The Politics of Bridging Scales and Epistemologies
Science and Democracy in Global Environmental Governance

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Why should global environmental assessments concern themselves with the complex, costly, and sometimes uncomfortable challenge of bridging scales and knowledge systems? After all, conducting a comprehensive, scientific assessment of environmental change at global scales is hard enough in itself. What benefits can be achieved from further complicating the task to integrate knowledge from alternative epistemological paradigms and subglobal scales?

One answer is to more effectively link knowledge to action by promoting accurate, policy-relevant global environmental assessments. Bridging scales and epistemologies may enable assessments to better integrate local knowledges into global models and data sets, potentially strengthening the accuracy of their findings. Likewise, integrating scientific and indigenous knowledges, or global and national styles of reasoning, may contribute to better translation of assessments into effective policy strategies for addressing global environmental change.

These are important pragmatic reasons to bridge scales and epistemologies. In this chapter, however, we approach the question from a more overtly political standpoint. Viewed politically, global environmental assessments are not only attempts to synthesize scientific knowledge but also elements in reworking the constitutional foundations of global order (Miller 2004a; see also Jasanoff 2003 and Litfin 1998). But what kind of global order are assessments forging? Unfortunately, too often, attempts by assessments to portray science in a unified framework contribute to excluding voices from global decision mak-

ing and exacerbating ideological divisions in global society (Miller 2004b, 2003). In this manner, assessments contribute to the growing "democratic deficit" that permeates international institutions (Held 2004; Verweij and Josling 2003; Keohane 2001). We contend that, if properly designed and managed, efforts to bridge scales and epistemologies in global environmental assessments could contribute to the converse: promoting inclusion, dialogue, deliberation, and democracy in global governance.

Our argument brings together two literatures; comparative policy analysis and deliberative democratic theory. Combined, these literatures suggest the need to recognize and foster epistemic pluralism and deliberation as an important element in democratizing international governance. Building on the idea that this might be accomplished through "reasoning together" (Jasanoff 1998), we suggest a fourfold strategy for bridging scales and epistemologies in global environmental assessments:

- *Building critical capacity for policy reasoning*—strengthening citizen capacity across the globe to formulate and reflect critically on reasoned justifications for global policy choices
- *Promoting epistemic tolerance and pluralism*— recognizing and facilitating the expression of divergent styles of reasoning about global environmental risks in governing forums
- *Enhancing epistemic dialogue and exchange*—encouraging efforts to bring divergent styles of reasoning into dialogue and exchange as well as cross-cutting reflection and evaluation
- *Orchestrating cross-scale epistemic jurisdiction*—strengthening dialogue and exchange, as well as appropriately delegating authority, across scales of assessment and governance.

We then turn to practical strategies that global environmental assessments might adopt to pursue this more politically oriented approach to bridging scales and epistemologies. In particular, we focus on regionalization. Regionalization, per se, is not the point. As a strategy, however, regionalization has immediate consequences—breaking up the assessment into parts, enabling variations in assessment design and practice across parts, and making possible dialogue among the parts—that may benefit a deliberative approach to global environmental assessment. We compare and evaluate several approaches to regionalization, including those adopted by the Millennium Ecosystem Assessment

(MA), the Intergovernmental Panel on Climate Change (IPCC), the Global International Waters Assessment (GIWA), and the Arctic Climate Impact Assessment (ACIA), illustrating how choices in assessment design and management can affect the ability of regionalization strategies to achieve the goals of our model. We conclude with suggestions for going beyond current strategies of regionalization to more effectively bridge scales and epistemologies in the service of democratizing international governance.

Reasoning and Democracy

Democracy can be understood as the insistence that all individuals affected by policy choices have a voice in the policies' making. Many practical approaches have been designed to try to achieve this goal: majority rule combined with protections for minorities, decentralization and differentiation of power, election of representatives to deliberative bodies, federalism, and so forth. Environmental change challenges most if not all of these traditional approaches to democracy. Natural systems and processes cross the boundaries of existing political jurisdictions and affect people who do not have a voice in policy decisions. Additionally, environmental policy making requires experts whose knowledge is essential for assessing and managing environmental problems but whose epistemic frameworks and styles of reasoning may disenfranchise other stakeholders. The need to bridge scales and epistemologies is thus endemic if environmental policy choices are to comport with the core tenet of democratic governance.

The environmental challenge to democracy and the need to bridge scales and epistemologies are particularly acute in global environmental governance. Global environmental change crisscrosses thousands of local and national jurisdictions, and epistemic pluralism is pervasive. Fundamental approaches to reasoning about risk vary across cultural contexts (see, e.g., Thompson and Rayner 1998; Wynne 1995; Krimsky and Plough 1988; Douglas and Wildavsky 1982), including between science and policy, lay, and indigenous communities' social and ecological knowledges (Lachmund 2004; Martello 2004a, 2004b; Iles 2004a, 2004b; Ellis and Waterton 2004) and also across national regulatory sciences (Parthasarathy 2004; Daemmrich and Krucken 2000; Jasanoff 1995, 1986). Even scientific disciplines differ in preferences regarding models, instruments, methods, and styles of reasoning (Hacking 2002). Consequently, bridging scales and epistemologies is not simply a matter of increasing the spatial or temporal

resolution but of stitching together multiple knowledge systems that encompass divergent paradigms and operate from distinct assumptions and evidentiary standards, ideological commitments, and frames of meaning (Miller 2000). In this sense, bridging scales becomes a special case of bridging epistemologies, as epistemic frameworks emerge as a key difference across scales.

To address these challenges, Jasanoff (1998) suggests "reasoning together." Theories of deliberative democracy emphasize the importance for democratic legitimacy of government agencies using reasoned analyses to justify their decisions.[1] They also emphasize the opportunity for public deliberation about the reasoning behind policy choices (see, e.g., King 2003).[2] As discussed, however, styles of reasoning used in justifying policy choices vary across countries, suggesting the need, first, for a dialogue about different styles of reasoning about risk before settling on unified global knowledges. Jasanoff characterizes this kind of intentional deliberation, exchange, and comparative evaluation and critique among epistemic frameworks as "reasoning together."

Global environmental assessments already play important roles in the deliberative justification of global environmental policy making; their primary task is to provide a reasoned analysis for making policy choices. To date, however, they have tended to approach this task as one of developing an objective, global rationale for policy action rather than from the perspective of fostering dialogue and exchange among multiple styles of reasoning. How might they do otherwise? Being primarily concerned with setting up the problem, Jasanoff (1998) offers only sparse practical guidance regarding reasoning together. Here, we elaborate the concept of reasoning together to provide more specific guidance for global environmental assessments.

We propose considering reasoning together in two parts: first, strengthening the representation of divergent epistemic frameworks in global environmental assessments; and second, fostering dialogue, exchange, and mutual evaluation and critique among these divergent styles of reasoning. Each can be further differentiated into two subparts. The goal of strengthening epistemic representation in assessments entails, first, building the capacity of divergent groups to articulate persuasive, credible styles of reasoning and, second, creating institutional spaces that help articulate divergent epistemic frameworks. In other words, an absence of epistemic pluralism in global environmental assessments can result either from an absence of multiple powerful voices or from institutional configurations that exclude or marginalize competing voices.

Likewise, fostering epistemic dialogue, exchange, evaluation, and critique involves two additional tasks: first, creating institutional frameworks that encourage such activity within assessments and, second, orchestrating epistemic dialogue and exchange across assessments at multiple scales and in distinct political jurisdictions. Thus, we suggest four challenges.

Building Capacity for Critical Policy Reasoning

A central element of deliberative democracy is the ability for participants in civic life to formulate, articulate, and critically evaluate reasoned justifications for policy choices. At stake is their capacity to reason deliberatively and to make informed judgments about important policy decisions. Yet, few anywhere can claim a high capacity for making reasoned judgments or for evaluating critically the claims made by others about the planet's future. Global environmental assessments reflect one aspect of necessary capacity, but one that meaningfully reaches only a fraction of the Earth's citizenry and that reflects limited epistemic frameworks. Strengthening capacity for critical policy reasoning on global issues will entail, to some extent, public education; but perhaps more important are institutional innovations that enable communities to feel confident, first, in critically evaluating policy rationales and their relevance to local frames of meaning and, second, in formulating and articulating supporting rationales for their judgments about how to protect the global environment. Numerous transnational movements and institutions are responding to this challenge, but global environmental assessments are uniquely situated to contribute to the integration of scientific reasoning into broader processes of social learning.

Promoting Epistemic Tolerance and Pluralism

Global environmental assessments and other global policy-making forums also need restructuring to recognize, tolerate, and facilitate the expression of divergent styles of reasoning. As capacity for critical policy reasoning about global change expands, engagement and participation in global policy exercises seems likely to grow. Global institutions must find ways to respond appropriately to this demand for the expression of ideas from across divergent scales and epistemologies, lest they suffer further loss of legitimacy (Stiglitz 2002). This seems particularly true for global environmental assessments, which have been criticized for failing to include knowledges that differ from those of transnational scientific networks (Thompson 2004; Rayner and Malone 1998; Agarwal and Narain 1991).

Enhancing Reciprocal Dialogue and Exchange

A third important objective is to restructure scientific assessments to serve as deliberative spaces within global governance. The model of reasoning together, as we conceive it, is one in which mutual learning occurs across scales and knowledge systems. Global environmental assessments can facilitate such learning by (1) making differences across styles of reasoning explicit, (2) structuring comparative evaluations of reasoning techniques, (3) promoting dialogue about the appropriate application of methods and frameworks to global contexts, (4) facilitating cross-cutting evaluation, and (5) communicating these deliberations broadly. The last is essential if deliberations prompted by global environmental assessments are to extend their impact to global audiences other than the individuals who participate directly.

Orchestrating Cross-scale, Epistemic Jurisdiction

Efforts to bridge scales and epistemologies should also be understood as part of a broader exercise of effectively linking local, national, and global governance. Deliberative reasoning needs to occur as much across scales as it does among participants at any given scale. Sorting out when reasoning can be left to local or national epistemic frameworks, as opposed to global standards, can be tricky. Likewise, as the structure and authority of global environmental governance expands, citizens, scientists, and businesses can be expected to join states in demanding greater access to global institutions, including those producing knowledge claims used to justify global policies. To help overcome some of the rifts in global environmental policy making, global environmental assessments need to find ways to be responsive to these shifts—for example, by supporting robust notions of epistemic citizenship for individuals around the globe (Jasanoff 2004).

Regionalization: A Strategy
for Reasoning Together?

How might global environmental assessments approach reasoning together, as elaborated here? Here we look at one possible strategy, *regionalization,* the practice of breaking up global environmental assessments into parts, each focused on a geographically bounded region. If the point is to promote epistemic pluralism and dialogue in global affairs, regionalization, as a strategy, has

immediate consequences—breaking the assessment into parts, enabling variation in assessment design and management across parts, and making possible dialogue among parts—that may help facilitate deliberative approaches to reasoning together. Regions can articulate different epistemic frameworks and rationales for global environmental policies. Not all approaches to regionalizing global environmental assessments are equally conducive to the model of reasoning together, however. Unless regionalization is designed as an exercise and experiment in reasoning together, it will likely fail to address one or more of the four challenges described above.

During the 1980s and 1990s, global environmental assessments focused on the globe, with little systematic attention to regions. For assessments like the IPCC and the Global Biodiversity Assessment, the primary purpose was to communicate the nature and extent of global environmental risks to negotiators of international treaties (Benedick 1991; Bolin 1994). A key feature of these assessments was their emphasis on the universality of such risks—risks that were framed on the scale of the planet itself (Takacs 1996; Jasanoff 2001; Miller 2004a, 2004b).

These first-generation global environmental assessments faced considerable difficulty from multiple styles of reasoning (Jasanoff and Wynne 1998; Thompson and Rayner 1998). In their search to present a consensus view of scientific knowledge, many experienced protracted contests over different approaches to reasoning about risk. One such disagreement took place during the second IPCC assessment report in the mid-1990s. Economists tasked with monetizing the economic impacts of climate change adopted statistical values for lives lost consistent with measures of lifetime earnings and willingness to pay to avoid loss of life. Their results valued lives in wealthy countries an order of magnitude higher than lives in poor countries, generating considerable scientific and diplomatic debate (Meyer and Cooper 1994). Criticism focused on the methods of valuation underpinning global policy decisions and sharply attacked willingness-to-pay approaches. The episode cost the IPCC considerable credibility, especially among developing country audiences (Masood 1995). In mid-1995, the Indian head of delegation to the Framework Convention on Climate Change wrote to his fellow delegates rejecting the IPCC economists' logic.[3] Angry letters, signed by a broad spectrum of scientific and nongovernmental organization (NGO) leaders, denounced the draft chapter in *Nature* and several major British newspapers.[4]

Since 2000, by contrast, international assessments have begun to incorporate

substantial regional components. In 2001, the IPCC subdivided the globe into ten geographic regions and carried out chapter-length assessments of climate impacts for each (McCarthy et al. 2001). The MA has developed a bifurcated strategy, including a global assessment and over two dozen "subglobal" assessments that include both regional and thematic, cross-regional studies. The GIWA has adopted a bottom-up perspective, aggregating watershed-scale assessments for each of the world's major river basins into a global narrative. Regions have also pursued their own assessments, such as the ACIA, a stand-alone assessment of the vulnerability of the Arctic region to changes in the Earth's climate system.[5] Many other stand-alone regional assessments of climate change have been carried out, including the U.S. National Climate Impact Assessment and the German Enquête Commissions.

As global environmental assessments have added regional components, they have minimally acknowledged that a single, global assessment fails to address the needs and concerns of people in different cultural and geographic contexts. In some cases, regional assessments have gone further, helping to pluralize styles of reasoning in global environmental governance by allowing regional assessors to adopt divergent methods and approaches. Regional assessments may also build capacity to conduct and critique assessments in multiple centers, and they are positioned, when conducted as part of a global assessment exercise, to bring multiple assessments into dialogue with one another across localities, scales, and epistemes. As the brief discussion of the MA, IPCC, GIWA, and ACIA suggests, however, regionalization has taken a variety of forms. How do these competing approaches to regionalization fare when evaluated according to our model?

Building Regional Assessments

Regional assessments vary according to a range of design and management options. Four are of particular note here: the integration of regional and global assessments; the degree of methodological standardization across regions; whether regional-to-global linkages are bottom-up or top-down; and whether regional assessments seek to bridge epistemologies as well as scales. Table 16.1 offers a brief comparison of the four assessments considered here across these dimensions.

The IPCC follows a common approach to bridging scales. In 2001, the IPCC

Table 16.1

Comparing regionalization strategies of four assessments

	Intergovernmental Panel on Climate Change	Global International Waters Assessment	Arctic Climate Impact Assessment	Millennium Ecosystem Assessment
Stand-alone regional vs. integrated global and regional	Integrated	Integrated	Stand-alone	Integrated
Standardization across regions	Strong: methods and regional definition	Strong: methods and regional definition	None	Weak: orienting principles
Top-down vs. bottom-up data flow and modeling	Top-down	Bottom-up	Both	Both
Epistemologies	Scientific	Scientific	Scientific and indigenous	Scientific and indigenous

subdivided the globe into ten geographic regions and carried out chapter-length assessments of climate impacts and vulnerability for each (McCarthy et al. 2001). These assessments followed a standardized, top-down approach. Each chapter analyzed regional climate impacts using data downscaled from global climate models. These assessments used only published, peer-reviewed scientific studies, and each chapter was written in a standard format, addressing the same topics in the same order.

GIWA also adopted an integrated, standardized approach. Like the IPCC, GIWA assessors divided the globe into nonoverlapping geographic regions that spanned the globe's surface. In contrast to the IPCC, however, GIWA built its global assessment of water resources by aggregating river-basin assessments (Global International Waters Assessment 2002). Like the IPCC, GIWA insisted on strict methodological standards to ease the task of aggregating regional data to derive a global picture. Also like the IPCC, GIWA insisted on using only scientific knowledge.

In contrast to the IPCC and GIWA, the ACIA focuses on a stand-alone assessment of climate change in the Arctic region (International Arctic Science

Committee 2000). The assessment is, nonetheless, designed to bridge scales. Assessors intend to use downscaled data and projections from climate models and satellite data sets to help create robust understanding of climate change in the Arctic. They also argue for the unique, global significance of the Arctic and, therefore, also for the value of insights from the Arctic in global environmental policy. Assessors label the Arctic "a canary in a coal mine"—a place where changes manifest early, warning of potential future dangers. ACIA also differs from the IPCC and GIWA assessments in that it explicitly bridges epistemologies. Scientists have played key roles; so, too, have indigenous communities, who bring knowledge of Arctic change, who learn about the Arctic's role in broader global environmental processes, and who have the potential to become stronger voices in global environmental forums.

While the IPCC and GIWA held regional assessors to tight standards, squeezing out competing styles of reasoning in favor of methodological consistency, the MA adopted a more flexible, plural approach to its "subglobal" assessments. MA subglobal assessments were not planned from above. Instead, the MA initiated these assessments with a call for proposals. Scientists interested in carrying out a subglobal assessment of ecosystem goods and services were invited to submit proposals describing proposed assessment designs. The MA Board then evaluated these proposals and provided seed funding to assessments that met predetermined criteria. The criteria included (1) likelihood of obtaining additional funding for the assessment from non-MA sources, (2) commitment to assessing ecosystem goods and services in an "integrated manner," meaning paying attention to interactions across multiple goods and services and multiple scales, (3) commitment to establishing ties to policy communities, the public, and indigenous groups, and (4) commitment to participating in the MA Sub-Global Working Group.

These criteria constituted a major element in the regulation of MA subglobal assessments, forming basic orienting principles but not specifying the methodology, scope, or institutional organization of a proposed subglobal assessment. This epistemic flexibility was further encouraged during the MA's ongoing work. Although the MA hired a coordinator for the Sub-Global Working Group, who organized frequent meetings among subglobal assessors, these activities were designed to build mutual understanding and dialogue among diverse assessments, not to encourage standardization. Likewise, although the MA strongly encouraged the exchange of data and people between the global assessment

and subglobal assessments, MA leaders insisted that these exchanges facilitate bidirectional flows of insights and information.

The MA's bottom-up approach resulted in divergent subglobal assessments, ranging from highly localized to subcontinent in scale. Although most were "regional" in a geographic sense, some, like the Alternatives to Slash and Burn Agriculture assessment, reflected themes that cut across geographic regions. Even among geographically defined assessments, regional boundaries were often defined by widely divergent criteria: geopolitical boundaries ("China" and "Africa"), natural regions ("Milne Bay"), and natural ("Mekong Delta" and "Salar de Atacama" in Chile) and human-managed ("Stockholm city park") ecosystems. Methodologies varied widely, as well, from ethnographic and focus group approaches to remote sensing and sophisticated computer modeling.[6] MA subglobal assessments also sought to link their activities to divergent policy and public audiences. In this way, the MA enabled subglobal assessors to take advantage of cross-national variation in the methods and integration of risk assessment, enhancing their credibility by tying them to regional evidentiary standards, problem framings, and institutional settings. Strong regional ties have also enabled subglobal assessments to work closely with local and indigenous knowledge holders.

It is worth noting that MA leaders also pursued a parallel approach to bridging scales. In over thirty countries, the MA established "user forums" in which policy and economic actors met regularly to discuss the MA. For each, a local coordinator (individual or organizational) was first identified, who was subsequently responsible for identifying both the rest of the participants as well as the precise modalities and activities of the forum. Like the subglobal assessments, user forums have given considerable flexibility to adapting forums to what "emerges organically in each country," and the resulting forums have taken divergent forms across different countries.[7] In some countries, for example, the forums have taken a strongly technical form, with heavy participation from scientists and midlevel managers from government and the private sector; in other countries, the forums have focused on high-level leadership from the government, NGOs, and indigenous groups. As the MA progresses, a careful, comparative analysis of the subglobal assessments and user forums, paying particular attention to their methodological flexibility and its impacts on issues of communication and engagement with global environmental change, will prove invaluable.

A Practical Approach to Reasoning Together in World Affairs?

What impact do these alternative designs for bridging scales and epistemologies have on the potential for global environmental assessments to promote reasoning together and democratization in global environmental diplomacy? In many ways, it is still too early to offer a full analysis. A large fraction of second-generation global environmental assessments, including the MA, GIWA, and ACIA, are still in progress. That said, the four challenges described above can serve as a starting point.

Capacity Building

Nearly all approaches to regionalization build capacity of some sort—but capacity for whom, to do what? Our model understands capacity very specifically: capacity of individuals and communities around the globe to reason critically about global environmental risks and their implications for day-to-day livelihoods. From this perspective, top-down approaches, such as the IPCC's regional chapters, provide less capacity than approaches that involve regional groups in assessments. Giving regional assessors greater flexibility in design and management (following the MA and ACIA) may also build greater capacity to develop, evaluate, and deliberate methodologies, scope, and meaning derivation than does requiring standardized global approaches (following GIWA).

Epistemic Pluralization

Like capacity building, the multiplication of voices and epistemic perspectives in global environmental governance is stronger in bottom-up approaches to regionalization. Independently organized assessments like ACIA allow regional assessors to diverge sharply from global standards and to choose their own problem framings, evidentiary standards, methodological approaches, institutional models, regional identities, and communication strategies. By contrast, top-down assessments like the IPCC and GIWA frequently generate little in the way of diversity of viewpoint or engagement in their regional assessments.[8] Although they may identify differences in the ways in which global environmental risks play out in regional contexts, they are less likely to fully explore such differences or to connect them effectively to local meanings and policies.

Epistemic Dialogue and Exchange

While both stand-alone and bottom-up approaches to subglobal assessment design provide advantages in terms of pluralizing voices in global policy making, stand-alone assessments offer less potential for creating new deliberative spaces in which multiple styles of reasoning can be brought into mutual dialogue and exchange. The ACIA, for example, is clearly intended as a device not only to help local communities in the Arctic region learn about climate change but also as an effort to communicate the region's vulnerability to climate change to a global audience. The problem with independent assessments like ACIA, however, is that they tend toward "place-based" approaches that are geared solely toward local knowledge and action. For reasoning together to occur, in our model, cultural styles of reasoning must be brought into regular dialogue that promotes mutual understanding and exchange of approaches and ideas. The ACIA accomplishes this to some degree, by bringing global environmental scientists into dialogue with local communities in the Arctic. Other communities are not involved, however.

In many ways, the MA faces the same problem of becoming too place based in its approaches. However, a key facet of the MA subglobal assessments is the collective participation of regional assessors in the MA Sub-Global Working Group. This group meets regularly, is facilitated by a central coordinator at the MA headquarters, and is tasked with producing a subglobal report as part of the MA's publication strategy. Both the subglobal meetings and the report emphasize dialogue and exchange among competing methodologies, approaches, and institutional arrangements as a key element of the Sub-Global Working Group's structure. A preliminary outline indicates that a variety of comparative analyses and efforts to identify best practices from among competing methodologies is a key goal of the subglobal assessment report. Facilitating stronger dialogue between the subglobal and global components of the MA has also occupied an important place in the discourse of the Sub-Global Working Group, and multiple efforts have been made to facilitate exchanges between the MA's subglobal and global participants.[9]

Jurisdictional Orchestration

Have efforts at regionalizing global environmental assessments helped promote appropriate integration and differentiation of multiple styles of reasoning and epistemic frameworks across local, regional, and global scales of decision

making? Not much evidence is in yet. It seems clear that the IPCC has not yet contributed to a full integration of national and global climate policies, as the regulatory frameworks and reasoning espoused by the framers of the Kyoto Protocol and the governments of the United States and many developing countries remain far apart from one another. Most of the other assessments, which have taken more flexible approaches to bridging scales and epistemologies, are not yet complete and have not yet been in a position to significantly influence decision making at any scale. One design objective of the MA, however, is to use regional assessments to allow for adaptation to culturally appropriate styles of reasoning that may help promote regional learning, as communities deliberate and exchange views on global issues and rethink their perspectives in forums that are not as politically fraught as global governing institutions. Whether it will achieve this goal or not remains an open question.

Regional assessments may also offer better opportunities than global assessments to link up global environmental governance processes to regional and local policy institutions, enhancing the potential for long-term uptake and implementation of ideas and policies. The key here is that more flexible assessments can be attuned not just to the information needs of regional and local decision makers but also to their frameworks of reasoning. Certainly the MA's subglobal assessments and user forums have developed stronger, more formal, and more long-term connections to policy and business communities at scales other than the globe itself than the IPCC regional assessments have offered. Time will tell whether the global MA is capable of capitalizing on these relationships to better integrate ecosystem governance across scales.

Future Challenges

Regionalizing global environmental assessments is hardly likely to serve as a panacea for overcoming the geopolitical and geographic divides that haunt global environmental governance at the start of the twenty-first century. The push toward conceptual and methodological pluralism is likely to spark resistance among those who see the current impasse on climate change and biodiversity loss primarily in terms of either a failure by scientists to communicate the true extent and consequences of global environmental risks effectively or the unwillingness of political leaders and public to undertake necessary economic, social, and policy reforms. The added cost and organizational complexity of

conducting multiple regional assessments is also likely to deter many assessments from investing in regionalization. The MA, for example, has devoted only a fraction of its budget to conducting regional assessments, and the proportion looks only somewhat better when one includes resources used to support coordination of the Sub-Global Working Group.

The explicit mixing of global and subglobal assessments nonetheless offers an interesting line of thought and analysis. Global environmental assessments, however organized, form a central element in the emerging civic epistemology of global civil society. This epistemology can perhaps better capture and communicate the heterogeneities of global environmental change and its meanings for the peoples of Earth if, rather than adopting a single, top-down perspective, it permits expression of a diversity of voices. Such an approach would also better reflect the uncertain state of global epistemologies in international diplomacy. Methods and approaches for producing policy-relevant knowledge on behalf of the entire planet are deeply contested at the moment. Allowing methodological pluralism, reflection, and dialogue within global environmental assessments seems an appropriate response.

We should not forget that science can significantly shape the character of democratic institutions and of democratic civil societies. The design and organization of international scientific assessments may factor strongly in shaping the emergence and success of democracy in global governance. Fostering the capacity of many parts of the globe to reason critically, to express their voices in pluralist forums, to deliberate and exchange ideas, and to coordinate across distinct governance regimes would be a valuable contribution to strengthening global civil society and global democracy. Achieving these goals will require global environmental assessments to go further even than the MA in explicitly bridging scales and epistemologies. To conclude, we offer four thoughts.

First, subglobal assessments must not fall back into the easy comfort of "place-based" assessments: local assessments of local concerns. Subglobal assessments can speak to regional perspectives on global risks as well as assess their regional manifestations. As assessors identify subglobal variations in the causes and impacts of global environmental change, they should also elicit subglobal variations in frames of meaning and styles of reasoning for producing knowledge about global risks.

Second, subglobal assessments should abandon their fixation on geography as the defining organizational characteristic. The point of bridging scales and

epistemologies is to find alternative ways to slice up global problems for analytical purposes. Many subglobal processes are not confined geographically. Consider the floral industry. Today, airfreight enables growers scattered across the globe to transport flowers to consumers overnight, creating a global market. Assessing changes in ecological services associated with this market might provide valuable insights into ecosystem dynamics across the globe but might not be captured in a standard regional or global environmental assessment. Consider, too, as another example, the ecological consequences of diasporas, which displace cultural ideas, expectations, and practices across multiple regions.

Third, assessments must reach out in their deliberative mechanisms beyond the experts who participate in the assessment itself. Suppose assessors do manage to find effective means of reasoning together. Will the communities that they represent be able to follow their new logics without themselves being engaged in deliberative activities? If global environmental assessments are to help reduce ideological fissures in global society, they must cease being isolated exercises of expert analysis and start becoming focal points by which whole communities can begin to learn to reason together.

Finally, much more needs to be done to fully evaluate the implications of both reasoning together as an approach to democratizing international governance and of using regionalization as a strategy for achieving this democratization. How do we move beyond the bimodal regionalization strategies (i.e., global and regional) currently used in global environmental assessments to more nuanced, multiscale approaches? What implications would this have for the challenge of orchestrating appropriate jurisdictional relationships among competing epistemic frameworks? Other than regionalization, how might global environmental assessments be reconfigured to promote reasoning together? These questions go beyond the scope of this chapter but will be extremely important in future analyses.

We believe efforts to bridge scales and epistemologies in global environmental assessments must be understood in political as well as epistemic terms, as core elements in the process of creating constitutional foundations for international governance. Acknowledging this fact will inevitably increase the complexity and politicization of efforts to bridge scales and epistemologies. Ignoring it will guarantee that global environmental assessments both fail to live up to their potential as experiments in global democracy and also risk perpetuating deep-seated political inequalities and further exacerbating ideological divides in world affairs.

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