INSTITUTIONAL DIMENSIONS OF GLOBAL ENVIRONMENTAL CHANGE

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Contents

Summary

Institutions loom large both in causing and confronting large-scale environmental changes. Much of the interest in this regard focuses on environmental/resource regimes or institutions that deal explicitly with human/environment relations. But the interaction of these regimes with other institutional arrangements must be considered as well. Major challenges in this field involve (a) evaluating the proportion of the variance in ecological conditions attributable to institutions, (b) pinpointing the determinants of the effectiveness of institutions, and (c) framing guidelines for the design of institutions to deal with specific problems. The study of institutions figures prominently in all the social sciences disciplines. Although this can lead to problems, it is also a source of intellectual richness. Perhaps the major challenge for students of global environmental change arising from the divergent perspectives of individual disciplines is to find ways to combine insights drawn from the collective-action models of institutions associated with economics and public choice and from the social-practice models rooted in anthropology and sociology.

1. Institutions and Environmental Change

Institutions loom large in most accounts of the causes of large-scale environmental changes. Emissions of ozone-depleting substances such as chlorofluorocarbons or CFCs and greenhouse gases such as carbon dioxide, for instance, are commonly regarded as unintended by-products or, in the language of economics, externalities of the operation of structures of property rights that do not compel owners/users to take these environmental side-effects into account in their private calculations of benefits and

costs. Much the same is true of the clear-cutting of forests on the part of harvesters who operate under systems of land tenure that do not force them to pay attention to collateral damages inflicted on local people and on ecosystems or long-term costs (e.g. the consequences of releasing carbon stored in trees) arising from consumptive uses of forest products. For their part, depletions of fish stocks and associated disruptions of marine ecosystems are regularly interpreted as consequences of rules governing the harvesting of marine living resources (e.g. open access rules) that do not give individual harvesters effective incentives to limit their activities in the interests of conserving stocks for the future.

Yet institutions also figure prominently in most accounts of strategies for preventing large-scale environmental changes or coming to terms with them once they have occurred. A key objective of regulatory regimes dealing with airborne pollutants (e.g. the arrangement covering sulfur dioxide emissions set forth in the American Clean Air Act Amendments of 1990) is to endogenize externalities by requiring relevant actors to pay some or all of the costs arising from the side-effects of their activities. Proposals for the protection of forest ecosystems frequently highlight adjustments in prevailing systems of land tenure designed to strengthen the rights of non-consumptive users of forest products in relation to the rights of timber harvesters. Many recent efforts to break the vicious circle leading to stock depletions in fisheries—often described in terms of the metaphor of the tragedy of the commons—center on changes in the rules of the game, such as the establishment of individual transferable quotas or ITQs, that are designed to affect outcomes by allowing individual users to reap the benefits of actions aimed at insuring that healthy stocks will be available for their own use in the future.

It is essential to recognize at the outset, the existence of limitations on the roles institutions play in this realm and of complexities that make it dangerous to generalize from one setting to another, regarding the design of institutions intended to govern human/environment interactions. Institutions constitute a crosscutting force in this realm. They determine a portion, sometimes a large portion, of the course that human/environment relations take in a wide range of settings. But in every case, institutions operate in conjunction with other driving forces (e.g. demographic, economic, and technological forces) that affect large-scale environmental processes independently or interact with institutions to create a complex web of drivers. Moreover, institutions themselves operate at many levels of social organization and vary greatly in terms of the consequences they produce. What works perfectly well in one social setting (e.g. local common-property systems) may be inoperable or lead to unsustainable uses of ecosystems in other settings (e.g. global arrangements dealing with climate change). Institutions that yield acceptable results during some stages of their existence may contribute to the occurrence of significant environmental problems during other stages. The challenge facing students of the institutional dimensions of global environmental change, therefore, is to develop procedures that will allow us, at one and the same time, to separate out the effects of institutions from the impacts of other driving forces and to enhance our understanding of the ways in which institutions interact with other drivers to cause large-scale environmental changes in some instances and to contribute to preventing or ameliorating such changes in other instances.

2. The Nature and Role of Institutions

At the most general level, institutions are constellations of rules, decision-making procedures, and programs that define social practices, assign roles to the participants in such practices, and govern the interactions among the occupants of those roles. Defined in this way, institutions constitute an important feature of the landscape in all areas of human endeavor. Thus, marriage is a social institution governing relations among members of family units; markets are economic institutions dealing with interactions between buyers and sellers of goods and services; electoral systems are political institutions guiding the interactions of voters and elected officials. As these examples suggest, institutions can and do vary greatly along numerous dimensions, including the nature and number of their members or subjects, the character and scope of the social practices they initiate, the degree to which they are formalized in legally binding or other official formulations, their location on a spectrum running from newly formed to long-established arrangements, the extent of the organizational apparatus established to administer them, and the degree to which they are embedded in larger systems involving both other institutions and culturally determined behavior.

When institutions deal explicitly with human/environment relations, it is normal to refer to them as environmental or resource regimes. The traditional arrangements dealing with the management of irrigation systems in small-scale societies, the more elaborate arrangements governing the uses of public lands at the national level, and the international regimes designed to protect the ozone layer and the Earth's climate system are all examples of environmental or resource regimes. In thinking about large-scale environmental changes that have significant anthropogenic components, it is natural to focus first and foremost on the roles that these environmental and resource regimes play both in causing environmental problems and in constituting the principal components of solutions to such problems. Yet it is essential to recognize from the outset that institutions dealing with other human activities can and often do produce significant environmental consequences. At the present time, for instance, there is great interest in the environmental consequences of the operation of trade regimes (e.g. the GATT/WTO or NAFTA). But any number of other arrangements, dealing with matters as diverse as electoral processes and the rights of non-human organisms, may have far-reaching environmental consequences as well. It follows that research on the institutional dimensions of global environmental change cannot deal exclusively with studies of environmental or resource regimes.

All students of institutions would concur with the proposition that there is great variance in the effectiveness of these arrangements or, in other words, the extent to which they determine the course of human/environment relations. Some institutions are largely ignored by all those nominally subject to their rules and decision-making procedures. Others (e.g. the regime dealing with pollution in the North Sea) prove far more effective during some stages of their existence than other stages. Still others (e.g. the Antarctic Treaty System) appear to yield decisive solutions to the problems that give rise to their creation. As a result, those interested in large-scale environmental changes have a strong interest both in explaining apparent successes, such as the ozone regime, and in determining whether these successes offer lessons of interest to those concerned with other large-scale environmental issues, such as climate change or the loss of biological diversity.

In every case, however, there are major analytical and methodological problems facing those seeking to prove conclusions about the effectiveness or ineffectiveness of specific institutional arrangements. Central to this challenge is the danger of arriving at conclusions that are based on spurious correlations. To illustrate, suppose a problem like oil pollution at sea arises, an explicit regime is created to solve the problem, and the problem subsequently subsidies. Can we conclude with confidence from this evidence that the regime has proved effective? Not necessarily. Despite the correlation between regime creation and problem solving, the forces responsible for alleviating the problem may lie elsewhere as in independent calculations on the part of tanker owner/operators regarding the benefits and costs of introducing new technologies (e.g. segregated ballast tanks). Even more likely is the prospect that institutional responses will constitute just one of a suite of interacting forces, including technological advances, demographic processes, economic incentives, and political pressures, that together determine the behavior of relevant actors with regard to particular issues. It may make sense in such cases to single out institutional forces for special attention, especially when there are good reasons to believe that institutional reform constitutes a necessary condition for solving the problems at hand. But the more basic challenge is to improve our understanding of systems of interacting forces and the roles institutions play as elements in these systems.

Where there is consensus on the proposition that an institution makes a difference, we come next to the issue of formulating criteria to be used in evaluating the performance of the relevant institutional arrangement. Those interested in large-scale environmental systems will find it natural to approach this issue initially from the perspective of sustainable development or ecosystems management. Do regimes governing local fisheries or arrangements dealing with international trade in endangered species, for instance, contribute not only to the maintenance of sustainable harvests of the resources in question but also to the avoidance of nonlinear or chaotic changes in the broader ecosystems to which these resources belong? This biogeophysical perspective on effectiveness is obviously essential. But, at the same time, it is important to ask questions about the degree to which institutional arrangements produce results that are efficient and that conform to various standards of equity. Can we replace traditional command-and-control regulations with tradable emissions permits that make it possible to lower the cost of limiting greenhouse gas emissions? Is it possible to devise procedures for limiting greenhouse gas emissions that will be accepted as equitable on the part of developing countries which have contributed little to the problem of climate change so far but have opted for development strategies that could well make them significant sources of greenhouse gas emissions in the future? In fact, sustainability, efficiency, and equity are likely to be closely linked under real-world conditions. Given the costs of dealing with large-scale environmental problems, success in the pursuit of sustainability will be determined, in considerable measure, by the extent to which we succeed in finding ways to achieve the desired results as inexpensively as possible. Given the difficulty of coercing key actors, especially at the international level, into adjusting their behavior to avoid or minimize environmental problems, moreover, the search for solutions that all concerned can accept as fair or just and therefore deserving of respect looms large as a condition governing success in the pursuit of sustainability.

Among those interested in the institutional dimensions of global environmental change,

three analytic themes have surfaced recently as matters deserving particular attention. These themes are often described as the problems of fit, interplay, and scale. The problem of fit revolves around the proposition that the performance of institutions in environmental terms is determined, in large measure, by the congruence or compatibility between the attributes of the relevant institutions on the one hand and the principal properties of the ecosystems in question on the other. Sensitive monitoring mechanisms and a capacity to adapt institutional arrangements quickly to ecological changes, for instance, are important in dealing with ecosystems prone to sudden, nonlinear changes. Similarly, the priority attached to the operation of compliance mechanisms should be a function of the capacity of the ecosystems in question to tolerate violations of the rules governing human uses of the relevant goods and services. The problem of interplay, by contrast, centers on the proposition that institutional arrangements regularly interact with one another, even though it may seem convenient to treat them as self-contained entities for purposes of analysis. A particularly prominent case in point arises from the interactions between trade regimes and environmental regimes. Many environmental regimes, including those dealing with ozone-depleting substances, transboundary movements of hazardous wastes, the protection of endangered species, and the consumption of tropical timber, have key provisions that deal with trade. At the same time, the environmental impacts of trade regimes, such as the GATT/WTO and a variety of regional arrangements, have environmental consequences whose full scope is only now becoming apparent. Understanding institutional interplay, therefore, is clearly a challenge that looms large for those concerned with the institutional dimensions of global environmental change.

The problem of scale arises from the fact that institutions affecting large environmental systems operate at a number of levels of social organization ranging from traditional practices governing the harvesting of local stocks of fish and trees through national arrangements dealing with human uses of natural resources located on public lands to international regimes addressing global problems such as climate change and the loss of biological diversity. Under the circumstances, it is natural to ask whether we can scale up and scale down in the dimensions of space and time in our efforts to understand the operation of institutions.

Can we apply lessons drawn from the study of small-scale, local systems and relating to long-enduring common-pool resource (CPR) institutions to the analysis of environmental regimes operating at the international level? Or do differences in the character of the actors involved or the nature of the relationships among them make it doubtful whether propositions developed at one level can be applied with suitable adjustments at other levels? This problem, which has long been familiar to students of biogeophysical systems, is now recognized as a major concern for those interested in the institutional dimensions of large-scale environmental changes.

Because anthropogenic forces affecting ecosystems occur at all levels of social organization, any comprehensive account of the institutional dimensions of global environmental change must deal with processes at work at each of these levels. But this does not license the conclusion that knowledge of the role of institutions developed at one level can be applied in any straightforward manner to processes at work on other levels.

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Biographical Sketch

Oran Young is the author or co-author of over 20 books and numerous scholarly articles. Dr. Young is Professor of Environmental Studies, Director of the Institute of Arctic Studies, and Director of the Institute on International Environmental Governance at Dartmouth College in the United States. He is also Adjunct Professor of Political Science at the University of Tromsø in Norway. Dr. Young served for 6 years as the founding chair of the Committee on the Human Dimensions of Global Change of the National Academy of Sciences in the United States and is now chair of the Scientific Steering Committee of the international project on the Institutional Dimensions of Global Environmental Change (IDGEC) under the auspices of the International Human Dimensions Programme on Global Environmental Change. In addition, he served for 6 years as vice-president of the International Arctic Science Committee and is currently a leader in the development of a decentralized University of the Arctic. Dr. Young's scientific work encompasses both basic research, focusing on collective choice and social institutions and applied research dealing with issues pertaining to international environmental governance and to the Arctic as an international region. Among his recent books are: *Governance in World Affairs*; *Creating Regimes*: *Arctic Accords and International Governance*; *International Governance*: *Protecting the Environment in a Stateless Society*; *Arctic Politics*: *Conflict and Cooperation in the Circumpolar North, and International Cooperation*: *Building Regimes for Natural Resources and the Environment.*