
Introduction

Globalization and Environmental Governance

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The Shape of the Future

The world today is in the grip of globalization. Networks of economy, technology, politics, and ecology have encircled the Earth, weakening the historical claims of nation-states, sovereignty, and cultural identity. With the end of the Cold War, worldwide trade liberalization, and the growing influence of multinational corporations, economic waves originating in one region flow out to others, sometimes with tidal force. Information travels instantaneously around the globe through phones, faxes, television, e-mail, and the Internet. As transportation and communication technologies develop, an expanding world population feasts on an increasingly homogeneous diet of fast food (Schlosser 2001), logoized consumer goods, blockbuster movies, international best-sellers, and the culture-defying strains of global popular music. The planet itself, as a self-contained orb, a biosphere of limited resources, challenges human beings to find communally sustainable ways of life, now and in the future (WCED 1987).

Sometimes, an event brings into fleeting focus an image of relative global harmony. The turn of the millennium was one such occasion. A huge, day-long spectacle, in which tens of millions participated from the privacy of their living rooms, focused the world's gaze upon itself as never before. The show began on a small and uninhabited outcrop of land in the Pacific Ocean, newly renamed Millennium Island, in the tiny Republic of Kiribati. Some 70 Micronesian dancers, splendidly attired in natural materials (grass skirts, headdresses, bold ornaments), transported there for the occasion from Kiribati's capital Tarawa, staged for the eyes of the global media a "traditional" ceremony to mark the birth of the new millennium. In succeeding hours, celebration moved from obscure Kiribati to Tonga,

Auckland, and Sydney; across Asia, heedless of competing local calendars (Joerges 2003), to Tokyo, Beijing, Jakarta, New Delhi; thence to Moscow, Berlin, Paris, and London, linking Europe's capitals in bursts of light; then across the Atlantic to New York's jubilant Times Square and on to Hollywood, before coming to rest in Honolulu, the occident's final outpost. For masses of people still nervously waiting for a "millennium bug" to trigger disastrous computer breakdowns, this ephemeral collage of the ancient and the modern, the real and the virtual, the natural and the artificial, the marvelous and the threatening fittingly captured the restless spirit of globalization.¹

Other times, images of discord and disunity dominate our consciousness. As was horrifically demonstrated by the events of September 11, 2001, globalization can be as much a catalyst for conflict as an incentive for living harmoniously together on a bounded planet. Often inarticulate and unfocused, the anti-globalization movements of the turn of the century nonetheless reflect a deep-seated antagonism toward emerging world institutions and the shape of the future they allegedly represent. Prospects for a consensual world order remain distant, whether or not one accepts the political scientist Samuel Huntington's (1996) prognosis that we are bound for a period of sustained clashes among civilizations. Finding common ground on a planetary scale is not outside the realm of imagination, but the way forward lies across uncharted ideological and political minefields.

Whether consensual or conflict-ridden, rising interchange among citizens and societies has generated demands for new forms of governance. A word of ambiguous meaning but growing popularity, "governance" lies in the conceptual gray zone between electoral politics and administrative rule making. It has been defined most neutrally as "rules and institutions for the authoritative organization of collective life" (Donahue 2002, p. 1). In European usage, it refers to methods or mechanisms for "dealing with a broad range of problems/conflicts in which actors regularly arrive at mutually satisfactory and binding decisions by negotiating and deliberating with each other and cooperating in the implementation of these decisions" (Schmitter 2001, p. 8). Equally normative is the definition adopted by the European Commission (EU 2001, p. 8): "'Governance' means rules, processes, and behavior that affect the way in which powers are exercised at European level, particularly as regards openness, participation, accountability, effectiveness, and coherence."

Not only does the word “governance” point to the rise of intermediate governing structures supplementing states and markets, but it also signals a growing role for decision-making bodies that are neither domestic nor international (i.e., representing nation-states). As “world” institutions proliferate—consider only the World Bank, the World Trade Organization, the World Intellectual Property Organization, and the World Economic Summit—the word “international” seems at times almost a relic of a forgotten age. The institutions and processes designed to manage the world system not only accommodate diverse national interests and facilitate cooperation; they help to construct a politics that at once crosses geopolitical borders and transcends them. Forums such as these are creating supranational norms and regulations and, in the process, helping to redefine agency, authority, leadership, and even citizenship in a new domain of supranational politics. So powerful and ineluctable do these forces appear that some have spoken of the coming of a new global empire (Hardt and Negri 2000). Yet it seems clear that global governance in coming decades will have to accommodate profound differences of religion, culture, property, and aspiration even as it obliterates distance and enforces economic and social togetherness. Global actors will have to tolerate, respect, or even defer to many aspects of the local while crafting institutions that seek to avoid the risks and errors of rampant localism.

Over the past 30 years, some of the most interesting balancing acts between the global and the local have come from the domain of environmental governance. The willingness to seek global solutions to problems of the human environment is one of the big—and as yet only partly told—stories of the late twentieth century (Miller and Edwards 2001). Starting in the 1970s, nations rallied together around such issues as acid rain, ozone depletion, hazardous wastes, marine pollution, biodiversity loss, desertification, and climate change. These efforts preceded the widely discussed globalizing effects of the Internet, trade liberalization, and the marketization of socialist economies at end of the Cold War. Environmental initiatives revealed, often for the first time, emergent aspects of transnational politics that will only grow in significance in this century: the increasing interaction between scientific and political authority, highlighting fault lines in each; the salient role of non-state actors in both knowledge making and politics; the emergence of new political forms in response to novel conjunctions of actors, claims, ideas, and events that cut across national

boundaries; and, of greatest interest here, the reassertion of local knowledge claims and local identities against the simplifying and universalizing forces of global science, technology, and capital.

In a time when national particularities are under pressure from many directions, it is of no small interest that the idea of the local has emerged as a salient topic in the policy discourses of environment and development. While seeking to establish common transboundary approaches to issues of sustainability, a remarkable variety of international regimes have recognized and accommodated knowledges and perspectives that are tagged as local. This juxtaposition of global and local, universal and particular, serves as the entry point for the work presented in this volume. We confront here a twofold puzzle. On the one hand, it is notable enough that environmentalism, so long associated with place-specific political phenomena such as the NIMBY (“not in my back yard”) syndrome, has become global at all. On the other hand, it is equally striking that the implementation of the global environmental agenda should so quickly and on so many levels have led to a rediscovery of the local.

Our aims in exploring these puzzles are both theoretical and pragmatic. On the theoretical front, we draw upon recent experiences in the field of environment-development politics to enrich our understanding of the phenomenon of globalization and its political ramifications. We are persuaded that the reappearance of the local within the discourses and practices of global governance is no passing fad—comparable for instance to global brand-name manufacturers deciding, after September 11, 2001, that business would improve through the incorporation of local style features into their blandly standardized luxury goods. Localism and globalism are far more problematic concepts for us than they appear to be for these suppliers of “glocal” mass markets.² The studies in this volume begin by asking what is *meant* by “global” and “local,” and how the meanings of these words connect to political struggles around varied environmental regimes. Each chapter examines how the dynamics of localization and globalization relate to different ways of knowing and evaluating environmental phenomena, as well as to the norms, beliefs, practices, and artifacts through which environmental knowledges gain power in political domains. Issues of this complexity can only be grasped by bringing together perspectives from several disciplines. Most of the contributors draw on more than one field that adds depth and texture to their analysis of environmental global-

ization. Insights from science and technology studies (S&TS) provide the intellectual backbone of the project as a whole, but the chapters are also informed by approaches from such fields as anthropology, sociology, law, political science, and political ecology.

Our pragmatic aims center on the design of institutions and processes of global environmental governance. The cases examined in succeeding chapters tell us much about what it will take to forge robust institutions to address problems that will in the future increasingly refuse to remain encapsulated within national boundaries. Three strong and interrelated themes emerge from these cases:

- Global solutions to environmental governance cannot realistically be contemplated without at the same time finding new opportunities for local self-expression.
- The construction of both the local and the global crucially depends on the production of knowledge and its interaction with power. How we understand and represent environmental problems is inescapably linked to the ways in which we choose to ameliorate or solve them (Jasanoff 2004). And which issues are defined as meriting the world's attention has everything to do with who has power and resources, including scientific ones, to press for them.
- Effective governance requires constant translation back and forth across relatively well-articulated global and local knowledge-power formations. This, in turn, calls for procedural innovation in science, politics, governance, and the interactions among them.

By presenting and analyzing a variety of such experiments, the chapters in this book enlarge our capacity to imagine more flexible, just, and effective approaches to global governance.

In the sections that follow, we first review several global environmental regimes that have established formal niches for local knowledge and politics. We next turn to different ways of theorizing the global and the local in the context of contemporary environmental politics. Drawing on several analytic literatures, we show that there is a need to integrate ethnographic and micro-focused accounts of local institutions and cultures with more systemic and macro-focused perspectives on globalization. This section also elaborates on the central role of knowledge in the formation of local-global relationships and draws out some themes that cut across subsequent chapters. We conclude by presenting an outline of the remaining chapters and showing how they relate to the main concerns of the book.

Recovering the Local in Global Regimes

The discourse of globalization has figured importantly in the framing and dynamics of environmental action since the early 1970s. Satellite images of the “pale blue dot” (Sagan 1994) gave rise to a rhetoric of the Earth’s fragility, finiteness, and ecological interconnectedness, as well as a new concern for preserving the biosphere’s shared and limited resources (Miller and Edwards 2001, particularly Jasanoff in that volume). Concurrently, *Only One Earth* (Ward and Dubos 1972) and *Our Common Future* (WCED 1987) helped to translate these ecological and ethical ideas into political action. Nations of the North and the South, both developed and developing, were urged to unite in a project of global environmental stewardship.

The terms “sustainable development” and “intergenerational ethics,” though vague and imprecise, nonetheless facilitated global negotiations about environmental goals and how to achieve them (Weiss 1989; Litfin 1994). Environmental science, too, became global in its ambitions, identifying new processes and objects for collaborative investigation. The proliferation of multilateral environmental agreements in the last quarter of the twentieth century attests to the wholesale adoption of shared environmental ontologies among the nations of the Earth: the ozone hole, shrinking habitats, biodiversity loss (Takacs 1996), and climate change, among others, were recognized as “real” problems, giving proof, if any were needed, that the severest environmental threats are politically borderless.

Institutional change followed quickly. For the environment as for the economy, mega-institutions such as the United Nations and the World Bank took up the task of management on a global scale. Just as modern states had done in the twentieth century (Price 1965; Mukerji 1989; Ezrahi 1990; Jasanoff 1990; Solingen 1994; Rueschemeyer and Skocpol 1996), and colonizing empires in the century before (Cohn 1996; Drayton 2000), these global bodies soon discovered the need for reliable knowledge to support their administrative and political authority. Producing shared cognitive foundations for global environmental regulation required further institutional innovation, and the new environmental regimes were fitted out with a panoply of scientific and expert bodies, such as the Intergovernmental Panel on Climate Change (IPCC) and the Subsidiary Body for Scientific and Technological Advice (SBSTA) attached to the UN Framework Convention

on Climate Change (UNFCCC). Non-governmental organizations (NGOs) with global missions, such as Greenpeace and the Worldwide Fund for Nature, followed suit, creating their own resources of expertise, or often *counterexpertise*. All these actors took up the business of producing for a global audience universally acceptable facts, ideas, and messages about phenomena such as “species protection,” “biosafety,” “risk assessment,” and “precaution.” They thus emerged as knowledge brokers for the world, although their political priorities and strategies remained, of course, markedly diverse.

It seems inevitable in retrospect that this vast project of integration—offering some of the starkest evidence, in Hardt and Negri’s (2000) terms, of the dawn of “Empire”—could not have unfolded without meeting resistance on many fronts. Environmental politics, as we have already noted, has historically been a politics of the local. It derives emotional force from people’s attachment to particular places, landscapes, and livelihoods, and to an ethic of communal living that can sustain stable, long-term regimes for the protection of shared resources (Ostrom 1990). Homely sayings such as “think globally, act locally” and “getting down to earth” point to the continued importance of local self-sufficiency and place-based identities. Not surprisingly, then, as some decision makers, experts, and publics confronted global articulations of environmental problems, it also became evident that other relevant actors, as well as their understandings of nature, could be integrated into environmental governance only at scales much more modest than the planet as a whole.

The paradoxical rediscovery of the local can be readily observed in the science and politics of climate change. Experts in the (global) IPCC and the (national) US government, for example, began to regionalize or localize their studies of climate impacts. Early work on sea level rise, extreme weather events, and crop yields tended to focus on how changes in climate parameters would affect ecological and social systems on global or near-global scales. Newer analyses, by contrast, examine the vulnerability and adaptability of particular social groups and ecological systems—in the Great Plains of the United States, for example, or on small islands such as Samoa. Acting under a 1990 law, the US government in 2000 completed its own assessment of the national consequences of climate variability and change (USGCRP 2000). The process involved stakeholders from all major geographical regions, as well as groups whose interests could not be

physically localized; native peoples and their homelands received an entire chapter in the final overview report, reflecting the quasi-sovereign status and political voice of this 1 percent of America's population.

Similar trends were evident in the politics of development. Thirty years ago, development organizations committed to the Green Revolution disseminated science-based agriculture to developing countries. Their aim was to increase productivity and enhance capacity according to a template of progress then deemed universally valid (Jasanoff and Wynne 1998). These efforts were only partly successful. Reprieve from hunger brought with it many disruptive changes in land tenure, wealth accumulation, and class relations. It aroused from the poor a covert resistance, using what James Scott (1985) has aptly termed the "weapons of the weak." The ecological costs were also considerable and not well accounted for in advance. The new grain varieties need such high inputs of water and fertilizers to "succeed" that some critics call them "high-response varieties" instead of "high-yielding varieties" (Shiva 1993, pp. 39–49).

Today, environmental regimes such as the Convention on Biological Diversity and institutions such as Canada's International Development Research Center recognize the need for more "culturally appropriate" technologies. In other words, even global actors have admitted the need to mobilize indigenous knowledge and promote community participation so as to improve people's lives in the developing world. No longer seen as merely victims of ecological breakdown, local communities and groups are instead assumed to hold some part of the solution to these problems.

International programs for biodiversity loss and forest preservation, for example, advocate participatory approaches, in which individuals—not state-like agencies—are given the opportunity to design, conduct, and evaluate environmental programs. The Convention to Combat Desertification similarly rests on a bottom-up strategy aimed at engaging women, communities, and NGOs in a common fight against dryland degradation. While the UNFCCC has not embraced a particularly populist management style, debates around global warming have catalyzed the formation of unlikely actor coalitions at far below global scales. One example is the Alliance of Small Island States (AOSIS), a group of 42 countries from around the world with disparate governments, economies, and social priorities. They are united only by a common vulnerability—the threat of extinction from sea-level rise. Armed with the strongest of normative claims, the right to live,

this odd association emerged in the 1990s as one of the staunchest advocates of policies to mitigate climate change.

Equally noteworthy is a shift from “science” as the primary cognitive resource for addressing global-scale social and ecological challenges to the broader category of “knowledge.” International environmental regimes increasingly admit that local, traditional, and indigenous knowledges may serve as useful instruments for sustainable development and for connecting with “on the ground” political constituencies. Some global institutions, including the World Bank, have even sought to standardize these resources, collecting and disseminating local knowledges through centralized databases. The desertification regime has sponsored workshops for sharing traditional and local knowledges and established a Panel of Experts on Traditional Knowledge. Similarly, the Convention on Biological Diversity established an Ad Hoc Working Group for the protection and application of local and traditional knowledge and practices (Martello 2001). Table 1 summarizes these and related provisions.³

In one sense, this move runs counter to the suggestion, made by Haas (1990) and others, that progress on regional and possibly global environmental accords would most likely come about through transnational “epistemic communities”—coalitions of professionals sharing a common causal explanation for perceived problems and an associated normative basis for allocating the costs of prevention and mitigation. The turn to local knowledge seems to make room instead for more fragmented and multiple visions of what is wrong with the environment, what values are stake, and above all what should be done about perceived harms and threats.

How should we account for the embrace of “knowledge” as a supplement to “science” in so many environmental regimes? We note to begin with that framings of environmental problems became increasingly more complex and systemic in the final decades of the twentieth century. Endangered species gave way to the ecologically sounder concept of biodiversity loss, encroaching deserts to land degradation, and the linear notion of global warming to the more turbulent concept of climate change. One consequence of these shifts is that policies for mitigating or managing environmental change must be spread across more numerous and diverse actors. Efforts to combat stratospheric ozone depletion, for example, could reasonably focus on the control of a small class of hazardous chemicals, whose properties could be scientifically studied, and on their manufacturers, many

Table 1

Traditional knowledge policies and programs (adapted from Martello 2001).

| Treaty or organization | Provisions or actions concerning traditional, local and indigenous knowledge |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agenda 21 (1992) ^a | <p>Traditional knowledge is important for promoting sustainable development and “capacity building.”</p> <p>Improvements are needed in understanding and applying indigenous environmental knowledge.</p> <p>Consultations with indigenous people are important for integrating their needs, values and practices into national policies and programs.</p> |
| Convention on Biological Diversity (1992) | <p>Respect, preserve, maintain, and apply indigenous, local and traditional knowledge, innovations and practices relevant for the conservation and sustainable use of biological diversity with the approval and involvement of knowledge holders.</p> <p>Protect and encourage biological resource use in accordance with traditional practices that are compatible with conservation or sustainable use.</p> <p>Facilitate exchange of indigenous and traditional knowledge relevant to biodiversity conservation.</p> <p>Encourage development and use of indigenous and traditional technologies.</p> |
| Forest Principles (1992) | <p>National forest policies should support the identity, culture and rights of indigenous people and their communities.</p> <p>Integrate indigenous capacity and local knowledge into programs.</p> <p>Equitably share benefits from the utilization of indigenous knowledge.</p> |
| Convention to Combat Desertification (1994) | <p>“Protect, integrate, enhance and validate traditional and local knowledge, know-how and practices,” and ensure equitable sharing of benefits.</p> <p>Parties shall, subject to national legislation and capabilities, promote, use, disseminate, adapt and make inventories of relevant traditional and local technology, knowledge, know-how and practices and their use.</p> <p>Integrate such technology with modern technology, as appropriate.</p> |
| World Bank (1998) | <p>Indigenous knowledge is embedded in practices, institutions, and relationships, and is “essentially tacit and not easily codifiable.”</p> <p>The sharing and exchange of indigenous knowledge and its integration in assistance programs can help to reduce poverty.</p> |

Table 1 (continued)

| Treaty or organization | Provisions or actions concerning traditional, local and indigenous knowledge | |
|------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| World Conference on Science (1999) | Declaration on Science and the Use of Scientific Knowledge | Traditional and local knowledge systems are dynamic expressions of perceiving and understanding the world. Preserve, protect, research and promote traditional and local knowledge. Bring together scientific and traditional knowledge. |
| | Science Agenda—Framework for Action | Countries should develop their strengths regarding “local knowledge, know-how and human and natural resources.” Environment-related science education should utilize traditional and local knowledge. |
| International Council for Science (ICSU) | Cairo Meeting 1999 | Undertook a study of the concept of “traditional knowledge” because of member concerns about the potential support for ‘anti-science’ ideas. (Dickson 1999). |

a. References to indigenous and traditional knowledge appear in several chapters of Agenda 21. Excerpts in this table are from chapter 26.

of whom were concentrated in developed nations (Benedick 1991). By contrast, policies for coping with climate change must reach into a broad range of economic and social activities whose impacts and interconnections are at best poorly understood, from subsistence agriculture and forestry to sophisticated forms of industrial production. Controls on greenhouse gas emissions are unthinkable without enrolling a far larger cross-section of the world’s population, and if possible their knowledges, into management initiatives. Similar observations could be made about many other regimes.

For many of the newer issues, too, ideas of physical and biological causality can scarcely be separated from normative presumptions about the agents and behaviors responsible for environmental harm. Anil Agarwal and Sunita Narain of India’s Centre for Science and Environment made this point most forcefully in connection with calculating the warming potential of greenhouse gases. They observed that treating all emissions alike, regardless of their source, would penalize “subsistence” activities just as severely as “luxury” ones; farmers producing greenhouse gases from rice paddies

would be held accountable for warming the Earth on exactly the same scale as car-owners driving to the beach for their summer holidays. The superficial egalitarianism of a scientific calculation, they argued, concealed a profoundly political intention *not* to distinguish among different types of resource consumption or different historical trajectories of development (Agarwal and Narain 1991). Bringing diverse knowledge holders into global deliberations offers a means of counteracting potentially explosive value choices of this kind that often underlie apparently scientific formulations of environmental problems.

Attempts to draw systematically on local knowledge, however, may entail major political adjustments. Unconventional forms of expertise cannot be accommodated in global environmental regimes without renegotiating basic rules of modern technical decision making. New participatory forums must be devised, because local knowledge resides, when all is said and done, in people, not places. Claims to the specificity, even superiority, of local epistemologies are frequently tied to the recognition of new rights for previously marginalized peoples; further, as we will see in succeeding chapters, “common” environmental resources may not be perceived or reliably managed as such unless they are coupled to processes of group identification and self-identification, so that people accept the resource as “theirs” to have, hold, and be responsible for.⁴

The concept of traditional knowledge, at any rate, has become a rallying point for indigenous groups around the world who wish to exercise voice in global forums. The “holder of indigenous and traditional knowledge” has emerged as a new actor in international discourse, with legally recognized claims to sit at international bargaining tables. Translocal actor coalitions have become increasingly prominent players at United Nations meetings and conferences, where they fight not only for their cultural and political rights, but also for the recognition of their knowledges and environmental practices. Constituted by and through their experiences of the environment, such groups have acquired new standing as experts. In desertification negotiations, for example, NGOs that once portrayed themselves as people’s advocates now also pattern as possessors of local expertise, with the capacity to provide practical solutions for dryland degradation.

By making room for local or indigenous knowledge, then, global environmental regimes have opened the door to experiments in politics and governance that will occupy us in succeeding chapters. There is, however, a

further point that needs to be emphasized in this introduction. While broadening the epistemological spectrum from “science” to “knowledge,” international regimes have continued to invoke, and so to reinforce, the boundary between science and other forms of knowledge; only knowledge that cannot and does not aspire to the status of science is labeled local or indigenous, as against science itself, which remains putatively universal and free from local coloration. The contributors to this volume adopt a more symmetrical position with regard to science and other knowledge,⁵ arguing that both can be seen as local—or, to borrow a term from the feminist historian of science Donna Haraway (1988), *situated*. Haraway and others have shown that communally accepted knowledge derives its robustness not from a free-floating universalism but from its attachment to particular ways of knowing. The authors in this volume argue that it is the *situatedness* of environmental knowledge that gives it force in decision making, whether the knowledge is scientific or of any other kind. The boundary between science and knowledge, moreover, is not given in advance but is constituted through social and political processes (Gieryn 1999; Jasanoff 1990). A major question addressed throughout this volume is how certain cognitive positions and technical skills achieve the privileged status of science, and what it means to attach the label “science” to particular ways of making sense of the world. We hope to show that the practices through which scientific and non-scientific knowledge are assessed, combined or differentiated form an essential component of contemporary environmental governance.

Knowing and Being: The Localisms of Modernity

In everyday speech, “local” connotes belonging to a particular place, a well-defined subunit of a larger geographical or political space, such as a region or a nation-state. A New York accent is local, as are Cajun cooking and Yankee ingenuity; so too are British humor, Italian elegance, and Arab hospitality. The localisms that have sprung up within the perimeter of the global, however, are different in kind. They are, to begin with, not necessarily tied to places. In the context of policies for environment and development, “local” has acquired richer meanings, associated not only with geographic locations but also with particular communities, histories, institutions, and even specialist expert bodies. What is interesting about the local

in all these senses is how it comes into being, sustains itself, competes with other localisms, and sometimes—as in the case of India’s famed Chipko movement (Gerlach 1991)—moves beyond the constraints of spatial or cultural particularity.

We argue in this book that the modern local is importantly constituted through its methods of producing situated knowledge; communal affiliations arise and are sustained by knowing the world in particular ways. This argument points to a need to supplement traditional social-science analyses of environmental globalization with perspectives from S&TS. It also underscores the centrality of knowledge making as a site of political engagement.

Between Knowledge and Information: An Analytic Deficit

As yet, the social sciences have not done justice to the resurgence of local epistemologies and their associated politics in the context of globalization. There are several reasons for this neglect. First, the local and the global have tended to be investigated by different disciplines in isolation from one another, thereby overlooking the ways in which they are related and the means by which each participates in the definition of the other.⁶ Second, conventional approaches to globalization tend to reinforce simple dualities, such as “modern” versus “traditional” and “Western” versus “non-Western”; the local comes to be seen in this context as pre-scientific, traditional, doomed to erasure, and hence not requiring rigorous analysis. Third and related, since much of the academic literature on environment and development accepts globalization as inevitable, localization is not recognized as a phenomenon deserving attention. Finally, much relevant work presents a static vision of local and global, as if these categories were fixed in meaning for all time rather than fluid and subject to strategic reinterpretation.

Interestingly, the theme of knowledge has figured more prominently in the scholarship of the local than the global. Localism, as we know from important works of twentieth-century cultural anthropology, is concerned as much with particular ways of knowing things as with being in particular places (Douglas 1970). Today, knowledge deficits are often adduced as an explanation for localisms, such as resistance movements, that hinder the spread of global technologies. Any deeper understanding of modern localism, however, has to liberate itself from the framework of “us” and “other” and from the implicit power relations between subject and object that

characterized older ethnographic traditions. Clifford Geertz's 1983 book *Local Knowledge* took a long step away from assuming the superiority of the observer's position to that of the observed. He advocated a special responsibility on the analyst's part to understand local ways of life within their own logics and frames of reference, and so break down the subject/object divide. But Geertz's work, too, has been criticized for adopting too essentialist a concept of local culture and privileging the eye of the beholder (Clifford and Marcus 1986). For similar reasons, some feminist theorists of science have advocated replacing local knowledge with the less loaded concept of situated knowledge (Haraway 1988). The discussion of new localisms throughout this volume is informed by this more reflexive and critical stance.

Recently, too, an impressive body of research has begun to challenge the assumption latent in many big development projects that local ways of knowing and relating to the natural world are invariably inferior to scientific knowledge and science-based technological practice (Brokensha et al. 1980; Escobar 1995; Fairhead and Leach 1996; Grillo and Stirrat 1997). Based on field studies in Africa, Latin America, and elsewhere, these works contend that practices of indigenous farming, livestock management, and water resource use can be more logical, effective, and fair than imported scientific methods of intervening in socio-ecological processes. James Scott (1998), for example, concluded that many large-scale twentieth-century development schemes failed because they did not incorporate local knowledge or forms of life. From a developing country perspective, Vandana Shiva (1993) has levied comparable charges against scientific forestry and agriculture, which are driven in her view by Western productionist ideologies and may have devastating consequences for local cultures and economies. In a similar vein, though in an altogether different context, Brian Wynne (1989; see also Irwin and Wynne 1994) showed how official UK scientific investigations of Chernobyl's effects ignored to their detriment the Cumbrian farmers' complex knowledge of their local environments and livestock management practices.

Globalization has become a prominent theme in the quantitative and predictive social sciences over the past decade, but as yet this work displays little of the engagement with epistemological issues that we observe in cultural anthropology and development studies, let alone in science and technology studies. "Information" is the word that comes closest to knowledge in the

globalization literature, but, black-boxed and unproblematized, information is ordinarily treated as just another commodity flowing—along with goods, money, people, and pollution—through dense networks of communication, trade, and transport that are shrinking space, compressing time, and melding cultures (Keohane and Nye 2001; Castells 2000; Giddens and Hutton 2000; Held et al. 1999; Cvetkovich and Kellner 1997; Appadurai 1990). To the limited extent that the local appears in these accounts of global movement, it is often portrayed as a vanishing social form—lodged in peoples, knowledges, and ways of life that are appropriated, threatened or deservedly overtaken by the liberating forces of the global.⁷

Most works on globalization dwell instead on the novel interdependencies that are created by global flows and networks: upturns and downturns rippling across financial markets; borderless environmental threats such as climate change and transboundary air pollution; migration of people in an increasingly mobile world; non-localizable “cyber crimes” requiring international systems of law enforcement; and the building of a worldwide coalition of nation-states against terrorism. But how do societies undergoing such massive transformation *know* things? Where do they turn for credible information, and what even counts as information in today’s complex and noisy networks of communication? How do widely dispersed actors, with no common experiential base, acquire shared knowledge, and what happens when they disagree about the immensely varied facts that are relevant for their survival? These questions, so critical to the success of global governance, have remained unasked and largely unanswered.

The contributors to this volume avoid these limitations in several ways. First, they approach the local and the global not as fixed in advance but as constituted through the beliefs, actions, and normative commitments of relevant social actors. This orientation is particularly consistent with the aims of STS, a field centrally concerned with the production of authority structures in scientifically and technologically advanced societies. Drawing on STS perspectives, the authors start from the tenet that *all* knowledge, including the “hardest” scientific facts, originates in some sense as local or situated. From this standpoint, the spread of science is something to be accounted for rather than taken for granted. It is well established, for example, that considerable simplification is needed to wrest scientific knowledge from its chaotic and often unreadable contexts and to make it intelligible to varied audiences (see Lachmund, this volume). Indeed, one way to under-

stand the nature of scientific production is to see it as a series of progressive translations from “wild” and excessively signal-rich contexts to the tamed but interpretively constrained currency of representations and publications (Latour 1999).

To such micro-focused accounts of “science in action” (Latour 1987) may be added the perspectives of development critics who stress another kind of reductionism: the displacement of heterogeneous local sensibilities through the particular highly successful local vision that goes by the name of “science”—producing what Vandana Shiva (1993) has provocatively called “monocultures of the mind.” Science, for our purposes, is not automatically exempted from the attributes of parochialism. Localism, correspondingly, is confined neither to remote villages nor to sophisticated laboratories and scientific workplaces, but can appropriately be observed in any site that produces authoritative knowledge. Localness in this sense is just as readily found in United Nations negotiating bodies and international scientific committees as in colonial South Africa or Native American tribal organizations.

Second, and related, our understandings of both local and global include but are not limited to geographic conceptions. Other ways of bounding the processes and preserves of knowledge making turn out to be equally significant for environmental governance: for example, the word “local” can be used to describe residents’ knowledge of a nature conservancy, users’ understanding of a technological system, the conclusions of a policy-making agency, or the practices developed by a scientific discipline or advisory body. By finding the local in such a diversity of sites, the contributors to this volume resist the tendency to equate “global” with progress or inevitability and “local” with tradition or resistance. Accordingly, a third concern of our contributors is to explore the complementarity between the local and the global. How, for example, do different conceptions of the local help to authorize the turn to the global, or vice versa? The answers open up news ways of thinking about what it means to embrace local as against global habits of thought when confronting environmental challenges. It is the mutually constitutive relationship between these allegedly opposing forms of life that commands the greatest interest. Thus, international debates about biodiversity conservation weave into a city’s urban wasteland experiments (Lachmund); assertions of community identity and expertise help to counter corporate notions of universal technical knowledge

(Iles); and international institutions attempting to produce shared meaning around ostensibly global concepts such as biosafety or climate change, reveal that to “assess” environmental risk globally is to take on board a host of locally significant normative and distributive questions (Fogel, Goldman, Gupta).

Finally, all the authors challenge static notions of local and global. They deal in one or another way with processes, be they processes through which scientists and communities negotiate over nature preserves in Berlin, citizens gain access to chemical companies, or plants from South America are translated into biodiversity information for US corporations. By treating local and global in these terms, the authors illuminate the intensely political character of local-global interactions. They call attention to the mechanisms through which ideas, communities, practices, economies, and knowledges acquire power and achieve currency. This dynamic approach also brings into relief crucial questions about institutional design: Who decides what counts as local or global, and by what criteria; and what weight is accorded to local concerns in translocal forums? Who speaks for the local and the global, and on what authority? How do knowledges, people, and technologies circulate (or fail to do so) in and across local and global arenas? How are these arenas shaped by, and in turn how do they shape, additional knowledge claims and technological developments? And in what ways do new configurations of the local and the global transform the processes of environmental knowledge making, technological innovation, and political action?

What Is at Stake?

Changing notions of locality and globality, then, are more than mere academic curiosities. They have important consequences for the configuration of power and the efficacy of governance in environment and development contexts. They also have far-reaching implications for the production of knowledge acceptable to an emerging global polity. As the chapters in this volume demonstrate, there are myriad ways in which processes of localizing and globalizing bear on the creation of laws and institutions, the allocation of resources, the provision of access to scientific or political forums, and the wielding of voice in public debates. The interplay of the local and the global influences the kinds of knowledges about the environment that are discovered, accepted as authoritative, and put to use in decision making. For now, we restrict ourselves to a few general observations about the

political implications of our analysis; we will return to a more detailed evaluation in the concluding chapter.

Environmental science, as we noted earlier, can be either local or global, situated or portable. Scientific knowledge production begins at one level as a deeply local activity. It takes place in field sites, laboratories, and at computer screens; equally, its production is embedded in particular traditions of securing social trust and credibility. But, as the sociologist of science Bruno Latour has shown in a series of influential works (1987, 1990, 1999), observations that achieve the status of “science” are able to circulate globally through journal articles, mathematical equations, maps, and charts, and through the interactions of international scientific communities. Claims that fail to circulate in these ways are not considered science, which continues to be seen as the only universally valid source of knowledge. Yet studies of environmental management have called into question assumptions about the adequacy, universality, and superiority of much scientific knowledge. The coming together of disparate cultures in international environment-development forums reveals important differences in ways of knowing throughout the world, even among scientifically advanced societies.

Globalization processes, as we have seen, have paradoxically helped to diversify the types of knowledges recognized and used in environment-development policy. Global regimes have not neutralized the politics of knowledge by consolidating all claims under one big, hospitable, relativizing tent, but rather have channeled scientific and political activity in specific directions. Thus, the dominance of computer modeling in an area such as climate change may discourage the use of more locally or regionally oriented methodologies such as forecasting by analogy (Glantz 1988). Sidelining the latter sorts of techniques may, in turn, disfavor framings of climate change that are most directly relevant to place-bound communities such as farmers and natural resource managers.

But it is not only such basic epistemological divisions that have come to light through the globalization of environmental problems; at stake as well is whose knowledge counts when views conflict. The emergence of local knowledge as a resource for achieving sustainable development has, in some cases, broadened the definition of “expert” to include non-scientists and caused expert committees to become more diverse and inclusive. And the resurfacing of local knowledge has also helped to redraw the meanings and goals of capacity building. Early development programs sought to build

capacity in the image of Western know-how by providing local peoples with modern technologies and analytic techniques deemed to be advantageous in all contexts. The new respect for local forms of knowledge and action recognizes the flaws in that approach. It has the potential to transform capacity-building by strengthening and enabling existing, in-situ capabilities among recipients of development assistance. These points are taken up repeatedly in the volume.

Sites of Localization: An Outline of the Volume

Each chapter in this volume takes up most of the themes and issues outlined above. It is thus important to emphasize the synergies among them. At the same time, the various chapters also deal with some recurrent forms of local-global negotiation that deserve recognition. The chapters are therefore organized so as to capture the interplay between the local and the global at three levels of governance: international institutions and their standardization of knowledge; national responses to environmental globalism; and environmental knowledge and cultural identity in communities other than nation-states.

In “Heaven and Earth,” Sheila Jasanoff introduces many of the volume’s principal themes. She connects the origins of the global perspective on the environment to the history of the US manned space program and notes that the resulting vision of the biosphere as a limited, ecologically interconnected space is not uniformly accepted across the world. In India, for example, environmental needs and values are related to visual representations that are remote from the totalizing image of the Earth floating in space. The adoption of the global view, Jasanoff suggests, entails the overriding of local sensibilities and commitments, without necessarily acknowledging the political consequences at stake.

In part I, Michael Goldman, Clark Miller, Cathleen Fogel, and Aarti Gupta examine how development processes managed by suprapstate bodies, under the heading of modernization, produce demarcations between local and global. These accounts illustrate how global scientific rationality, operating as a leveler of difference, encounters and deals with local specificity. As well-intentioned analysts seek to develop common languages and create portable claims and artifacts, they often over-simplify or ignore complex local ways of life. In response, local constituencies are increasingly

demanding voice and agency, not only in the forums that develop multilateral policies, but also in processes that generate knowledge about global environmental change. Transnational negotiating forums have emerged in consequence as producers of local knowledge as well as global regulatory concepts.

Goldman examines the World Bank's social and environmental assessment practices following the protracted Narmada Dam controversy in India. The Bank, in Goldman's account, functions much like a reductionist planning state, translating local peoples and their complex life worlds into abstract knowledge and data that can circulate globally. Newly devised assessment and consultation procedures ostensibly serve as tools for avoiding the "Narmada effect" by promoting environmental sustainability and creating transparency. In employing these tools, however, the Bank reverts to its old habits and does more to simplify and even erase "local" subjects than to empower them.

Along similar lines, Miller, in his analysis of the International Research Institute for Climate Prediction (IRI), emphasizes the lack of accountability in the scientific expertise and predictive technologies undergirding some international institutions, and he suggests that many of globalization's discontents stem from this weakness. Reviewing IRI's attempts to make El Niño-Southern Oscillation (ENSO) forecasts available worldwide (in Peru in particular), he pleads for greater attention to the ways in which such institutions remake, or attempt to remake, the localities in which they intervene.

Fogel takes forest management as her focus and analyzes the activities of the Intergovernmental Panel on Climate Change and the Kyoto Protocol regime in constructing the identities and roles of indigenous peoples. As Scott (1998) and Shiva (1993) did, Fogel shows how the IPCC's scientific forest assessments have tended to overlook the people who use forests. Indigenous groups, however, have reinserted themselves in climate change negotiations, where they present their own ways of understanding and relating to forests and argue for greater attention, on the part of scientists and policy makers, to peoples and places served by global forest resources.

In partial contrast, Gupta's analysis of the Biosafety Protocol negotiations suggests that a conceptual framework such as biosafety can function as both globally compelling and locally contingent. At one level, negotiators from participating countries appear to be talking about the same thing when referring to biosafety. Yet when they attempt to give the concept a

universal meaning, they run into problems because the scientific principles on which biosafety is allegedly based turn out in reality to be highly contested and culturally variable.

In part II, Myanna Lahsen, Silke Beck, Tim Forsyth, and Astrid Scholz deal with the uptake and redefinition of global knowledge-power settlements in national contexts. The authors ask how knowledge is traded, interpreted, and institutionalized across different levels of governance, and how these exchanges shape the politics of centers and peripheries. When national-level actors confront transnational problems such as climate change, they often discover incongruities between globally constructed framings of environmental phenomena and their own histories, political cultures, and priorities. And while global institutions may operate on the assumption that local groups speak for the disenfranchised, national-level experiences sometimes reveal a different reality. These chapters point to the dangers of stereotyping the local or the global. They illustrate the everyday challenges that people (including indigenous peoples and developing country scientists) face in traversing and mediating between the national and transnational settings in which environmental science engages with politics and ideology.

Lahsen's analysis of climate scientists in Brazil explores the contradictions of leading an active scientific life in both local and global arenas. Climate scientists are supposed to belong to a unified international research community, but Lahsen's ethnographic investigations reveal a more complicated reality. From a scientific standpoint, climate change is a global problem demanding a unified response from science; yet the consequences of climate change are not evenly distributed around the world, and the politics of knowledge making and knowledge interpretation vary by region and state. Thus, while participation in international forums confers professional rewards, Lahsen's Brazilian scientists realize that these forums also support research and policy agendas at odds with Brazilian needs and priorities.

Beck draws on theories of political culture in examining the appearance of climate change as a national policy issue in Germany. Looking at the work of two parliamentary commissions, she shows that each translated concerns about the climate into a political idiom consistent with German views about the nature of expertise, the role of dissent, and the norms of environmental responsibility. Beck argues that institutions, scientific enterprises, and policy processes put in place to deal with climate change at the

international level are founded on unrealistically monolithic visions of the problem and its management. Not surprisingly, such approaches tend to overlook the national particularities that make international coordination on this issue so difficult to achieve.

Turning to Thailand, Forsyth takes issue with the idealistic view that associates environmental NGOs with the elevation of local knowledge and democratization. Environmental social movements, he observes, are not classless resistance movements, but are themselves tied to particular socio-economically and culturally inflected visions of the environment. NGOs thus may propagate erroneous or ill-considered scientific doctrines, ignore systematic environmental abuses, propagate falsely romantic views of the “local” or ally themselves with repressive policies. In Thailand, he further suggests, environmental social movements have been largely middle class enterprises. Far from representing the voices or knowledges of the poor or marginal, they have more often repressed them.

Scholz tells a more optimistic story about the dynamics of localization and globalization in the emerging field of natural products chemistry, where important relationships between knowledge and power are again at stake. Scholz compares a project of the International Cooperative Biodiversity Group (ICBG) in Panama with its sister projects elsewhere in the program. The Panama program successfully produces natural products for the world, but also gives back resources, knowledge, and technologies to the localities from which the products are derived. Elsewhere in the ICBG program, the delocalization of biodiversity and local knowledge has proceeded without comparable local payoffs.

In part III, Jens Lachmund, Marybeth Long Martello, Alastair Iles, and Stacy VanDeveer examine the intricate links between knowledge making and identity formation in the context of environmental politics and explore how knowledge is mobilized in support of local forms of life that gain their power partly by contesting or dissociating themselves from global environmental regimes. Strategies of localization and globalization have proved to be important resources for scientists, Native Americans, citizens, corporations, and regional communities as they work out their own identities; their definitions of nature, expertise, and place; and their roles in environmental governance. In discussing these examples, the authors ask what it takes to establish or extend the power of knowledge produced in various local settings, be they nature reserves or new scientific disciplines.

Lachmund's analysis of a nature park in Berlin offers fascinating insights into the tenacity of local practices, both symbolic and material, in a globalizing world. Tracing the development of urban ecology in West Berlin, Lachmund describes how ideas about human-nature relationships co-evolved with new conventions of ecological research, and how the results achieved both cognitive and political viability in the unique environment of Germany's once and future capital city. "Living ecologically" and adapting to "global change," in his account, were not scientifically defined endpoints; rather, they were performative goals that allowed both lay and expert actors to participate in determining what should count as natural and how nature should be studied and protected.

Martello looks at the strategic deployment of rhetorics of localization and globalization in the debate over whether the Makah tribe of the Pacific Northwest should be allowed to hunt gray whales. The Makah's very existence as a community depended in this case on their ability to assert unique claims about their relationship to the environment. Exchanges between the Makah and the anti-whaling activists centered on who (if anyone) has the right to define "global nature" on their terms, and on what (if anything) counts as authentic "local" culture, entitled to retain its distinctive environmental practices in a globalizing world.

Iles turns to the corporate sector as a locus of knowledge and identity formation and examines how the American chemical industry reinterpreted the notions of "local" and "expert" in implementing global standards. This quintessentially modern industry once equated the local with notions of inferior, parochial, non-expert, and lay; today, however, a new vision is emerging in which the local is recognized as a source of power, voice, and specialized knowledge. Even the chemical industry has begun to view so-called local people as potential experts and as reliable partners in chemical plant oversight, thus laying the basis for a new, transnational culture of regulatory cooperation.

VanDeveer uses examples from the European Union and eastern Europe to illustrate the emergence of "regions" as a new unit of environmental governance. The identity and autonomy of regions, he suggests, results from the interaction of knowledge about nature and visual representations of nature, such as maps, with associated forms of politics. In a global context that is otherwise largely governed by national entities, regions function as an interesting kind of locality, with power to foster politics and

even identity formation on the basis of shared conceptions of environmental problems.

In a brief concluding chapter, we summarize the insights gleaned from the preceding chapters and their implications for policy institutions and processes. We indicate which kinds of accommodations between the global and the local are most likely to lead to political impasse and injustice, and which by contrast can be expected to produce more balanced, interactive, and knowledge-enhancing relations in future environmental governance.

Notes

1. Others have noted the weaving together of local and global themes and images during the millennium celebrations. We are particularly indebted to Clark Miller for related insights and comments.
2. The words “glocal” and “glocalism” have attained currency in journalistic and popular writing (Ball 2002). They imply that there are ready-made spheres of the global and the local and that the challenge of marketing or governance is simply to hybridize them. The authors of this book resist any such implication.
3. The table does not claim to present an exhaustive account of all transnational initiatives on local, traditional, and/or indigenous knowledge. Agreements and organizations that address traditional knowledge but are not included in the table include the International Undertaking on Plant Genetic Resources, the World Intellectual Property Organization, the General Agreement on Tariffs and Trade, and the Trade-Related Aspects of Intellectual Property Rights Agreement.
4. The co-construction of norms and identities around natural resources has not been sufficiently stressed in the extensive and widely cited literature on common pool resources (e.g., Ostrom 1990). Written from a realist perspective on the natural world, this literature generally takes the “commonness” of natural resources for granted. Particularly in the context of globalization, however, we need to consider how planetary resources come to be seen as held in common and demanding shared stewardship.
5. This methodological approach is consistent with the strong program in the sociology of scientific knowledge, which invites analysts to explore through social scientific means how certain facts and claims acquire or maintain the status of science while others do not (Bloor 1976).
6. For exceptions, see Robertson 1995 and Cvetkovich and Kellner 1997.
7. Roland Robertson (1995) uses the word “glocalization” in calling for sociological analyses that examine the interactions of homogenization and heterogenization that have been part of so much late-twentieth-century life. Robertson argues that focusing exclusively on globalization as a process that overrides the local neglects the role of the trans-local and the super-local in constructing the local and overlooks weaknesses in notions of “universal time” and “particularistic space.”

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