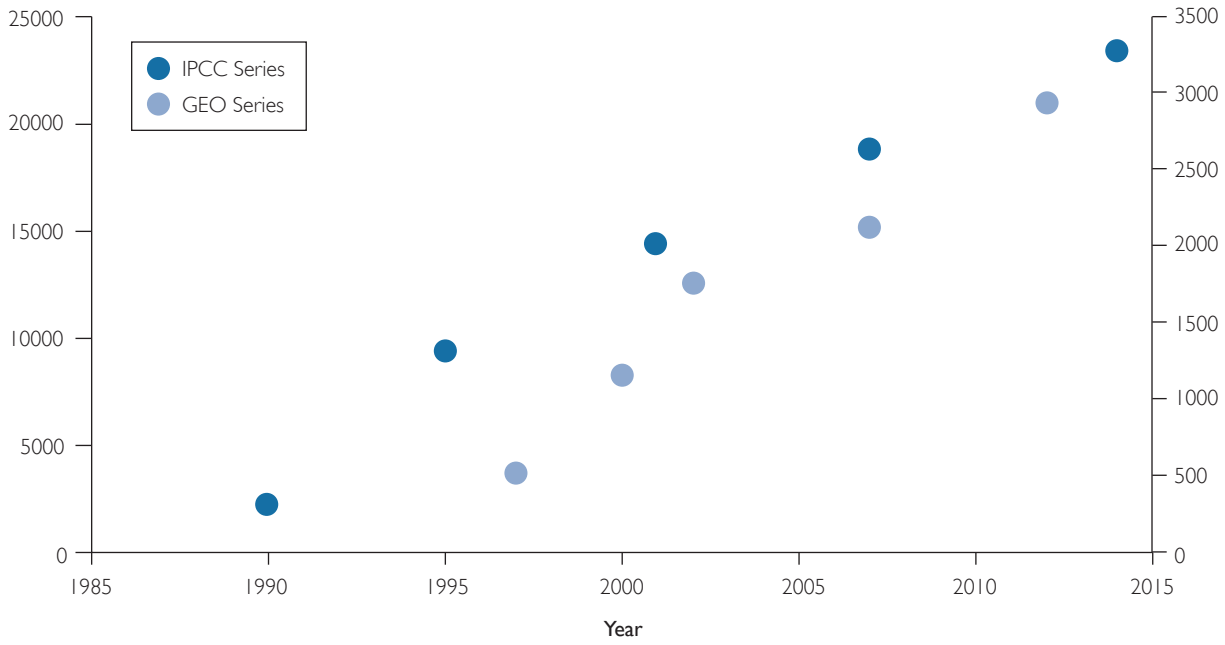

Figure 2 - *Trends in the number of references/ source materials used in recurring GEO and IPCC assessment over five successive iterations. The left vertical axis indicates numbers for the IPCC, the right hand axis for GEO.*

The growth of complexity in the task GEAs are facing is also indicated by a substantial rise in the number of mandated objectives per assessment (Figure 4). The number and range of specific scoping and framing questions that assessments are expected to address (now a prominent feature of intergovernmental GEAs) has also increased significantly. Moreover, of the GEAs assessed, there was no evidence of any deliberate prioritization or ranking of such objectives; thus, leaving their relative importance open for interpretation.

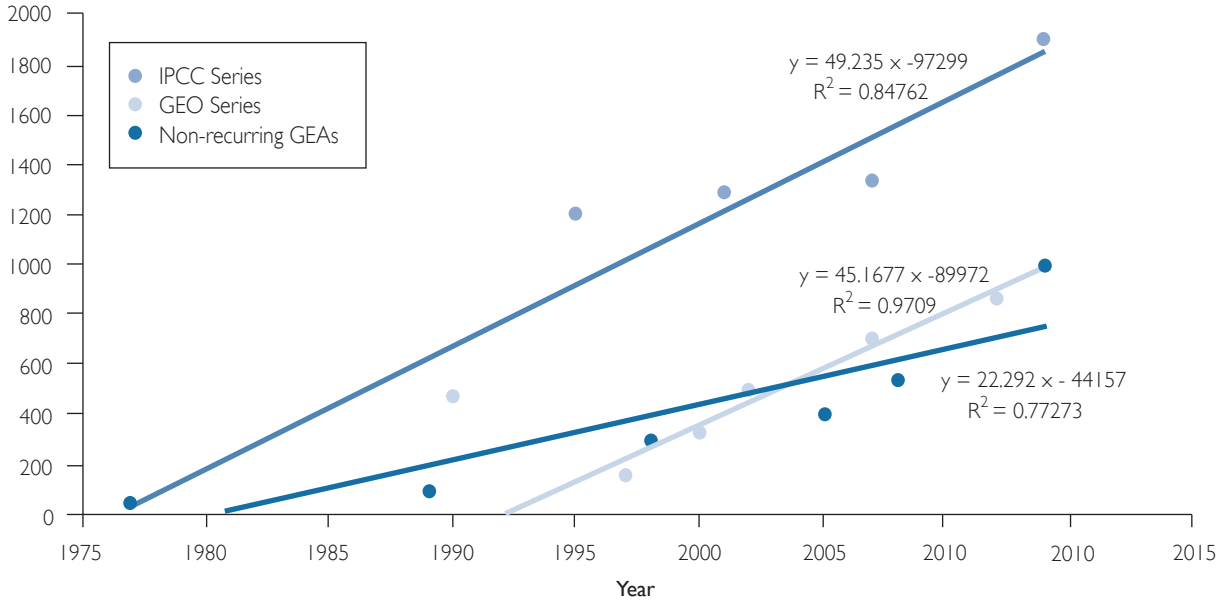

Figure 3: *Trends in the number of authors and expert contributors for GEO series, IPCC, and several non-recurring GEAs.*

In addition to these changes, contemporary GEAs exhibit a deeper engagement with, and emphasis on future outlooks, response strategies, action-oriented narratives, and to varying degrees, public policy analysis. This is reflected in both the evolution of institutional objectives and authorizing mandates for GEAs processes, and their aggregate outputs, where 44% of the content presented in GEO-5 represented solution-relevant material. Discourse analyses on 320 source materials of four GEAs[1] from 1985, 1995, 2008, and 2012, reveals an increasing reliance on solution-focused information with 0%, 12%, 47% and 55 % respectively. Taken together, these changes correspond to the perceived shift towards solution-oriented GEAs expressed by many stakeholders and researchers interviewed in the context of the FOGEAM project.

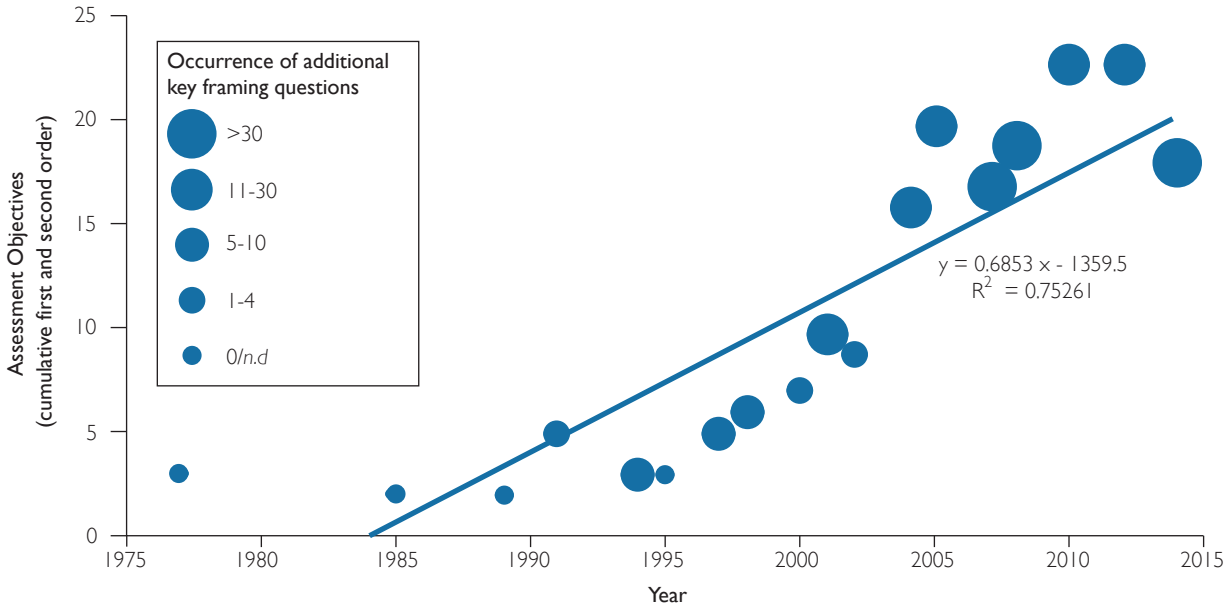

Figure 4: *Increase in the extent and scope of assessment objectives over time. The size of a data point represents the occurrence of additional key framing questions.*

This shift towards solution-orientation of GEAs is likely attributable to recent changes in the global political arena where environmental issues have become more mainstreamed (particularly in the context of sustainable development) and where a number of international policies and regimes have been adopted, but lack appropriate means of implementation. As pervasive environmental problems persist, key stakeholders appear to be increasingly interested in a better understanding of the trade-offs across multiple societal objectives (including macroeconomic and social) that alternative future policy scenarios will imply.

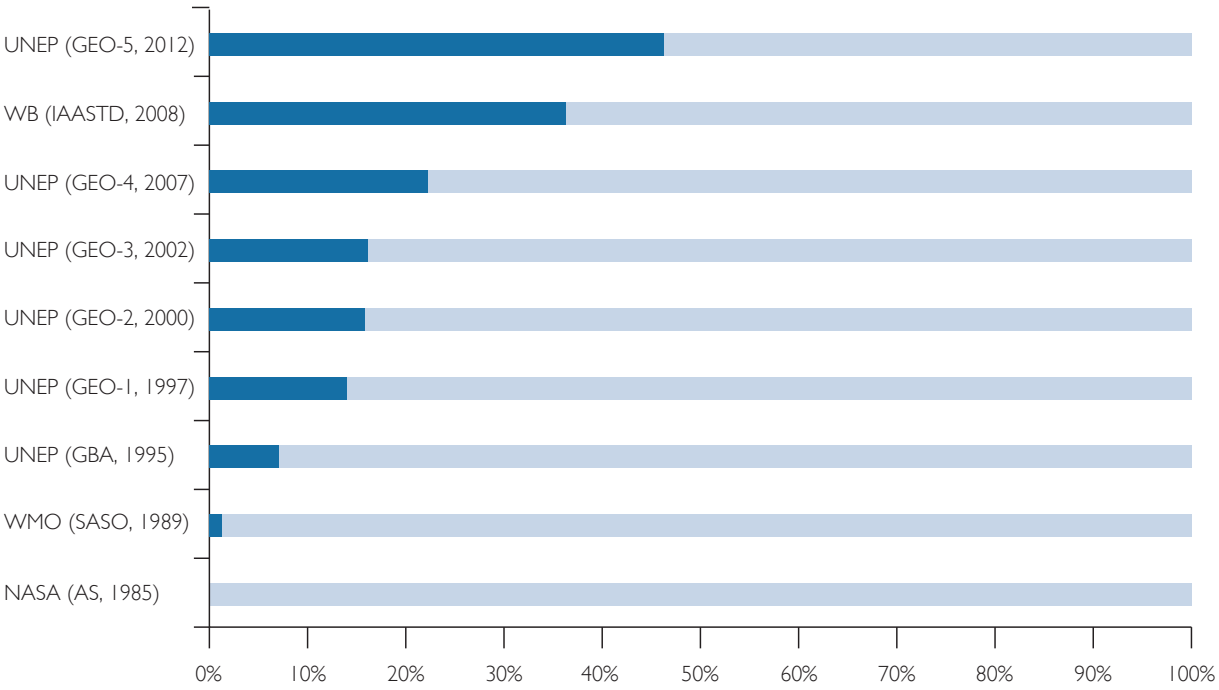

Figure 5: *Proportion of selected GEA reports representing solution-oriented material, analysis and findings as reflected in narratives, graphical illustrations, tables, data and supporting imagery.*

An increasing focus towards solution-oriented public policy assessment in GEAs would offer the opportunity of enhancing the quality of public policy discourses by providing answers to salient policy questions. Ultimately, this can enable, replace and/or have the potential to improve the existing flows less reliable, and highly fragmented forms of policy information. Solution-oriented policy assessment in GEAs, as enterprises with a distinctly *global* scope, bear three distinct opportunities: (i) Informing and potentially facilitating deliberations over and the implementation of global and international policy regimes; (ii) facilitating the diffusion of domestic policy lessons and related collective learning processes across regions, and sometimes disputing stakeholder groups; and (iii) supporting environmental policy agenda-setting processes by initiating more explicit, systematic and rational public discourses on the suitability of alternative policy instruments and measures.

2. Emerging challenges: Complexity managment and policy assessment

These changes are giving rise to a number of challenges. The increasing epistemic and process complexity of GEAs renders process coordination and goal attainment ever more difficult, and resource-intensive. The shift to the analysis of potential policy solutions in GEAs is accompanied by several fundamental challenges: The complexity of the domain of international environmental governance (IEG); prevailing research gaps in research on policy options; the pervasive uncertainty of policy-related knowledge; and the disputed normative implications of such research.

The challenge to integrate an increasingly vast and diverse body of scientific knowledge to serve the rapidly expanding demands of target audiences is pushing the capacities of GEA teams towards their "feasibility frontier", where difficult trade-offs are arise. For example, while enlarging page counts and producing increasingly voluminous reports allows for a wider range of topics to be covered with more depth, it also reduces accessibility of an assessment. Increasing the size of author and production teams, and expanding rigorous peer-review processes renders process coordination ever more costly and demanding. The proliferation of GEA objectives and the broadening of their scope risks diminishing the intensity of the analysis, creating confusion and friction among experts, and exposes assessment processes to be diverted by peripheral issues. In the absence of additional guidance and/or stricter measures on the development of GEA objectives, many assessment processes could soon be besieged by their own mandates and unwieldy bulk.

One of the main challenges of moving toward solution-orientated of GEAs is the fundamental complexity and high-dimensionality inherent in global environmental governance domain. Among the multiple interacting dimensions that need to be specified in any policy assessment are time (past vs future), multiple spatial and governance scales, multiple sectors (including environmental and economic), multiple objectives motivated by multiple actors, and multiple methodologies that may employed in the assessment (including the treatment of uncertainty). These dimensions combined result in a staggeringly complex domain of knowledge that is virtually impossible to address comprehensively within a single GEA. Second, the current lack of policy research on many of the uncomfortable questions that solution-oriented GEAs are addressing (e.g., on human behaviour and political action) makes it

difficult for them to develop the required knowledge syntheses. Third, pervasive uncertainty in much of the social scientific knowledge that is available imposes challenges of how to conceptually manage and communicate these uncertainties to GEA audiences. Fourth, the often politically contested nature of policy analysis at the national level render GEA processes subject to internal and external conflicts in discussing related divergent viewpoints that are often value-laden. In addition to these challenges, the absence of broadly accepted conceptualizations and methodologies for policy assessment in GEAs has impeded their design and conduct in the past, including in GEO-5.

3. Response options: The importance of focus and alignment of objectives and means

Responding to the challenges associated with increasing epistemic and process complexity of GEAs requires a targeted re-orientation of contemporary GEAs. In general, responses should be guided by an improved strategic alignment of (i) the scope and objectives of GEAs; (ii) the provision of appropriate means and resources (methodologies, frameworks and procedures, expertise, time, funds); and (iii) the broader context in which GEAs are situated in terms of relevant policy discourses and imminent policy questions. As an interim measure, one specific option for facilitating this alignment is to reduce the scope and objectives for a given GEA.

As several expert observers have suggested[2], more narrowly defined scope and objectives for GEAs would mean addressing only targeted questions within a GEA that are particularly relevant for specific policy discourses. Importantly, this implies deliberately restricting the temporal, spatial, sectoral and other relevant dimensions of the analysis during the inception and mandating of future GEAs.

Such considerations should to take into account the trade-offs between resource-intensive GEAs providing more comprehensive, integrated knowledge synthesis on the one hand (such as the IPCC assessments), and less onerous but narrower niche contributions to policy discourses on the other (such as the UNEP Emissions Gap Report). Considerations over the scope of GEAs should also take into account the possibility of optimizing the effects of improved coordination across the emerging landscape of GEAs to ensure that, in aggregate, sufficient quality information on the overall policy domain is provided to policy discourses. In view of proposals for GEO-6, the broad scope and range of objectives in terms of reviewing both environmental challenges as well as promising policy pathways in all world regions as well as the global level, combined with an ambitious time frame that would have GEO-6 finalized by either 2016 or 2018, begs the question of whether the implementation and delivery of these outputs could be deliberately and strategically sequenced.

4. Policy assessment: Mapping future pathways

One option for responding to the challenges that solution-oriented GEAs face—in terms of the pervasive uncertainty and the disputed normative implications—is to conceptualize them as scientific mapping exercises of alternative future policy pathways and their likely implications, including trade-offs among multiple objectives, potential risks and uncertainty. This should be strongly based on systematic retrospective (ex-post) learning from specific policies. Resultant "dynamic maps of knowledge" can potentially catalyse collective, rational and iterative learning processes in contested public policy discourses without being policy-prescriptive. Expressed in metaphorical terms, such maps can support policy-makers in navigating the political solution space. Policy assessment exercises could benefit from well-designed inclusive stakeholder engagement processes, and would ideally respond to specific and imminent questions in contemporary public policy discourses.

The formulation, implementation and reform of environmental policies at various levels of decision-making will continue to be a dynamically evolving and experimental process in the years to come. GEAs can improve the quality of policy-making by synthesizing and disseminating *ex post* policy lessons, as well as *ex ante* analyses of policy options and how they impact multiple social objectives (including macroeconomic and social). This can inform and enhance the quality of policy discourses and ultimately decisions over the adoption of alternative future policy pathways. Figure 6 provides an illustration of such a conceptualization of policy assessment in GEAs.

The conceptualization emphasizes various options for drawing lessons from historical policy experiments. First, providing monitoring functions by assembling policy-relevant historic indicator data might provide basic information both on the state of the environment, and the state of policy responses. If this approach is pursued in GEO-6, it can build on and develop the UNEP Live platform to aggregate and disseminate relevant data and indicators. Comparing the historic development of such descriptive indicators with past policy objectives (operationalized as goal values of indicators) can offer lessons on whether societies are on track to meeting their objectives or not – the latter signalling a need to re-orient high-level policy attention towards imminent policy failures. Such a function, pioneered in GEO-5, could also benefit from knowledge management capabilities and improved data flows made available through UNEP Live. Third, assessment of case-specific counterfactual analysis can reveal lessons on the distinct impacts of specific policies. Regularly aggregating and updating such lessons within GEAs offers the potential for a systematic process of cumulative 'global environmental policy' learning. However, this is a highly resource-intensive exercise if a broad scope for analysis is adopted in terms of considered policies or spatial extent.

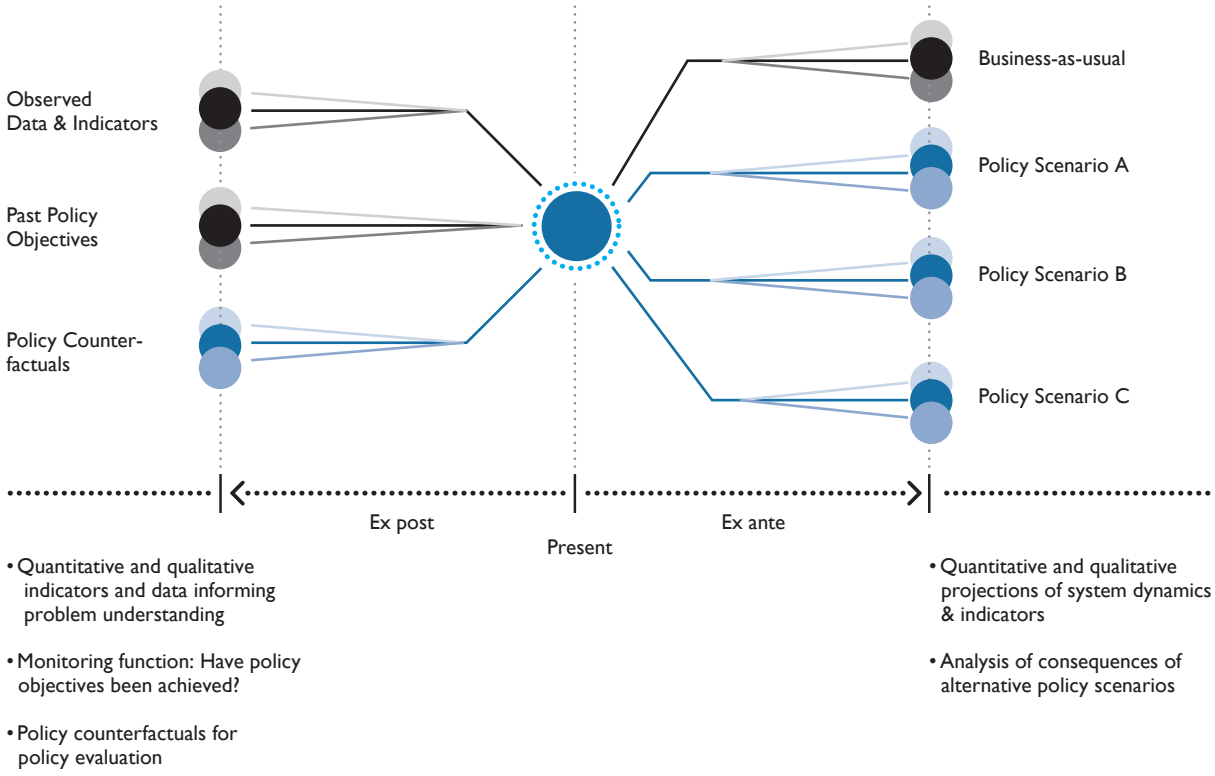

Figure 6: *Conceptual illustration of policy assessment as ex post and ex ante mapping of policy lessons and future decision alternatives. Dashed lines symbolize the need to consider uncertainties in the assessment of policy pathways.*

The increasing significance and high-stakes of environmental policy-making, together with the inherent divergent viewpoints that result from different perceptions, interests and value-sets, will inevitably lead to some degree of politicization and heightened tension within solution-oriented GEAs. Some observers suggest therefore abstaining from engaging in solution-oriented analysis in GEAs altogether. However, abandoning solution-oriented analysis will forgo the potential benefit of providing a fair and transparent account of the likely implications of different public policy positions; which in turn could facilitate and catalyse more constructive discourses and social learning processes, even across conflicting stakeholder groups. An integrated analysis of alternative perspectives within GEAs might seek to establish consensus in terms of "agreeing to disagree" on strongly competing positions. This might involve systematic inclusion of stakeholders within GEA processes that inter alia represent conflicting interest groups to better understand and possible resolve divergent viewpoints. Alternative future policy pathways suggested by different actor groups could be consistently analysed in view of their expected impacts on the policy objectives and interests that are important from the points of view of various relevant actor groups. Public policy objectives that could be considered are those currently deliberated in the emerging set of Sustainable Development Goals (SDGs). These relate to the provision of basic material income, food, health services, access to clean energy, water, reducing inequality, and other societal objectives, including sustainable consumption and production.

In both *ex post* and *ex ante* policy assessment, uncertainties and lack of knowledge over data, theories, models etc. need to be systematically considered in methodologies employed. The dashed lines in Figure 6 symbolize this need for living up to the state of the art of uncertainty treatment in GEAs exemplified e.g. in the multi-model and multi-scenario assessments of the IPCC, or the UNEP Gap Report. There is clearly a challenge in improving GEAs' conceptual capacities for dealing with uncertainties. Among promising approaches are risk management frameworks that are directly geared towards the decision-support needs of policymakers and societies that invariably need to act under conditions of uncertainty.

5. Strategic investments to enhancing policy assessment capacities

It seems worthwhile and strategic to invest in expanding the capacities of solution-oriented GEAs for effectively responding to the challenges of complexity and lack of research, in the mid- to long-run. Such investments should include building relevant Communities of Practices (CoPs), as well as research agendas (including in the relevant social sciences and humanities) in parallel to formal GEA processes. These efforts should be geared towards developing methodologies and empirical knowledge, which can better inform and support the needs of future GEAs.

Partly owing to the inherent complexity of environmental governance, for several policy domains, high-quality research is currently not readily available. As such, there is value in addressing existing knowledge deficits by empowering and engaging appropriate institutions, research networks and scientific partnership. New online Communities of Practice (CoP) could contribute to extending this knowledge base—including enhanced policy assessment methodologies—by building collaborative relationships and communal resources. GEA processes can contribute to such capacity building by identifying gaps in knowledge, leveraging existing partnerships, networks and centres of excellence to engage a broader range of experts, and by leveraging innovative digital platforms that can efficiently organize and convene such CoPs (i.e., UNEP Live).

Beyond the GEA enterprise, public and private research funding agencies have an important role to play in funding research that caters to the needs of GEAs, and could be approached by GEA stakeholders to ensure these organizations recognize this potential. Also, enhancing the incentives and rewards for contributing to GEAs, and conducting research that caters to their needs (e.g. in the evaluation criteria of universities and research institutes) could enhance the engagement of individual researchers. These incentives could also entice larger institutions to orient their existing work towards the specific knowledge needs of GEAs.

Conclusions

A major objective of earlier iterations of GEO was to provide a comprehensive overview of the state of the global environment, considering all relevant environmental sectors both at the global and regional level, and to consider potential policy options. In view of the challenges and response options facing contemporary GEAs, one major question arising in formulating the specific objectives of GEO-6 is whether it could benefit from narrowing its scope and ambition. Three overarching questions can guide related considerations: To which policy discourses (including target audiences) and specific policy questions could GEO-6 respond to? How would this translate into a formal operating mandate providing adequate and well-defined scope, objectives and target audiences? Which resources (including methodologies, frameworks and procedures, expertise, time, funds) are required to meet these objectives, and can they be mobilized for GEO-6?

Three options for the orientation of GEO-6 help illustrate related considerations: First, if GEO-6 would aim at retaining its broad scope in terms of addressing all relevant environmental sectors both at the global and regional level, the scope of this exercise might be narrowed by focusing on systematically assembling historical data on environmental indicators (and deliberately not to engage in comprehensive *ex post* policy assessment). Such an exercise might also assemble *ex ante* projections for these indicators (e.g. generated in related assessment exercises, such as scenarios over future emissions or global warming indicators analysed in the IPCC). UNEP-Live offers an innovative platform and unique opportunity for integrating, managing and communicating this type of knowledge efficiently. In addition, building on the pioneering analysis of GEO-5, *ex post* analysis of progress made on policy targets related to these indicators as agreed in multilateral environmental agreements and conventions could be systematically reviewed. This would contribute to global and sub-global policy discourses by responding to the policy question "are we on track to meeting policy objectives", thereby providing a monitoring function that can guide policy attention towards instances where the answer to the question is "no". Such an exercise could also be closely aligned to the emerging discourse over SDGs and post-2015 development agenda. Again, UNEP-Live could be leveraged as a platform harness appropriate data flows and synthesizing such knowledge. Adopting this approach might imply the need for reducing (or even eliminating) the scope e.g. of policy assessment elements in GEO-6, to focus resources and maximize the quality of such an indicator-oriented exercise. Alternatively, sufficient overall resources need to be provided to enable the same level of quality in pursuing a broader scope. While this might fundamentally alter the character of the GEO relative to earlier iterations, such change in orientation might pay off in terms of enhancing the impacts of the assessment on policy discourses. In terms of required means for such an approach, it would need to strongly involve national and sub-regional stakeholders that retain data on relevant indicators, and to assemble technical expertise as well as policy-oriented expertise on the use of indicators in policymaking.

A second, and alternative, option for refining the mandate for GEO-6 could be to focus on the role of policies, the environment and its inter-linkages with the economy and other social systems in providing basic human services such as health, food and other basic goods (for example, those specified in the emerging set of SDGs). Such an approach could explore alternative future policy pathways to meeting these goals. This would involve a substantive re-orientation of GEO away from offering a comprehensive view of the state of the global environment, and responding more directly to policy discourses related to the provision of these basic goods. Related expertise would need to be carefully assembled to enable integration of knowledge from multiple domains (including e.g. natural, social, and political sciences).

Finally, a third option for GEO-6 might be to attempt building a global policy database that would aim at providing policymakers and society a broad repository of options that promise to successfully tackle environmental challenges. However, such an exercise would need to carefully specify and restrict its scope, as the collation of information on all environmental policies existing worldwide would be highly resource intensive and clearly exceeds the capacity of any existing GEA process. Also, without careful assessment of *ex post* analyses and specific lessons learned for each specific instruments, and consideration of how these lessons can translate into policy

recommendations in other governance contexts, the practical value of such a database will remain very limited. If adopted, one key criterion for selecting the scope of such an exercise should be the availability of reliable literature providing and analysing case studies on policies that lend themselves to review in a GEA. Also, sufficient expertise in the establishment of such databases – posing novel methodological challenges to policy research – would need to be involved, and sufficient time would have to be granted. Overall, in view of the current state of the available environmental policy assessment literature, attempts to create comprehensive global policy databases including multi-dimensional and high-quality data of environmental policies across all dimensions of the domain of global environmental governance seem unrealistic. Experiences gained in GEO-5, suggest that such an ambitious approach, while attractive in principle, would require more strategic and long-term preparation to be successful, including the development of methodologies, CoPs and research programs that produce the necessary knowledge for utilization in future GEAs.

[1] In 1975 the OECD led the first comprehensive GEA process to deliver the *Assessment of Long-Range Transport of Air Pollutants: Measurements and Findings*; this two-year endeavour, the first of its kind, was the product of extensive co-operation between international scientists, laboratories and research institutions across 11 participating countries.

[2] For example see Mitchell et al., 2006; Rothman et al., 2009; Watson, 2013

[3] GEA Harvard Project

[4] The FOGEAM project (Future of Global Environmental Assessment Making) commenced in 2013 and is a joint research initiative by the MCC (Mercator Research Institute on Global Commons and Climate Change) and UNEP. The MCC is an independent academic research institute established in 2012 and located in Berlin (www.mcc-berlin.net). The research in FOGEAM aims at learning from past GEAs to inform the design and conduct of future GEAs. It employs multiple empirical methods, including 81 interviews with various stakeholders in the GEO-5 process and other GEAs including the IPCC AR5 (avg. interview duration 55 minutes); compilation and analyses of a GEA metadata catalogue comprising of information on 20 large-scale assessments; analysis of GEA background documents; and several expert workshops. The empirical analysis is complemented by literature review and synthesis as well as own conceptual argumentation. A preliminary draft report on the work in progress conducted under the FOGEAM project is available at the UNEP Live GEO-6 Community of Practice website.

[5] Grieneisen and Zhang, 2011

[6] These include the 1985 Ozone Assessment, the 1995 Global Biodiversity Assessment, the 2008 International Assessment of Agricultural Science, Technology for Development, and the 2012 Fifth Global Environment Outlook.

[7] Nature 2013, Hulme 2010, and several interviewees