

## Chapter Six

### Scale: Understanding Local and Global Commons

CAN WE APPLY LESSONS derived from the burgeoning literature on the management of common-pool resources (CPRs) in smallscale – often local – settings to the treatment of global challenges involving such matters as the depletion of the stratospheric ozone layer, the loss of biological diversity, and changes in the Earth’s climate system? The advantages associated with an affirmative answer to this question are apparent, and a number of those who have studied smallscale systems have reached optimistic conclusions about the prospects for transferring propositions from one level to another (McGinnis and Ostrom 1996). In a major article published in *Science* during 1999, for example, five prominent contributors to the literature on long-enduring CPR institutions conclude that “[s]ome experience from smaller systems transfers directly to global systems,” although they are careful to note that “global commons introduce a range of new issues, due largely to extreme size and complexity” (Ostrom et al. 1999: 278).

How should we evaluate propositions of this sort? More specifically, how can we differentiate conclusions derived from the study of smallscale systems that do apply at the global level from those that do not? In this chapter, I argue that this question centers on the problem of scale, a concern that has received comparatively little attention among social scientists, although it is a prominent concern throughout the natural sciences. The key issue is easy to articulate. Are largescale systems essentially macrocosms of smallscale systems, so that it is a straightforward matter to scale up findings derived from the study of smallscale systems or, for that matter, to scale down findings based on the study of largescale systems? Or are there more or less

significant differences in the structures and processes of systems operating at different scales, so that assuming the transferability of propositions across spatial or temporal scales – in this case, levels of social organization - is a risky business? The attractions of assuming that it is possible to transfer propositions across scales in the dimensions of space and time are evident. But as many disappointed scientists – not to mention policymakers who have followed their lead - have discovered, the pitfalls associated with matters of scale awaiting the unwary are numerous and often debilitating.

This chapter examines the problem of scale with particular reference to the relationship between the management of smallscale CPRs and the handling of global environmental challenges. In considering the prospects for scaling up in this setting, I focus on: (1) problem structure or the nature of the problems arising in the two settings, (2) agency or the character of the actors in smallscale systems and in international society, and (3) social context or the nature of the social settings prevailing at the two levels of social organization. A concluding section comments briefly on the design implications of the differences between smallscale CPRs and global environmental problems. Given the nature of the issues under consideration, I move back and forth between local concerns (e.g. sustaining specific fish stocks) and global systems (e.g. managing the use of the electromagnetic spectrum) in order to illustrate the arguments presented.

Nothing in this analysis suggests that we should eschew efforts to scale up from smallscale systems to largescale systems or, for that matter, to scale down from macro-systems to micro-systems. Although the literatures on local, community-based resource regimes and on international environmental regimes are both expanding vigorously, there is surprisingly little

contact between the two. Under the circumstances, there is much to be gained and little to be lost from a sustained effort to compare and contrast the findings of the two streams of analysis. Even so, the principal conclusion to be drawn from the analysis presented in this chapter is that the differences between the two sets of cases are substantial. The pitfalls confronting those desiring to scale up in this context are correspondingly severe; incautious efforts to apply local lessons to global challenges may do more harm than good.

## 1. Problem Structure

Common-pool resources are conventionally defined in terms of two distinct dimensions: excludability and rivalness. If we treat each dimension as a dichotomy, it is possible to construct a 2x2 table that makes it easy in conceptual terms to identify CPRs and to differentiate problems associated with CPRs from problems exhibiting other structures. CPRs are goods that are non-excludable in the sense that it is costly - or even impossible - to prevent all the members of a group from enjoying their benefits once they become available to any member of the group and rival in the sense that the consumption of a unit of these goods on the part of any individual member of the group diminishes or degrades the supply available for consumption or appropriation on the part of others.<sup>1</sup> Thus, CPRs occupy the upper righthand cell of Figure 1. They differ from pure public goods, which are non-rival as well as non-excludable; from private goods, which are excludable and rival, and from club goods, which are excludable and non-rival (at least among those who are members of the relevant club).<sup>2</sup>

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<sup>1</sup> . In reality, some resources are likely to exhibit degrees of excludability or rivalness. For a general account of such matters described in terms of “fuzzy sets,” see Ragin (2000).

<sup>2</sup> . Here, too, several caveats are in order in applying these analytic distinctions to real-world situations. While some public goods can become degraded or congested as the size of the user group grows, others are strictly non-rival in the sense that they are not subject to degradation regardless of group size. Similarly, club goods may be subject to crowding or degradation if the organizers/managers are unable or unwilling to construct or implement effective entry barriers.

FIGURE 1 TYPES OF GOODS/RESOURCES		
	<u>Excludable</u>	<u>Non-excludable</u>
<u>Rival</u>	Private Goods	CPRs
<u>Non-rival</u>	Club Goods	Pure Public Goods

The fundamental challenge arising in connection with CPRs is to avoid or overcome the familiar “tragedy of the commons” in which a group of appropriators, acting on the basis of individualistic calculations, deplete the resources or use them unsustainably due to the absence of incentives for individuals to husband the resources in a setting where the benefits flowing from conservation will accrue largely to others. Human uses of a variety of living and flow resources, such as fish, forests, pastures, and aquifers, can and often do pose such problems. Efforts to solve problems of this sort constitute the main focus of the rapidly growing literature on long-enduring CPR institutions in smallscale societies (Ostrom 1990). With a little ingenuity, it is possible to expand the scope of this analysis by treating ecosystem services (e.g. the capacity of watersheds and airsheds to absorb human wastes) in somewhat similar terms. It is often hard to exclude individual users of these services from dumping wastes into water bodies, for instance, even though at some stage the actions of a group of users who adopt such practices will degrade or even overwhelm the capacity of these ecosystems to handle wastes.

To what extent do international and ultimately global problems involve efforts to manage CPRs? It turns out that this seemingly simple question harbors significant complexities. Most importantly, environmental problems are socially constructed in the sense that there are almost always a number of plausible ways to think about them, and the choice of conceptualizations is apt to have significant consequences for the interests of one or more of the members of the relevant group (Jasanoff and Wynne 1998). Efforts to distinguish between excludable and non-excludable resources offer a particularly striking case in point. In most situations, excludability is a human artifact rather than an unalterable natural condition. Fish stocks, for instance, are often seen as exemplifying the category of non-excludable resources. But managers all over the world are now experimenting with a variety of techniques, such as individual transferable quotas or ITQs, to create effective exclusion mechanisms in this realm (Iudicello, Weber, and Wieland 1999). Similar remarks are in order regarding water, where there is a long history of efforts to achieve excludability through the development of various types of water rights. A particularly interesting case, in today's world, involves the introduction of exclusion mechanisms relating to waste disposal through the creation of discharge permits covering liquid wastes and emissions permits applying to gaseous wastes. The purpose of these observations is not to advocate any particular type of exclusion mechanism or even to argue that the creation of such mechanisms is necessarily a good thing. Rather, the point to ponder is that the extent to which any given environmental concern is properly construed as a CPR problem is apt to be more a matter of how we choose to look at it than a fact of life.

Even so, it is possible to offer some relevant observations about the character of environmental problems arising at the international level and to compare and contrast them with

smallscale environmental problems. Some largescale environmental do lend themselves to treatment as CPR problems (Barkin and Shambaugh 1999). This is true, for instance, of situations involving consumptive uses of birds and marine mammals (e.g. whales) that migrate across jurisdictional boundaries or fish stocks that transcend the boundaries of national jurisdictions (e.g. highly migratory species like tunas). It is also true with regard to the appropriation of certain non-living resources whose supplies are finite, such as the electromagnetic spectrum or deposits of manganese nodules located on the deep seabed.<sup>3</sup> In such cases, it seems reasonable to conclude that the fundamental character of the problems at stake is essentially the same whether we are contemplating local problems or global problems. Not surprisingly, then, many efforts to create and implement international resource regimes bear a distinct resemblance to similar efforts in smallscale settings.

In other cases, however, the relationship between classic CPR problems and global challenges is less straightforward. Many of the global challenges that occupy our attention today (e.g. ozone depletion, climate change) are not consequences of the actions of a group of relatively homogeneous appropriators seeking to maximize individual benefits accruing from the use of the same resource. Rather, they take the form of externalities or unintended side effects of efforts to pursue other objectives. No one sets out intentionally to destroy stratospheric ozone or to alter the Earth's climate system; no one benefits by beating others to the punch and appropriating the lion's share of these resources. True, the stratospheric ozone layer and the climate system can be thought of as ecosystems producing services that are non-excludable and depletable. But in many cases, those whose actions produce the relevant externalities are able to

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<sup>3</sup> . In the case of the electromagnetic spectrum, advances in technology may make thkis natural resource non-rival for all practical purposes.

shield themselves from the negative impacts of their actions either by removing themselves from the impact zone (e.g. locating their homes upwind from smokestacks) or by insulating themselves from the relevant impacts (e.g. installing air conditioners with effective filters). In such cases, the task of regulators seeking to deal with environmental problems is not a matter of persuading a group of appropriators to join forces in devising common restraints from which they themselves will benefit directly. Rather, it is a matter of society at large imposing restraints on polluters who are likely to view these restraints as costly limitations that, at best, impose similar limitations on their competitors, and, at worst, disadvantage them in a competition focused on the production of other goods and services. Where substantial asymmetries exist among competitors, as in the case of operators of coal-fired versus hydroelectric power plants, the treatment of these regulatory issues is likely to become especially controversial. Operators of coal-fired power plants who are subjected to costly regulations designed to reduce sulfur emissions or carbon-dioxide emissions, for instance, are apt to object that this puts them at an unfair disadvantage in relation to operators of hydroelectric power plants who are not required to shoulder the costs of repairing damages that dams inflict on ecosystems.

Another set of cases encompasses situations that turn on conflicts among users possessing divergent lifestyles and seeking to exploit the same resource for different purposes. In extreme situations, these problems degenerate into intractable value conflicts as in the case of the confrontation between conservationists who wish to harvest whales in a sustainable manner and preservationists who regard any consumptive use or killing of whales as unacceptable and even immoral. In less extreme forms, conflicts among groups seeking to use the same resource for different purposes are both common and highly relevant to today's global challenges. They

include conflicts among subsistence users of forest products, timber companies, owners of oil palm plantations, and those seeking to preserve forests in order to protect biological diversity; clashes between upstream users desiring to divert water for irrigation and downstream users interested in navigation, and confrontations between developers seeking to erect buildings in coastal areas and conservationists dedicated to the protection of coastal wetlands and mangrove forests. In all these cases, the problems are more complex than those involved in persuading a group of more or less homogeneous appropriators to impose restrictions on themselves in the interests of conserving a resource that they all think about and value in similar terms. This is not to say that societies have no capacity to cope with situations of this kind. But to the extent that the solutions require value judgments or the adjudication of claims based on fundamentally different classes of rights to the same resources, the problems posed by such situations are apt to prove more difficult to resolve than those envisioned in the ordinary CPR setting.

Going a step further, we encounter problems that are essentially jurisdictional in nature in the sense that they turn on ambiguities or disagreements about who has – or should have – the authority to make decisions or to promulgate rules regarding human uses of valuable resources or ecosystems. The problem of devising a management regime for Antarctica where some countries (the claimant states) asserted jurisdictional claims while others (the non-claimant states) explicitly refused to recognize such assertions is a familiar case in point. But other equally important problems exhibit the same defining feature. Consider, for instance, the question of whether flag states or some entity representing international society (for example, an International Seabed Authority as envisioned in the 1982 UN Convention on the Law of the Sea), should exercise authority over activities relating to deep-seabed mining or the issue of whether

states in which companies are incorporated or some international entity (e.g. the World Trade Organization) should be empowered to make rules about the production and consumption of chlorofluorocarbons (CFCs) or fossil fuels. In simple situations involving the use of CPRs, these issues do not arise. The members of the relevant group are the appropriators themselves, and their problem is to come to some workable agreement among themselves that applies to their own actions. With regard to many global challenges, by contrast, human actions disturb ecosystems located wholly or partially beyond the jurisdiction of the individual members of international society, and there are frequent disagreements about the locus of authority to address the resultant problems.

Three additional observations will help to flesh out this picture of problem structure as it relates to environmental issues arising at various levels of social organization. First and undoubtedly foremost, some environmental problems – at the local level as well as at the global level – are simply harder to solve than others. Some observers attribute this variation mainly to attributes of the relevant biogeophysical systems and, in the particular case of global challenges, to issues of “extreme size and complexity.” Proceeding in this way, they argue that “[c]haracteristics of CPRs affect the problems of devising governance regimes” and point to a range of specific factors including the size and carrying capacity of the relevant systems, the measurability of the resources, and the speed with which resources regenerate (Ostrom et al. 1999: 279). What should we make of this argument in connection with the prospects for scaling up from local lessons to global challenges? Some biogeophysical factors undoubtedly do constitute important considerations in dealing with global challenges (as well as with smallscale concerns). It makes a difference, for instance, whether populations of living resources are slow to

regenerate (e.g. whale stocks) or are capable of bouncing back on the basis of one or two years of high recruitment (e.g. capelin or herring stocks). Similar remarks are in order about the capacity of large ecosystems (e.g. the Great Lakes) to absorb human wastes without becoming severely degraded and the extent to which these systems have thresholds beyond which disturbances trigger irreversible changes.

At the same time, it is important to note that several attributes of the relevant human systems play key roles in determining how hard specific problems are to solve and that some of these concerns loom particularly large when it comes to meeting global challenges. To use language devised by students of international regimes, these factors are key determinants of the location of specific problems on a scale running from generally benign situations to highly malign situations (Miles et al. forthcoming). The number of human actors involved, the importance that key actors attach to the relevant activities, and the relationships of power among them are major considerations. Thus, the facts that (1) DuPont produced about 25% of the world's CFCs in the mid-1980s, (2) this product line still did not account for a major part of the company's overall business, and (3) the company is more concerned with absolute gains than with relevant gains surely made the ozone problem easier to solve than the problem of climate change where the relevant activities involve large numbers of actors, go right to the heart of advanced industrial economies, and raise sensitive matters of North/South relations (Young 1999: Ch. 3). Similar remarks are in order regarding transparency or the ease with which it is possible to determine what key players are actually doing in the relevant issue area. Many observers have expressed a concern, for instance, that globalization will impede efforts to meet global challenges by making it increasingly difficult to monitor the behavior of multinational

corporations with precision (Reinicke 1998). The strategic character of the problem or the structure of the relationships among the major actors is another important consideration in this connection. As many analysts have pointed out, it is one thing to solve coordination problems (e.g. managing international air traffic) in which there are no strong incentives to cheat. It is something else to solve collaboration problems (e.g. managing consumptive uses of fish stocks) in which individual participants have incentives to cheat even though this is likely to lead in the end to outcomes that are undesirable for everyone (Stein 1982).

A second observation concerns the role of uncertainty, a factor common to most environmental problems but often more severe in connection with largescale systems. Although surprises are always possible, users of smallscale CPRs (e.g. inshore and localized fish stocks) are apt to have a well-developed – though not necessarily scientific in the western sense - understanding of the dynamics of the biogeophysical systems in which they are embedded. Compare this with efforts to manage human activities in large marine ecosystems (LMEs), such as the Bering Sea or the South China Sea (Sherman 1992). The dynamics of these LMEs typically feature chaotic behavior in such forms as ecological cascades or relatively sudden shifts from one state to another, which generates high levels of uncertainty as far as those responsible for operating resource regimes are concerned (NRC 1996). Among other things, this condition often allows self-interested members of user groups to find respected scientists ready and willing to make projections that suit their preferences, no matter what they are. This may be what the authors of the *Science* article had in mind in referring to the “extreme size and complexity” of many global problems. But note that the underlying issue here is really a matter of uncertainty

regardless of the factors that cause it and that the threshold between low and high levels of uncertainty will not always be a function of size

Finally, whatever the nature of any given environmental problem, the development and implementation of a solution is apt to involve the supply of a public good. Thus, regulatory rules, decisionmaking procedures, and systems of implementation review tend to be both non-excludable in the sense that they apply to all members of the group and non-rival in the sense that applying them to one member of the group does not diminish or dilute their application to all members.<sup>4</sup> One way to think about this phenomenon is to say that creating a management regime to protect a natural resource or an ecosystem requires the members of the relevant group to join forces to supply a public good, whereas the tragedy of the commons arises from the actions of a group of users that deplete or destroy a good supplied by nature. The classic impediment to the supply of public goods centers on what is known as the free-rider problem (Olson 1965). Individual members of the group may derive net benefits from the creation of a management regime even if they have to pay their fair share of the operating costs. But they will do even better in situations where they benefit from the operation of the regime while failing to comply with the rules or avoiding the payment of fees. This is not to say that groups – at any level of social organization – will be unable to overcome this impediment. But it does explain the preoccupation with procedures for overcoming the free-rider problem among both practitioners and analysts concerned with the creation of resource or environmental regimes

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<sup>4</sup> . Under some circumstances, regulatory rules or decisionmaking procedures may suffer from congestion in the sense that regimes typically have a limited capacity to deal with multiple issues at the same time. Note also that some members of the recipient group may place a negative value on specific public goods.

Where does this account of the nature of environmental problems leave us regarding the prospects for scaling up from local lessons to global challenges? Clearly, they do not vitiate all efforts to transfer insights drawn from the study of CPRs in smallscale settings to the assessment of global problems, such as climate change and the loss of biological diversity. But they do justify the conclusion that we should proceed with extreme caution in this realm. There is considerable room for debate and even conflicting conclusions regarding proper ways to think about most environmental problems; this is true of smallscale problems as well as largescale problems. There are good reasons to doubt the wisdom of approaching every environmental concern exclusively or even primarily as a CPR problem. Although this conclusion applies at all levels of social organization, it is probably fair to say that we should be particularly careful to avoid assuming unreflectively that largescale and especially global issues are properly treated as CPR problems.

## **2. Agency**

If the nature of the problems underlying global challenges is one determinant of the extent to which we can scale up from smallscale systems to global systems, the character of the actors engaged in efforts to deal with these problems constitutes another important consideration. There are three distinct sets of questions to be addressed in this connection. First, assuming that those seeking to avoid or solve environmental and resource problems are unitary actors, what can we say about the forces that drive the behavior of such actors at different levels of social organization? Second, what consequences flow from the fact that many of the actors involved in efforts to deal with global challenges are complex entities whose actions reflect internal

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Those who dislike a particular regime, for instance, may regard it as a public “bad,” even though they cannot exclude themselves from its effects.

dynamics of the sort envisioned in the concept of two-level games? Third, what are the implications of the fact that the actors who become the members of international regimes created to deal with global challenges often are not the same as those whose behavior gives rise to largescale problems, such as climate change and the loss of biological diversity?

The literature on smallscale societies focuses almost exclusively on the behavior of individuals who are appropriators or users of the resource(s) in question, who must work together in the search for ways to avoid the tragedy of the commons, and who can be thought of without any serious complications as unitary actors seeking to pursue their own goals under conditions of interactive decisionmaking. Beyond this common core, however, it is possible to identify two distinct streams of work on the management of CPRs which differ in the assumptions they make about the sources of the behavior in question. The essential difference between these streams is captured in the distinction that a number of analysts have made between the logic of consequences and the logic of appropriateness (March and Olson 1998). Thus, one school of thought, exemplified in most respects by the seminal work of Elinor Ostrom, conceptualizes issues relating to the management of CPRs as collective-action problems, treats the members of the groups of appropriators as self-interested utility maximizers, and approaches the issue of management as a matter of providing individual users with incentives to act in ways that conserve the relevant resources (Ostrom 1990). The other school of thought, represented by the work of anthropologists and sociologists like Svein Jentoft and Bonnie McCay, directs attention to the evolution of social practices that constrain the actions of individual users, emphasizes the role of social norms, and envisions a significant role for socialization and other processes that lead participants to take norms and rules for granted in the absence of utilitarian

calculations about the pros and cons of complying with these guidelines (Apostle et al. 1998, McCay and Acheson 1987). Some analysts, including Ostrom herself, have begun to look for ways to combine or integrate these perspectives (Ostrom 1998). But for present purposes, it will help to consider them separately.

A sizable subset of those concerned with global problems, such as climate change and the loss of biological diversity, build their analyses on the assumption that we can treat the participants in international management systems or, to use a term that has become common currency in this field of study, international regimes as unitary actors (Levy, Young, and Zürn 1995). Within this group, it is undoubtedly correct to say that models based on utilitarian assumptions constitute the dominant approach. For those who adopt this premise, the problem of scale centers on similarities and differences between the way in which individual users in smallscale systems and the members of international regimes in largescale systems behave with regard to efforts to avoid or solve collective-action problems. Clearly, the similarities between the two sets of analyses are substantial. Yet there are a number of areas in which utility-maximizing members of international regimes – usually though not always thought of as states – may differ from their counterparts at lower levels of social organization. Some analysts argue that international actors pay more attention than their counterparts at the local level to the pursuit of relative gains in contrast to absolute gains (Baldwin 1993). Many believe that because states survive over the long run, they will employ lower discount rates (sometimes called social discount rates) than individuals in considering the long-term consequences of current actions. Still others consider states to be less risk averse than individuals in dealing with specific environmental problems on the grounds that they are less likely to face ruin than individual

appropriators as a consequence of making bad decisions in single issue areas. Those working in this subfield have devised a number of additional propositions of this sort. But perhaps the key point to consider in the context of this analysis is that the suggested differences can cut both ways with regard to their implications for avoiding or solving collective-action problems.

Although it remains a minority perspective, interest has grown in recent years in the application of social-practice models to the problem of coping with global challenges. Here, the questions that arise about the differences between individual users of local CPRs and the individual members of international regimes are of a more fundamental nature. What does it mean, for instance, to speak of norm-governed behavior on the part of collective entities like states? Does it make sense to think in terms of socialization or the development of a “habit of obedience” in thinking about the behavior of states, even when they are treated as unitary actors? What do we understand by the idea of social learning, and is learning on the part of states different in kind from learning on the part of individuals (Clark et al. forthcoming)? The point of posing these questions is not to argue that it is useless or even misguided to apply concepts like socialization and learning to the behavior of states. After all, we are concerned here with the construction of analytic models, which are normally judged in terms of their helpfulness or the correctness of their predictions rather than in terms of their descriptive accuracy. Rather, the relevant question concerns the degree to which it is useful to transfer concepts like socialization and learning, which were developed in efforts to understand the behavior of individuals, to studies dealing with the behavior of collective entities like states. The jury is clearly out regarding this matter; studies of global issues that draw on the intellectual capital of social-practice models in a systematic fashion are just beginning to yield results. Yet one likely

outcome of this line of analysis is that although these studies may generate useful insights, there is no one-to-one correspondence between individuals and large collective entities like states when it comes to the behavioral consequences of the logic of appropriateness.

Beyond this, two larger sets of issues relating to the nature of the actors raise more profound questions about the prospects for scaling up from smallscale systems to global challenges. If we drop the simplifying assumption that states and other actors relevant to global challenges can be treated as unitary actors, a whole range of issues come into focus which have no direct counterparts in studies of smallscale CPRs. To be sure, individual users of CPRs sometimes experience cognitive or even normative dissonance. Who has not felt pulled in several directions at once with regard to the pros and cons of choosing different strategies in situations involving interactive decisionmaking? As a result, it would be naïve to suppose that individuals who initially agree to the rules of a management system based on some variation of common property will automatically comply with these rules once the arrangement is put into practice. Much of the massive literature on compliance would be of no more than passing interest if this were the case.

Even so, there is no comparison between the effects of cognitive and normative dissonance at the individual level, and the complications associated with the internal dynamics of states and other actors engaged in efforts to solve global challenges. More specifically, there are at least three broad sets of issues that surface once we relax the assumption that states are unitary actors. One set is captured in the idea of two-level games; it refers to the fact that states encompass numerous interest groups which may adopt conflicting views regarding the relative

merits of international agreements and often make concerted efforts to oppose the implementation of specific agreements in domestic arenas (Putnam 1988). The inability of the Clinton Administration to persuade the United States Senate to ratify the 1992 Convention on Biological Diversity and the 1997 Kyoto Protocol on climate change are dramatic illustrations of this phenomenon. A second set of issues involves the organizational and bureaucratic processes involved in transferring the provisions of international agreements from paper to practice. It is well-known, for instance, that the processes involved in implementing rules often produce a substantial disparity between rules on paper and rules in use (Ostrom 1990, Victor et al, 1998). Yet another set of issues arises from the fact that governments – at least in democratic systems – must seek new mandates from their electorates from time to time. When elections bring new governments into power, the willingness of public agencies to live up to international commitments entered into by preceding governments may decline (or rise) sharply.

These last observations lead to a consideration of what may well be the most fundamental difference between the actors seeking to manage CPRs in smallscale settings and the actors engaged in efforts to meet global challenges. For the most part, those who are appropriators of local CPRs and those who endeavor to regulate the actions of appropriators are the same individuals. It follows that avoiding or solving the tragedy of the commons at the local level is fundamentally a matter of self-regulation. Contrast this with the situation facing those concerned with global problems like ozone depletion, climate change, or the loss of biological diversity. In this setting, regulation is a two-step process. Those whose actions cause emissions of greenhouse gases, for example, include private corporations whose production processes are energy intensive, municipal governments that own and operate power plants, and large numbers of

individuals who drive cars and burn fossil fuels to heat their homes. The signatories to the 1992 UN Framework Convention on Climate Change and the 1997 Kyoto Protocol, by contrast, are states. Of course, there are instances where the rules established to cope with global challenges apply directly to the behavior of public agencies. This is especially true in societies where states own large quantities of natural resources or control a sizable proportion of the means of production. In the typical case, however, there is a clear separation between those who formulate and adopt the rules and those who are the subjects of the rules set forth in international agreements.

What are the implications of this feature of efforts to address global challenges? Even in cases where governments are generally honest and effective, it is often difficult for public agencies to induce subjects to alter their behavior to comply with the rules of international regimes. This is due to a combination of factors, including difficulties in monitoring the behavior of subjects, the ability of many actors (e.g. multinational corporations) to escape the jurisdiction of individual governments, and the resources available to some subjects to fend off – or co-opt – regulators in both legal and political arenas. Under the circumstances, it will come as no surprise that many management systems or regimes that seem attractive on paper turn out to have little capacity to solve problems in practice. And when we drop or modify the assumptions that governments are generally honest and effective, the problems arising from the gap between regulators and subjects grows by leaps and bounds. As those who have studied the implementation of domestic policies have shown repeatedly, what may look perfectly good in the capital often falls flat in the provinces (Pressman and Wildavsky 1973). And this problem is at

least as severe in the case of commitments entered into at the international level as it is with regard to purely domestic policies.

Where does this leave us with respect to the issue of scaling up from efforts to deal with CPRs in smallscale settings to initiatives aimed at meeting global challenges? The discussion in this section should not be taken to mean that there is no hope for efforts to scale up in this domain. Especially in studies that treat states as unitary actors and that approach issues as collective-action problems, the prospects for scaling up seem promising. Discussions that direct attention to the question of whether there is a social rate of discount, for instance, implicitly and perhaps reasonably assume that the smallscale processes and the global processes have much in common. But when we move on to other analytic perspectives, the prospects for scaling up seem far more circumscribed. Note that this is not, fundamentally, a matter of “extreme size and complexity.” Rather, the problem arises from differences between individuals and states and from the separation between those who formulate the rules and those who are subject to them in most efforts to solve environmental and resource problems at the international level. What emerges in such situations are top-down initiatives intended to guide the behavior of those responsible for the relevant problems with all the difficulties attendant upon processes in which there is an imbalance between top-down and bottom-up efforts. There are, of course, some things that states can do to draw subjects into processes of regime formation and to give them a stake in the success of the resultant arrangements. But even under the best of circumstances, there is no getting around the fact that this feature of efforts to meet global challenges should make us wary of simple efforts to apply local lessons to the handling of largescale challenges.

### 3. Social Context

The preceding sections focus on the nature of environmental problems and the character of actors whose behavior gives rise to them without reference to any features of the social contexts in which they are embedded. But environmental and resource problems do not arise and play out in a social vacuum. Even in smallscale settings where the arrangements governing the use of CPRs (e.g. the hunting of whales or the herding of reindeer among indigenous peoples) constitute a defining feature of the social landscape, complex cultural practices emerge that deal with a variety of human interactions not limited to the primary resource complex. At the international level, environmental challenges – even important ones such as climate change – constitute only a small segment of the overall agenda, which also encompasses security issues, economic issues, and human rights issues. What this means is that efforts to address global challenges not only compete for attention and resources with other concerns but also, and most importantly, unfold in a larger social context whose character has significant consequences for the design of management systems or regimes and for the effectiveness of these arrangements once they are put in place. How different are the social settings prevailing in the typical smallscale society and in international society? What are the implications of these differences for efforts to apply local lessons to global challenges?

The answers to these questions depend, in part, on the conceptual and theoretical lenses employed by those who address them (Young 2001a). Those whose thinking is rooted in collective-action models and especially in the familiar constructs of game theory, for instance, are apt to take the view that all relevant contextual matters are - or can be - endogenized in utility functions or in the information embedded in games in normal form. Others who think in terms of

social-practice models and emphasize the logic of appropriateness, by contrast, generally expect that the behavior of actors involved in specific environmental problems will be affected substantially by a range of cognitive, cultural, and socioeconomic forces that are not specific to individual environmental problems (March and Olsen 1998). Those who are optimistic about the prospects for scaling up typically view the world more through the lens of collective-action models than in terms of the perspective of social-practice models. Of course, there are obvious analytic attractions to a strategy that seeks to come to terms with environmental problems without reference to matters belonging to an open-ended category like social context. Yet this does not mean that considerations of context are irrelevant to an assessment of the prospects for applying local lessons to global challenges.

Those seeking to avoid the tragedy of the commons at the local level can and often do rely on several mechanisms of social control to strengthen resource regimes that are underdeveloped – some would argue non-existent - at the global level. Rules and decisionmaking procedures devised to regulate the actions of users of smallscale CPRs are normally embedded in broader cultural systems. Significantly, this link to culture has a cognitive component as well as a normative component. Common understandings of the forces at work in key ecosystems as well as the probable results of human uses of the relevant resources often become elements of the shared intellectual capital that serves to guide the thinking of the members of user groups. These common understandings may turn out to be incorrect in specific cases. But the point to ponder here is that culturally-embedded understandings are generally taken for granted in the sense that they prescribe normal or natural forms of behavior, so that there is no need to worry about finding ways to induce individual participants to comply with the prescriptions implicit in these

understandings. There is simply no serious alternative to engaging in the familiar practices. What is more, when issues of compliance do arise, cultural practices commonly provide a variety of methods for sanctioning non-compliant behavior which can prove effective even though they do not involve the sorts of procedures associated with efforts to deter or punish violators in contemporary western societies. Classic examples involve the operation of taboos, which can serve to guide behavior effectively without regard to the logic on which they are based (Fienup-Riordan 1990).

It would be wrong to suppose that cultural encoding eliminates all problems arising from incentives to cheat or from efforts to maximize relative gains in smallscale settings.<sup>5</sup> Nor is it reasonable to conclude that there is no such thing as culture at the global level. The diffusion of cultural preferences, styles of thought, and even behavioral norms made possible by modern technology is a striking phenomenon. Nonetheless, it is difficult to identify any counterpart to the cultural practices governing fishing, hunting, and herding in traditional smallscale systems operating at the global level. Is it possible to imagine the emergence of a global culture that would serve to organize the ways in which we think about the protection of biological diversity or to spell out norms relating to activities that generate emissions of greenhouse gases? Perhaps so. Yet to pose this question is to provide a clear sense of the magnitude of the gap between current realities and what would be required to develop cultural practices capable of serving as effective mechanisms of social control in efforts to meet global challenges. Although we should not dismiss this source of social control out of hand, it would be naïve to overlook the significance of the gap between smallscale societies and international society in these terms.

A somewhat related mechanism of social control that figures prominently in some analyses of smallscale CPRs centers on the role of community. It is not easy to devise a precise definition of community, even at the level of local societies. Yet most observers would agree that community has something to do with relationships between individuals and the larger groups to which they belong. Where community is strong, individuals derive a significant part of their identity from membership in the larger group, link their own welfare with some concept of social welfare, and exhibit a willingness to subordinate the pursuit of narrow self-interest to the achievement of the common good. Where community is weak, by contrast, individuals are likely to care little for the welfare of the group and to resist any pressure to subordinate the enhancement of self-interest in the narrow sense to actions designed to promote the common good. It is easy to see how a strong sense of community can function as a mechanism of social control among users of CPRs (Singleton and Taylor 1992). To put the point in utilitarian terms, the existence of a sense of community gives rise to interdependent utilities, a condition that motivates individuals to consider the impacts of their actions on the welfare of others rather than thinking exclusively in terms of their own welfare. Approached from a social-practice perspective, the same point can be thought of in terms of the incorporation of a concern for the common good into the identities of individual members of the group. In either case, the result is the same. The tragedy of the commons is a product of highly individualistic or self-interested behavior occurring under conditions of interactive decisionmaking. Community serves to soften the impact of social dilemmas caused by behavior of this sort.

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<sup>5</sup> . There is ample evidence to support the view that power relations constitute a major determinant of outcomes at both the local level and the international level. But since the role of power is similar in the

Can we rely on a similar sense of community to enhance the effectiveness of efforts to meet global challenges, such as climate change or the loss of biological diversity? Many commentators refer - rather casually - to the existence of an international community. Yet it is difficult to see what this can mean in practice (Claude 1988). To the extent that we are concerned with international society in the sense of a society of states, the idea of an international community is difficult to interpret even in conceptual terms. If we are thinking about the existence of a global civil society, on the other hand, the idea of community is understandable in conceptual terms, but it seems clear that this community is currently very weak at the international or transnational level (Wapner 1997). Does this mean that there is no place for community in efforts to meet global challenges? Perhaps the most interesting response to this question acknowledges that the sense of community at the international level is presently weak but that there are signs that it may now be on the rise. Those who espouse this view point to the apparent increase in the willingness of outsiders to incur costs in order to protect the human rights of those residing within the boundaries of individual states as well as to the rise of ideas like the common heritage of humankind to express a sense of community interest in the protection of the Earth's life support systems.

Even so, it is hard to avoid the conclusion that the nature of international society, at least in the familiar form of a society of states, constitutes a significant barrier to the rise of a global culture or to the growth of a strong sense of community at the international level. Embedded in the concept of international society is a clear commitment to a set of norms and rules that grant states far-reaching authority over events occurring within their boundaries and that proscribe outside interference in the internal affairs of individual states, except under extreme

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two settings, I do not deal with it at length in this discussion of scaling up.

circumstances.<sup>6</sup> In effect, the extreme decentralization of international society and the vigorous opposition that proposals involving supranational arrangements typically evoke create a social setting in which the deck is stacked against those seeking to bring broader mechanisms of social control to bear in efforts to solve specific problems, such as ozone depletion or the loss of biological diversity.<sup>7</sup> This is why most efforts to create regimes dealing with global commons, such as the high seas or the Earth's climate system, involve relatively elaborate rules intended to avoid infringements on the authority of member states (e.g. consensus rules regarding decisionmaking or provisions allowing dissenters to exempt themselves from group decisions by entering objections or reservations).

At the same time, it is fair to say that we are witnessing significant changes in the character of international society, brought about at least in part by a growing awareness that the costs of ignoring a variety of global challenges are likely to be great. Even in the realm of interstate relations, some initiatives featuring the creation of international regimes (e.g. the ozone regime, the chemical weapons regime) have led to successful experiments with devices for circumventing or transcending limitations arising from the general character of international society. The inspection procedures established to operate the chemical weapons regime, for instance, feature striking intrusions into the domestic affairs of member states (Reinicke 1998). Beyond this, there are numerous signs (e.g. the growing influence of a range of non-state actors, the emergence of a global civil society) that developments are now underway that are likely to produce substantial changes in the character of international society during the foreseeable future (Zürn 1999). We are reminded, under the circumstances, that the heyday of international society

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<sup>6</sup> . For an argument that these norms are often violated in practice, see Krasner (1999).

treated as a system of territorially-based and sovereign states has been relatively short. Does this mean that the familiar society of states with its elaborate protections for the rights of individual members is likely to collapse and be superseded by some alternative form of social organization at the global level? Not at all. What is probable is the emergence of a more complex social setting in which new actors and new social practices become relevant to the development of strategies designed to address global challenges. Whether this will, on balance, improve our track record in meeting global challenges is not easy to tell at this stage. At a minimum, however, these dynamic features of the social setting are sufficient to warn us against any assumption that the context within which efforts to meet global challenges unfold is static or unchanging.

The differences between local and often traditional settings in which arrangements for managing the use of CPRs are hard-wired into cultural practices and the international setting construed as a society of states are stark. But these are both ideal types that should not be allowed to rigidify our thinking, even though they are clearly helpful for some purposes. The most sophisticated literature on common-property systems recognizes that culture is not a magic mechanism of social control which can be counted on to guide the actions of users of CPRs to sustainable outcomes under all circumstances. The actual record regarding the use of smallscale CPRs is replete with failures as well as successes (Krech 1999). Nor is the image of a society of states that are impervious to the impacts of various mechanisms of social control an accurate reflection of the international setting today. Increasingly, states are allowing themselves to be drawn into more or less effective international regimes covering a variety of functionally and spatially defined problems. And some of the more interesting initiatives aimed at coming to

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<sup>7</sup> . Yet ambitious developments, such as the dispute resolution procedures of the World Trade Organization and the law of the sea tribunal, indicate that international society is changing in these terms.

terms with global challenges are not governed exclusively by the actions of states. The differences between smallscale settings and international society justify the proposition that we should proceed with extreme care in efforts to scale up from local lessons to global challenges. Yet it seems to me that we should not conclude from this that experiences in dealing with CPRs and similar matters at the local level have nothing to contribute to our thinking about global challenges.

#### **4. Design Implications**

It seems logical to assume, as a first approximation, that there is considerable scope for scaling up - and scaling down - across levels of social organization in dealing with environmental problems. Thus, the rapid growth of knowledge regarding the development and maintenance of sustainable management practices in smallscale systems seems to offer grounds for optimism among those concerned with global challenges, such as ozone depletion, climate change, and the loss of biological diversity. On second thought, however, the differences between the two levels of social organization with respect to problem structure, agency, and social context seem striking. As a result, it is easy to come to the conclusion that local lessons have little to tell us in our efforts to meet global challenges. The message I wish to convey, by contrast, is that we should make a concerted effort to avoid both of these conclusions. There is little prospect that we will be able to scale up in any simple or mechanical sense. On the other hand, the observation that smallscale systems based on common-property arrangements can yield effective solutions to a variety of environmental problems is a finding of great interest to those interested in parallel problems arising at the international level. In my judgment, the adoption of

this middle road offers the best hope for adding to our knowledge of environmental governance in human affairs.

Beyond this lies the question of the specific design implications of the argument set forth in this chapter. Interestingly, many commentators (e.g. the authors of the *Science* article referred to at the beginning of this chapter) are not very precise in their comments regarding this matter. They observe that "... a scholarly consensus is emerging regarding the conditions most likely to stimulate successful self-organized processes for local and regional CPRs" (Ostrom et al. 1999: 281). But they content themselves with extremely general and somewhat imprecise formulations of these lessons - or, in their terminology, design principles - and they make almost no effort to discuss the issues that arise in attempts to apply generic lessons to specific situations even at the smallscale level, let alone at the global level.

If the argument set forth in this chapter is correct, it has a number of relatively specific implications for the design of resource or environmental regimes that are applicable not only to the way we respond to global challenges but also to the treatment of environmental problems at other levels of social organization. Above all, we need to avoid the expectation that one size will fit all or, in other words, that we can devise a simple and unified checklist of steps that will allow us to deal with a wide range of environmental problems in a more or less routine fashion (McGinnis and Ostrom 1996). Rather, we need to consider matters of problem structure, agency, and social context in thinking about environmental problems and to design management regimes on a case-by-case basis that are well-suited to the circumstances at hand. I can only scratch the surface of this topic here (see Ch. 7 for a more general account of institutional design). Yet Table

1 lists the principal distinctions regarding problem structure, agency, and social context discussed in the substantive sections of this chapter and points to a number of design implications arising from these distinctions.

With regard to problem structure, for instance, we can approach individual problems as CPRs, externalities, value conflicts, or jurisdictional differences. Although no characterization may be objectively correct, the choice of one perspective or another has substantial consequences. Whereas solutions to CPR problems call for self-regulation and efforts to build trust among a group of appropriators, dealing with externalities often requires the establishment of external regulatory mechanisms capable of applying formal sanctions to achieve high levels of compliance. The treatment of problems featuring value conflicts calls for responses rooted firmly and unambiguously in considerations of equity.

TABLE 1  
ISSUE ATTRIBUTES AND DESIGN IMPLICATIONS

<u>Issue Attribute</u>	<u>Design Implication</u>
<i>Problem Structure</i>	
CPRs	Self-regulation/trust
Externalities	External regulation/ sanctions
Value conflicts	Role of equity
Jurisdictional differences	Higher authority
<i>Agency</i>	
Unitary/complex actors	Targets of influence

(Non)utilitarianism	Role of incentives
Co-extensive groups	One/Two-step processes
<i>Social Context</i>	
Overarching culture	Socialization
Community	Appeals to the common good
Civil society	Social pressure

Coming to grips with jurisdictional differences, by contrast, is apt to call for the creation of a higher authority capable of making decisions about whole ecosystems, whether or not this authority takes the form of a formal organization of the sort we would normally regard as a government.

In the case of agency, we want to know whether actors are unitary or complex agents, the extent to which they base their decisions on utilitarian calculations of expected benefits and costs, and whether groups of users/appropriators and regulators are co-extensive. It may be difficult to accomplish in practice, but it is a relatively straightforward matter to seek to influence the behavior of unitary utility maximizers through arrangements that affect their incentives. In cases featuring complex actors that respond to non-utilitarian cues or signals, on the other hand, efforts to solve environmental problems must address issues like the development of appropriate discourses, social learning, and the cultivation of feelings of legitimacy. And when groups of users and regulators are not co-extensive, there is no substitute for efforts to cultivate feelings of legitimacy toward the regulatory process on the part of members of user groups.

Similar remarks are in order regarding the design implications of social context. Where a strong, overarching culture is operative, it makes sense to design regimes that are compatible with - and even build on - culturally familiar mechanisms of social control and, in effect, to socialize regime members in terms of larger cognitive constructs and norms. The presence of a strong sense of community among the members of the relevant group makes it possible to appeal to the importance of promoting the common good as a means of influencing the behavior of key actors. In the absence of community, there is no alternative to guiding behavior through measures that address the self-interest of individual actors. The existence of a civil society opens up prospects for using social pressure to influence the behavior of those whose actions give rise to environmental problems. At the international level, we are witnessing a steady rise in the role of various non-governmental organizations in bringing pressure to bear on governments regarding environmental matters (Wapner 1996). Similar phenomena are discernible in efforts to come to terms with many problems in smallscale settings.

Are global challenges more difficult to meet than local challenges? Can we scale up lessons learned from experiences with smallscale CPRs in our efforts to address global challenges? In the end, I would argue, these questions do not yield very insightful answers. The variance among environmental problems at all levels of social organization is sufficient to cast serious doubt on any effort to apply a single set of design principles without an intimate knowledge of the character of specific problems and a concerted effort to construct arrangements well-adapted to individual cases. Nonetheless, while smallscale systems and largescale or global systems are far from identical, there is reason to believe not only that those seeking to solve global problems can benefit from the experiences of those dealing with local problems but also

that those concerned with local problems stand to benefit from the experiences of those wrestling with largescale problems. It follows that the nurturing of a dialogue between students of smallscale common-property regimes and students of international environmental regimes should be a matter of high priority for all parties concerned.