
Evaluating the Influence of Global Environmental Assessments

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Introduction

Global environmental changes and scientific assessments of those changes have become increasingly common elements in international, national, and even local policymaking and decision making. Do assessments of the causes of, impacts of, and options for dealing with global environmental problems influence how society addresses those problems? How do those assessments influence policy and economic decisions at levels from the global to the local? What conditions foster or inhibit such influence? In what ways can careful design of an assessment increase such influence?

Large-scale environmental problems typify the challenges of complex interdependence facing today's global community (Keohane and Nye 1977/1989). Both understanding and addressing most such problems require cooperation among different countries, between scientists and policymakers, and across the range of concerned and affected actors from the local to the global level (Keck and Sikkink 1998; Ostrom 1990; Betsill and Corell 2001; Young 2002). In response to such problems, organized efforts to mobilize scientific information in support of decision making have become increasingly frequent. The work of the Intergovernmental Panel on Climate Change (IPCC) is perhaps the best known assessment but assessments have been regularly conducted in the past and are planned for the future, with recent ones including the Millennium Ecosystem Assessment, the Global Mountain Biodiversity Assessment, the Global International Waters Assessment, the Comprehensive Assessment of the Freshwater Resources of the World, and a

planned Global Marine Assessment (Parris 2003). We sought to build on the emerging literature on the interaction of science and environmental policy (Haas 1992b; Jasanoff 1990; Boehmer-Christiansen 1997; Andresen et al. 2000; Social Learning Group 2001a, 2001b; Grundmann 2001; Parson 2003) by characterizing and trying to explain variation in the influence of a range of global environmental assessments.

In this book, we present results from a multiyear, interdisciplinary, international research program that compared a range of environmental assessments from climate change and water management to biodiversity in an effort to better understand how global environmental assessments operate, when and how they influence policymaking and decision making, and how they can be designed to be more effective.¹ In this chapter, we begin by defining and reviewing the “global environmental assessments” (GEAs) we seek to understand and the challenges and opportunities for using them to inform environmental decision making. We then briefly summarize relevant scholarship from a variety of fields that informed our initial research on the influence of GEAs. There follows an outline of the conceptual framework we developed for this study and a preview of the case studies that constitute the bulk of this volume. Our conclusions on both the design of institutions for carrying out more effective GEAs and on the implications of GEA experience for broader social science scholarship on the influence of information are presented and discussed in the book’s final chapter.

What Are Global Environmental Assessments?

Global environmental change, and its human causes and consequences, has become an increasingly prominent dimension of international affairs over the last thirty years (Committee on Global Change Research and National Research Council 1999; Young et al. 1999). Nations have negotiated hundreds of bilateral and multilateral environmental agreements to address transnational problems from climate change and biotechnology to endangered species and nature preservation (Mitchell 2003). Large-scale environmental issues have become linked to globalization, energy, trade, population, and other policy issues. Political and economic decision makers increasingly realize that understanding environmental change and devising strategies to mitigate or adapt to it require appre-

ciation of scientific and social processes, and of how those processes interact at and across levels from the local to the global (Schellnhuber 1999; Steffen et al. 2001; Turner et al. 1990; Clark 2000). This has led to a growing demand for scientific knowledge that can inform and support decision making in ways that acknowledge the large spatial and temporal scale of many environmental problems without ignoring the more delimited information needs of decision makers from local farmers to international negotiators (Carnegie Commission on Science, Technology, and Government 1992; Corell and Bolin 1998; Mahoney 2002).

Scientists often seek to inform public debate on policy issues through publications in the peer-reviewed literature, through the popular media, and through private advice to decision makers. Large-scale international scientific assessments have become another, and increasingly common, arena in which science and policy interact. We call such assessments “global environmental assessments” or GEAs. We define “assessments” as formal efforts to assemble selected knowledge with a view toward making it publicly available in a form intended to be useful for decision making. By “formal,” we mean that an assessment is sufficiently organized that such aspects as products, participants, and issuing authority can be identified relatively easily. By “efforts to assemble selected knowledge,” we seek to recognize that assessments vary both with respect to how comprehensive they are and whether they involve conducting new, or summarizing and evaluating existing, research. We interpret “knowledge” broadly, treating the question of which kinds of information or expertise a specific assessment chooses to incorporate as an empirical rather than definitional one. We emphasize “publicly available” to distinguish assessments from technical advice prepared for the private use of decision makers.² Finally, we use “decision makers” to encompass actors in government, private corporations, research laboratories, nongovernmental organizations (NGOs), and civil society more generally.

The “global” focus of our study also deserves comment. Global environmental assessments have been the subject of less research and that research has been far less conclusive than that on the influence of assessments at national and subnational levels, which themselves remain areas

where considerable work remains to be done. Although countries could rely exclusively on national scientific capabilities to understand global problems, most see advantages in pooling scientific expertise and data in “global” assessments. “Global” or transnational assessments such as those listed in table 1.1 can differ from local or national assessments in at least three senses. They may address environmental problems caused by actors in more than one country; they may address problems that have implications for decision makers in more than one country; or they may simply involve participants from more than one country in the assessment. Such assessments are usually undertaken with at least the nominal goal of constructing a science-based account of the problem in a way that decision makers in multiple countries will view as useful. While the primary focus of our analysis was on assessments defined as “global,” we understood the importance of exploring the interaction of the global with the national and local. After all, one of the purposes of “global” assessments is to inform national and subnational decision makers. Thus, as described later, several of our cases studies were selected specifically to examine the dynamics of assessment influence in subnational issue domains.

Although no comprehensive catalog of GEAs exists, the number, size, and costs of global environmental assessments is both large and growing. From the mid-1980s to the mid-1990s, two to three GEAs per year were completed on climate change, ozone depletion, and acid rain (Social Learning Group 2001a; Social Learning Group 2001b, chaps. 15, 17). In 2003, large-scale GEAs were underway on at least a dozen issues (Convention on Biological Diversity 2003). The UNEP Global Environment Outlook (GEO) project has produced three comprehensive global state-of-the-environment reports as well as regional, subregional, and national assessments. Some involve ongoing scientific committees created to provide inputs to the processes of environmental management conducted under international treaties, such as by recommending catch quotas to the parties to fisheries agreements. Others involve independent scientific bodies with close ties to policy—for example, the non-governmental joint wildlife trade monitoring program of the Convention on International Trade in Endangered Species (CITES), the International Institute for Applied Systems Analysis (IIASA) for the Convention on

Table 1.1
Recent global environmental assessments

Assessment	Lead organization	Scope; scale; timetable
Dryland Land Degradation Assessment	FAO	Drylands; global, regional; in development from 2001
Forest Resources Assessment	FAO	Forests; global, regional, national; FRA 2000 every 10 years
Global International Waters Assessment	UNEP	International (transboundary) waters; global, regional; 1999–2002
Global Environment Outlook	UNEP	Environment; global, regional; GEO-3 report 2002, biannual
Intergovernmental Panel on Climate Change	IPCC	Climate change; global, regional; 3rd report 2001
Millennium Ecosystem Assessment	UNEP	Ecosystems—goods and services; global, regional, national, local; 2001–2005
World Resources Report	WRI	Environment (themes); global, regional; biannual
World Water Assessment Programme	UNESCO	Freshwater; global, regional, basins; 2000, 1st report 2003
State of the world's plant genetic resources	FAO	Plant genetic resources; global, regional, national; 1996 (I) and 2007 (II)
State of the world's animal genetic resources	FAO	Animal genetic resources; global, regional, national; 2005, country reports 2003
Comprehensive assessment of the status and trends of agricultural biodiversity	SCBD, FAO, MA	Agricultural biodiversity; global, regional, national; 2007, preliminary assessment 2003, draft full assessment 2005
State of the world's traditional knowledge on biodiversity	CBD	Indigenous knowledge on biodiversity; global; 2003

Source: Adapted from Convention on Biological Diversity 2003.

Long-Range Transboundary Air Pollution (LRTAP), and the Scientific Committee on Antarctic Research (SCAR) for the Antarctic Treaty System. Yet others become primary sources of information for certain policymaking forums even though no formal ties exist, as evident in the International Council for the Exploration of the Sea providing expertise to several fishing agreements or the IPCC informing the UN Framework Convention on Climate Change (UNFCCC). Some GEAs limit themselves to scientific issues while others examine social and economic impacts and possible options for problem resolution. Some involve participants as representatives of governments and NGOs while others require participants to serve in their individual capacities. Some are intended to be ongoing whereas others are intended to disband after producing a single report. Some explicitly focus on one level (purely global), while others focus on multiple levels simultaneously and the interactions across levels.

In short, GEAs have become part of the political landscape at the international, national, and local levels. Scientists, governments, and both nongovernmental and international organizations expend considerable time, effort, and resources supporting them. They create large networks of scientists and focus the attention of numerous scientists on certain environmental issues and not others. Collectively, they have produced innumerable reports and policy recommendations that, in turn, have led to extensive press coverage. The key question for the research presented here was “do they matter?” That is, in what ways have GEAs influenced political, social, and economic choices regarding global environmental issues? And what factors explain why some GEAs are more influential than others?

The Influence of Scientific Information on Policy

Practitioners—the scientists, civil servants, and other advocates and policy advisors engaged in conducting and using GEAs—have learned a great deal about how to design a GEA that works and have shared that with immediate colleagues (Social Learning Group 2001a, 2001b). But few of those lessons have been evaluated and generalized by independent analysts. Some practitioners have thoughtfully reflected on their involvement in one or more assessments (Watson 2002, 1994; Tuinstra,

Hordijk, and Amann 1999; Bolin 2002, 1994; Schoenmaeckers 2000; Houghton 2004; Somerville 1996; Tolba and Rummel-Bulska 1998; Benedick 1998). Others have used their experience to advocate particular assessment methods or approaches (Clark and Jäger 1997; O’Riordan 1997; Kates 1997; Morgan and Dowlatabadi 1996; Dowlatabadi and Morgan 1993; Rotmans 1998; Rotmans and Vellinga 1998; Rotmans and Dowlatabadi 1998; Hordijk and Kroeze 1997; Morgan et al. 1984; Rubin, Lave, and Morgan 1991–1992). Efforts to bring experienced practitioners together, such as the OECD’s Megascience Forum, have produced a rich, practice-based literature (Corell and Bolin 1998) with valuable insights “from the trenches” that have not yet been analyzed comparatively to identify lessons that can be confidently applied to other environmental challenges.

Scholars interested in the role of science have just begun to study GEAs. Several studies have examined how technical information in general—and formal assessments in particular—have influenced particular issue areas such as marine pollution (Haas 1990), stratospheric ozone depletion (Downing and Kates 1982; Haas 1992a; Parson 2003; Litfin 1994; Grundmann 2001), whaling (Andresen 1989), climate change (Miller 2001), and acid precipitation (Boehmer-Christiansen and Skea 1991; Wettestad 1995; Alcamo, Shaw, and Hordijk 1990). A few teams of scholars have systematically compared a range of assessment experiences within a common analytic framework (Andresen et al. 2000; Social Learning Group 2001a, 2001b; Young 2002), including the two companion volumes emerging from our research program (Jasanoff and Martello 2004; Farrell and Jäger 2005).

Insights from this previous work provided the initial foundation for the research presented here. GEAs have varied considerably in their influence. They also vary considerably in their designs, in their processes, and in the circumstances under which they operate. Numerous propositions have been put forth regarding why science, and particularly GEAs, appear to contribute significantly to environmental progress in some areas but not others. Some have pointed to the importance of context, such as how much attention is paid to the issue, how politically contested it is, and how it is linked to other issues (e.g., Social Learning Group 2001a, 2001b). Others have seen cognitive factors as central,

including the maturity of scientific understanding and the degree of consensus about the problem, its causes, and its solutions (e.g., Ravetz 1986; Haas 1990). Yet others have focused on design factors, such as how assessments structure the interactions among scientific and policy communities and how they incorporate information and knowledge from, and disseminate them to, stakeholders at the local, national, and international level (e.g., Farrell and Jäger 2005). One branch of this line of work asserts that polycentric systems that entail nodes of authority across levels and between science and decision making effectively integrate multiple ways of producing and utilizing knowledge (Ostrom 1998; McGinnis 1999). Still another perspective has focused on the construction and use of scientific information as involving social processes in which norms, methods, and agendas are dynamic, interactive, and negotiated elements of social, political, and cultural processes (Jasanoff 2004; Jasanoff and Wynne 1998).

When, why, and how GEAs wield influence constitute special cases of larger questions related to how information influences action at both the domestic and international level. Domestic theorists have posited two competing models of decision making and, hence, of informational influence. A standard, “rational actor,” model sees policymakers as undertaking a careful analysis of the costs and benefits of available alternatives, choosing those that best further their objectives given their resource constraints. Policymakers are assumed to desire—and be consistently open to—new information since it helps them better achieve their objectives. Such a model assumes “the breadth and competence of analysis” (Lindblom 1977, 314), with an assumption that decision makers turn to scientists to provide disinterested analysis for use in identifying and evaluating alternative scenarios and options comprehensively in order to make the best possible decisions. Decision makers are assumed to understand the problems they face well enough to ask scientists questions that, once answered, will allow them to decide on the best course of action. In this view, assessments are reports that provide answers to clearly delineated questions from policymakers.

Alternative models view decision makers as facing significant constraints on their time, resources, knowledge, and cognitive abilities, particularly when faced with problems as complex as most global

environmental problems. Rather than seeking out information to optimize their decisions across various alternatives, decision makers “satisfice” and make “good enough” decisions by using rules of thumb and other heuristics that reduce the need to collect and process information (Simon 1957, 1982; Kahneman et al. 1982). In such models, decision making entails “muddling through,” with scientific information being only one element of “a broad, diffuse, open-ended, mistake-making social or interactive process, both cognitive and political” (Lindblom 1990, 7; also Lindblom 1959). Scientists and decision makers are involved in ongoing and iterative interactions. Rather than knowledge informing decision making, policy choices get made only in conducive contexts in which usually independent streams of problems and solutions come together (Cohen et al. 1972; Kingdon 1984). Policies develop out of ongoing interactions among groups of people and organizations concerned with a given policy issue (Jenkins-Smith and Sabatier 1999, 119, 135). Over time, these interactions can produce shared understandings that a problem exists, how the problem should be defined, that action should be taken, and what is the best choice from the range of possible solutions (Sabatier 1988). Scholars of science studies and constructivism have taken this logic further, arguing that the degree to which science is, and is seen as, separate from other forms of knowledge and from policymaking is “a contextually contingent and interests-driven pragmatic accomplishment drawing selectively on inconsistent and ambiguous attributes” (Gieryn 1995, 393; see also Beck 1992; Wynne 1995; Hajer 1995; Jasanoff 1990). In this view, assessments are iterative social processes in which what questions are being asked about what problem and what information is being collected and analyzed are identified not at the outset but through an ongoing and iterative process between policymakers, scientists, and stakeholders (Jäger, van Eijndhoven, and Clark 2001).

International relations scholars have been particularly skeptical of the influence of scientific information (Susskind 1994, 63; Funtowicz and Ravetz 2001; Haas 2002). National policymakers are unlikely to be swayed by scientific information generated by others because of a deep-seated belief that other governments generate and disseminate information in an effort to manipulate and gain advantage (Morgenthau 1993;

Waltz 1979; Morrow 1994). In an international realm in which competition and the pursuit of power are primary objectives, any information generated by GEAs can be assumed to be simply one more means by which powerful countries seek to manipulate weaker ones (Miles et al. 2002, 472–473). Especially when environmental problems have implications for higher-priority security and economic concerns, international scientific information and ideas are likely to have little independent impact on national behaviors (Goldstein and Keohane 1993). That said, states may be more receptive to new information in situations in which policymakers recognize that they must navigate in a complex and uncertain world in which their own country's welfare depends considerably on the actions of other governments (Keohane and Nye 1977/1989; Jervis 1997). Crises (e.g., oil spills) and scientific breakthroughs (e.g., discovery of the ozone hole) demonstrate that environmental issues are particularly complex and that scientific knowledge is particularly uncertain, limited, and evolving. In response, national policymakers often seek out scientific experts whose engagement with networks of other international scientists allows them to provide better insights into the seriousness and causes of the problem and alternative solutions (Haas 1990, 1992b). Science can prompt intergovernmental negotiations to resolve transnational environmental problems. And the discussions of relevant science such negotiations entail can promote shared understandings, trust, and political consensus that leads, relatively directly, to policy and behavior changes (Kay and Jacobson 1983; Jacobson and Brown Weiss 1998, 525; Risse 2000; Miles et al. 2002). States clarify their goals and the best means of achieving them only through interactions with other states (Ruggie 1998; Checkel 1998). Nominally scientific discussions engage implicit debates over what is “good” or “appropriate” behavior and what it takes to be considered a “green” state or environmental leader (Risse, Ropp, and Sikkink 1999; Checkel and Moravcsik 2001; March and Olsen 1998; Litfin 1994; Katzenstein 1996).

How Should We Evaluate the Influence of GEAs?

These views of the influence of science on policy, and policy on science, provided guidance for examining the influence of GEAs but did not provide specific hypotheses about when we might expect science to influ-

ence policy and economic decisions. Given this, we adopted an inductive research strategy in which authors evaluated a set of initial cases that used insights from the practitioner and scholarly literature cited above as investigative starting points. The initial goal was for authors to look at their cases to determine why some assessments appeared to wield considerable influence while others appeared to wield very little. This task required addressing questions about where to look for assessment influence and where to look for its causes.

We initially conceptualized influence as the ability of GEAs to lead governments and substate actors to adopt different policies and behaviors than they would have otherwise. Yet, earlier research on global environmental change (e.g., Social Learning Group 2001a, 2001b) had shown that focusing exclusively on changes in policies and state behaviors would miss much of “the action” in domains—such as global environmental change—characterized by a complex interplay among different actors, interests, ideas, and institutions and in which causal influences may be indirect and take considerable time to become evident. To address this, we broadened our definition of “influence” by looking for changes in what Sabatier and Jenkins-Smith (1999) call “issue domains,” defined as arenas in which interested actors seek to address an issue of common concern about which they have different beliefs and policy preferences. To the extent that an assessment ultimately fosters improved environmental quality, such changes must occur through changes in the actors involved in the issue domain, including their relevant goals, interests, beliefs, strategies, and resources; the institutions that enable and constrain interactions among those actors; the framings, discourse, and agenda related to the issue; and the existing policies and behaviors of relevant actors. All these elements of an issue domain are changing over time in response to nonassessment factors such as changes in the attention and resources actors dedicate to the problem, the availability of social and technical solutions, and the norms and discourse regarding behaviors that harm the environment. Thus, authors sought to distinguish changes in issue domains caused by assessments from those caused by other factors. Figure 1.1 illustrates our conceptualization of what constitute issue domains and how assessments influence them.

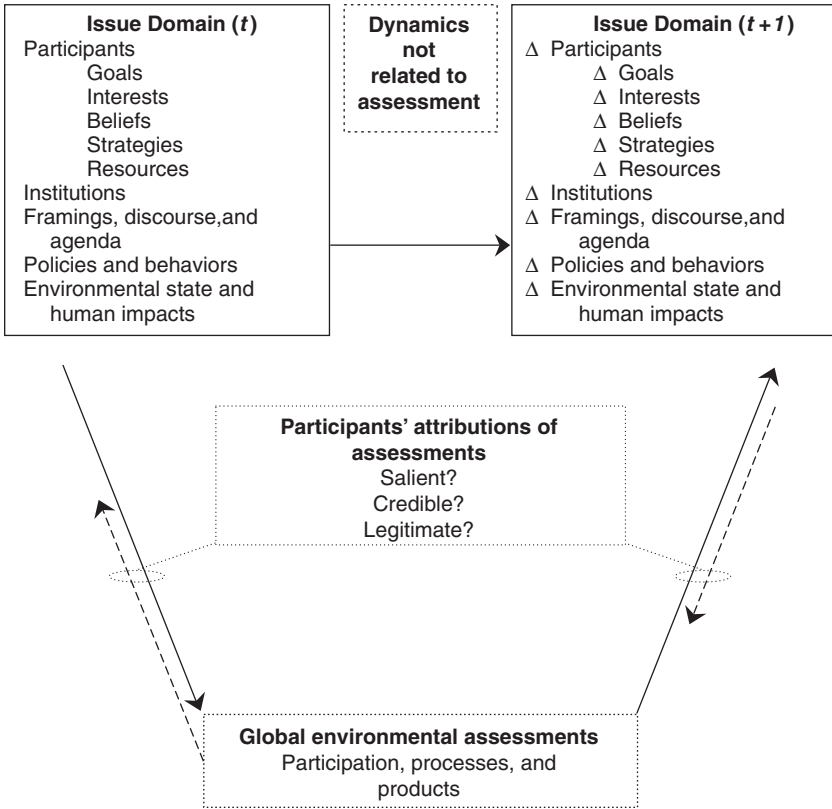


Figure 1.1
The role of scientific assessments in issue development: A conceptual framework

To understand assessment influence, we sought to explore the conditions under which assessments are influential, the design features that foster their influence, and the pathways by which they wield that influence. We sought to identify when GEAs matter—that is, the conditions and external factors that foster or inhibit assessment influence. We started with a strong sense that policymakers and other decision makers sometimes reevaluate their beliefs and alter their behaviors in response to assessments about global environmental problems. At times, cognitive or normative uncertainty seem to create “fluid moments in history” with “openings for rethinking” in which decision makers even seek out new

information (Goldstein and Keohane 1993, 16, 26; Ikenberry 1993, 58–59; Kingdon 1984; Lee 1993; Haas 2001; Baumgartner and Jones 1993). But our optimism that assessments can have influence was tempered by knowing they sometimes do not. Decision makers, especially national policymakers addressing global environmental issues, often are unreceptive to new information. Actors ignore new information when they are firmly committed to previously defined goals, options for actions, and the causal connections among them; when the information relates to an issue they do not consider to merit their attention; or when they believe that others will not respond to rational argument but only to power (Hasenclever, Mayer, and Rittberger 1997, 184).

Besides such external conditions of influence, we wanted to know how design choices allow GEAs to take advantage of moments of receptivity. We wanted to know not merely “when” information matters but “what type” of information matters. We were motivated by the knowledge that some assessments released reports that had few apparent impacts on an issue domain, while others, changed the views, policies, and behaviors of far less receptive audiences. We first thought that most variation in GEA influence could be explained by the content of assessment reports and the links between those conducting the assessment and those using it. We were particularly interested in how institutions that produce assessments make those assessments credible. We wanted to know whether assessments were more influential when those producing the assessment had close ties to, or were more distant from, those negotiating and implementing policies. We expected credibility to be an important aspect of assessments but were open to differences in how credibility was achieved and to other facets of assessments that proved important.

Finally, we sought to understand the process that leads decision makers to adopt insights from some GEAs but not others—that is, we tried to understand the causal mechanisms or pathways of GEA influence. Since the influence of GEAs lies only in the information they contain, we recognized that their influence always involves changing actors’ beliefs. Precisely because policymakers and decision makers cannot determine for themselves the accuracy of the scientific claims at issue, we sought to understand how assessments gain credibility. We were particularly

interested in how assessments balance the desire to involve the “best” scientists in a politically impartial setting and the desire to involve those who may have less scientific expertise but whose views are trusted, and hence more likely to be accepted, by relevant political and economic actors.

After an initial round of research, we sought to make sense of what our team of scholars had discovered about the influence of GEAs and to adjust our research strategy appropriately. Two major insights jumped out of that midterm evaluation of our work. The first insight was that, in almost every case, assessment reports were not the right focus of attention. Thus, proposition 1 became: GEAs are better conceptualized as social processes rather than published products. The right questions were not ones about report content, framing, or components that could be answered by simply reading the report. Rather, the right questions seemed to revolve around the social process of assessment, as well as the products thereof. We came to see assessment as a social process in which scientists, policymakers, and other stakeholders are (or are not) gathering data, conducting analyses, explaining, debating, learning, and interacting with each other around the issue on which the assessment focuses. The process by which information is generated and delivered affects the potential of that information process to influence outcomes. From the time at which a few scientists, policymakers, and/or stakeholders initiate an assessment, it is this process of interactions by which knowledge is created and transmitted among actors that determines whether a GEA will be influential. GEA influence seemed to depend on the characteristics of the extended and extensive social process leading up to as well as coming after an assessment report. It is not merely that these interactions determine how various actors respond to the written products of an assessment, though they certainly do. But it is also that these interactions themselves are important mechanisms by which the assessment influences how and what actors think and, hence, how they behave in response to the information generated. We therefore shifted our focus from evaluating the influence of assessment reports to the influence of assessment processes. We began looking at assessment reports as simply one visible indicator of a larger social process that seemed to be the real source of any assessment’s influence.

The second insight from our initial exploratory work was that GEA influence did not just depend on “getting the science right.” Building on earlier work of Ravetz (1971), Clark and Majone (1985), and the Social Learning Group (2001a, 2001b), we determined that the credibility of the ideas, information, and knowledge produced and exchanged during an assessment process was only one of three major determinants of GEA influence. Thus, proposition 2 became: to be influential, potential users must view a GEA as salient and legitimate as well as credible. The information produced by an assessment process is salient when potential users believe that the information is relevant to their decision making and is legitimate when they believe that the information was produced by a process that took account of the concerns and insights of relevant stakeholders and was deemed procedurally fair. Not surprisingly, with hindsight, we found that these insights coincided with points raised in the extant literature but that had not been brought together in quite the same way as we were observing them in the global environmental assessment setting. Thus, on salience, analysts are frequently dissatisfied “because they are not listened to,” while policymakers are dissatisfied “because they do not hear much they want to listen to” (Lindblom and Cohen 1979; ICSU, ISTS, and TWAS 2002). Decision makers often have little time and attention for any but the most pressing issues; scientists often have little interest in problems that have large policy, but little scientific, import. Equally important, both decision makers and scientists often misperceive the policy-relevant questions to which science can best contribute. On credibility, more has been said, particularly with respect to adapting standard procedures used to gain acceptance of scientific claims to the assessment context. Thus, scientific influence increases by careful attention to issues involving data reliability, methods used, the validity of inferential claims, identification of pitfalls and rival hypotheses, and independent peer review (Ravetz 1971; Underdal 2000, 182). And on legitimacy, scientific information must overcome distrust from those who suspect experts of using information to lead them to adopt behaviors that serve the self-interests of those experts or those to whom they answer. Thus, a tension exists between the desire for science to be simultaneously well informed and well analyzed and to also be democratic (Lindblom 1980, 12). Even those seeking out information are skeptical

of claims and arguments made by others unless processes reassure them “that their legitimate interests will be respected” (Hasenclever, Mayer, and Rittberger 1997, 184). Science no longer holds the “numinous” legitimacy accorded to religion and royalty; instead it must gain “civil legitimacy” through freely negotiated agreement among affected parties as to what rules and procedures will govern its meaning and use (Clark and Majone 1985; Ezrahi 1990; Weber 1922/1957; Brickman, Jasanoff, and Ilgen 1985; Jasanoff 1990). We were particularly intrigued by a sense that—in a world of limited resources and time—these three attributions of salience, credibility, and legitimacy were interconnected both in the sense that procedures intended to foster one often undermined another and in the sense that satisfying critical thresholds of all three attributions appeared to be a necessary, but not sufficient, condition for assessment influence.

These insights from the first phase of our research informed the second round reported here in two important ways. The first involved the case-study authors going back to their cases to look more systematically at how assessment processes promote or inhibit an assessment’s influence, paying particular attention to how those processes foster perceptions of salience, credibility, and legitimacy and how much those perceptions contribute to assessment influence. Our initial research had demonstrated that different actors perceive the salience, credibility, or legitimacy of any assessment differently. As we returned to our cases, we conceptualized these as attributions that different participants make of assessment processes and products rather than as properties of the assessment *per se*. This implies both that an assessment’s influence on a given actor depends on characteristics of both the actor and the assessment and also that assessment influence varies across different actors. Because actors concerned with an issue differ in their goals, interests, beliefs, strategies, resources, and the local, national, or international scale at which they work, they also tend to differ with respect to what information they will be interested in; what scientific discussions they can actively participate in and understand; how they perceive salience, credibility and legitimacy; and how open they will be to new information and persuasion. We hoped to discover how global environmental assessments foster cooperative resolution of environmental problems by leading actors who come to

such problems with different interests and initial policy preferences to share perceptions of an environmental problem and its best solutions. A second, and equally important, change to our research was to incorporate cases, as described below, that allowed us to gain insight into elements of assessment processes that were hinted at but could not be fully developed from our initial cases, most notably the ability of global and large-scale assessments to influence local-level action.

Organization of the Book

Our intention for this book was to articulate and explore propositions—rather than test hypotheses—about the conditions under which and processes by which GEAs wield influence. Given the absence of much previous comparative analytic work on their influence, we selected cases that could broaden and deepen our knowledge about GEA influence and that seemed likely to provide a foundation for critical hypothesis testing by subsequent scholars. We sought to include assessments whose influence, if any, would be evident in direct and immediate changes in policies and behaviors at the international level as well as assessments whose influence was at levels below the international and was less direct, less proximate, and less visible. We also sought to capture some variation in the environmental problems being assessed and in the types of actors or potential users that might be influenced by the assessment.

The cases finally included in this volume reflect several perspectives on GEA influence. Some examine a particular global environmental assessment, looking for what influence, if any, that assessment had on particular issue domains. Others start at “the other end of the telescope” and examine particular actors within an issue domain to see what influence, if any, relevant GEAs and intervening institutional arrangements had on them. Yet others illuminate the particular challenges that our initial research showed exist in linking information and action across multiple levels. Most of the cases in this last group do not fit our definition of global environmental assessments, delineated above, but instead are included because they provide “high-resolution” studies at the regional scale that allow close comparisons of how different institutional arrangements affect the ability of assessments to promote cross-scale linkages and provide analogies for examining assessments in international settings.

We have divided the empirical studies into three sections, organized by the scale of the issue domain in which we look for evidence of assessment influence. The first two chapters look at the impact of global assessments on the international policy agenda. Wendy E. F. Torrance examines the sequence of climate change assessments from the 1970s through the 1990s, examining the roles of both political context and assessment content in explaining why a 1985 assessment (the Villach assessment) transformed the issue domain of climate change where previous assessments had failed to do so. Aarti Gupta examines the negotiations over information sharing in the 2000 Cartagena Protocol on Biosafety to the Convention on Biological Diversity. She explores how agreement on procedures for biosafety information production, exchange, and dissemination depends on prior resolution of conflicts over whether—and what type of—an environmental problem exists and, thus, how problem framing affects assessment influence.

The next four chapters look at the impact of global assessments at the national level. Frank Biermann explores why global assessments of climate change and biodiversity had so much less influence in India than in developed countries. Stacy D. VanDeveer, like Torrance, largely links the increasing influence of acid precipitation assessments among Central and Eastern European states to changes in the broader political context rather than changes in those assessments themselves. Liliana B. Andonova explains differences in the responses of Polish and Bulgarian actors to assessments commissioned by the European Union and World Bank as due to variation in assessment processes ranging from collecting data to producing final reports. Noelle Eckley Selin looks at why LRTAP assessments that were European and North American in focus had such significant influence on global negotiations of regulations of persistent organic pollutants.

The final three empirical chapters focus on the influence of assessments on local-level decision makers. GEAs cannot be influential if they only operate at the international level—their influence depends on connecting in meaningful ways to “local” decision makers. Since our initial research demonstrated that bridging barriers of “scale” was important to the influence of many assessments, we sought out cases that would shed light on how knowledge generated at higher levels in the local-national-

international hierarchy influenced behavior at lower levels in that hierarchy. Susanne C. Moser explores the different degrees of influence of assessment information in two U.S. coastal states, examining why projections of climate change and sea-level rise had little direct effect on coastal policymaking and management in Maine and Hawai'i but contributed to varying degrees to long-term changes in both states' issue domains. Anthony G. Patt's chapter investigates why some farmers in Zimbabwe directly incorporated global assessments of El Niño/Southern Oscillation events and corresponding rainfall forecasts into their planting decisions while others did not. David W. Cash's investigation of the complex institutional landscape for managing the U.S. High Plains aquifer shows how the influence of aquifer-related information on farmers' water usage depended on the relationships and networks that spanned both the science-action divide and the several informational and regulatory scales involved. While this chapter does not focus on a global assessment, its analysis of cross-level interactions of science and policy examines an analogous case that complements the other chapters.

The final chapter draws two types of conclusions from across these chapters. The first type involve five propositions supported by evidence from most of these cases. First, assessments vary in the type of influence that they have, not just the amount of their influence. Second, assessment influence varies significantly across different audiences or potential user groups and the extent of influence depends significantly on the relationship of the audience to the assessment. Third, that relationship becomes evident in the variation in audiences' attributions of salience, credibility, and legitimacy to an assessment. Fourth, assessment influence is best understood by recognizing that assessments, to be influential, must foster a process of coproduction of knowledge that involves stakeholder participation in ways that build salience, credibility, and legitimacy with many potential users. Finally, achieving those goals depends on building the capacity of various actors to contribute to assessments and to understand the information they produce. These propositions seem to us to have become sufficiently clear from our work that they can be used as the basis for specific hypotheses deserving of rigorous scholarly testing and can also be used, perhaps more tentatively and cautiously,

to guide the choices of practitioners trying to improve the influence of assessments.

The second type of conclusions are more speculative propositions for which one or two cases provide tantalizing but anecdotal evidence. These insights might well be artifacts of the constellation of factors and conditions of a particular case—but they may be examples of more generally applicable rules related to successful assessment design. First, we found that the characteristics of the institution responsible for an assessment affect that assessment's influence. Second, attributions of salience, credibility, and legitimacy have particular difficulty traversing from the global to the local scale. Third, an assessment's influence depends on the informational competition it faces. Finally, we found some evidence that assessors can learn to conduct assessments more effectively over time.

We conclude with lessons for practitioners. Our goal in writing this book was to analyze the factors and conditions that lead GEAs to influence policy and decision making but to do so in a way that provides more practical help to those producing global environmental assessments. Those lessons are fivefold:

- Focus on the process, not the report.
- Focus on salience and legitimacy as well as credibility.
- Assess with multiple audiences in mind.
- Involve stakeholders and connect with existing networks.
- Develop influence over time.

We hope this book contributes to a larger process in which both scholars and practitioners learn from the experience of global environmental assessment so that, in the future, individuals and nations around the world committed to learning more about the many global environmental problems we face and how to resolve them can do so more effectively than they have in the past.

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Notes

1. The other two volumes are Jasanoff and Martello 2004 and Farrell and Jäger 2005. All three efforts drew from the Global Environmental Assessment Project.
2. We focus on public advice because earlier work reported by the Social Learning Group (2001a, 2001b) led us to suspect that very different factors may determine the influence of public and private advice.

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