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***The Institutional Dimensions of Environmental Change:  
Fit, Interplay, and Scale\****

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Several of the individual chapters of this book have appeared elsewhere in somewhat different forms. The inaugural issue of the new journal *International Environmental Agreements* carried an earlier version of Chapter 2. I prepared a somewhat different version of Chapter 4 for a project organized by the Committee on the Human Dimensions of Global Change of the US National Academy of Sciences. It is included as a chapter in the resultant book entitled *Institutions for Managing the Commons*. A shortened version of Chapter 6 appeared in French in a symposium on the Environment and International Relations published in the journal *Critique internationale*. I am grateful to the publishers in each case for permission to use these materials in this volume..

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## Introduction

THE MEMBERS OF THE LARGE AND GROWING community of researchers interested in the roles that institutions play both in causing and in confronting various types of environmental change have much in common. They subscribe, for the most part, to the tenets of the movement known as the “new institutionalism” in the social sciences (Powell and DiMaggio 1991; Rutherford 1994). They assume that social institutions constitute a potent driving force, accounting for a significant proportion of the variance in the condition of many biogeophysical systems and looming larger and larger as we move toward a world of human-dominated ecosystems (Turner et al. 1990; Vitousek et al. 1997). They are dedicated as well to empirical research on institutions as they actually operate or, in other words, on systems of rules in use in contrast to the study of formal rules or rules on paper which was characteristic of an earlier generation of research on institutions (Ostrom 1990).

These are strong bonds, and they clearly serve to provide a common direction to the work of those concerned with the institutional dimensions of environmental change. Even so, it is hard to detect the growth of consensual and cumulative knowledge in the work of this community of scholars. There is a clear sense that the members of this group are working on similar or parallel issues, such as the conditions governing the formation of environmental regimes or the factors determining the effectiveness of these arrangements once they are put in place. But on closer inspection, it often turns out that individual studies do not have enough in common to make it possible to compare and contrast their findings rigorously. The result is a proliferation of individual findings that are tantalizingly similar but fail to yield a core of agreed upon propositions.

What is the source of this problem? No doubt, a number of factors are relevant to answering this question. But in my judgment, the essential source is an inability or unwillingness on the part of researchers concerned with the institutional dimensions of environmental change to adopt common definitions of central concepts, to specify key variables in a fully compatible manner, and to make use of harmonized data sets in evaluating major hypotheses. To make this point more concrete, take the case of institutional effectiveness construed as a dependent variable and consider the efforts of those who approach this variable in terms of compliance with rules, behavioral change, problem-solving, or movement toward some collective or social optimum. Analysts who work with these different perspectives have much in common. They all want to know whether institutions matter and how much of the variance in outcomes can be attributed convincingly to the operation of institutions. Yet there is no straightforward way to compare and contrast the conclusions they reach about the relative importance of matters like problem structure, actor attributes, and institutional features as determinants of the effectiveness of environmental regimes.

What is to be done about this problem? I believe the solution lies in striking a proper balance between the development of a common structure and the identification and preservation of personal niches that appeal to individual researchers. Those who study the growth, operation, and effects of institutions will not and should not allow themselves to be straight-jacketed by a top-down effort to dictate research foci and strategies. There must be ample scope for the role of individual creativity and bottom-up initiatives in order to maintain the vibrancy of this field of study. As things currently stand, this is one of the strengths of the new

institutionalism. At the same time, progress in this field in the form of the development of cumulative knowledge requires practitioners to accept a common structure with regard to definitions, variables, and data sets. Currently, this is an area in which the new institutionalism is relatively weak.

The goal of this book is to address this complex of issues with particular reference to the work of participants in the largescale, international research program focused on the Institutional Dimensions of Global Environmental Change (IDGEC). Specifically, I take the analytic themes identified in the IDGEC Science Plan (Young et al. 1999) as cutting-edge concerns for research on the institutional dimensions of environmental change and endeavor to develop them conceptually and analytically in a manner that can provide a common structure for individuals and groups participating in the activities of IDGEC. In some ways, this is a risky venture. The typical social scientist is not in the habit of taking direction from others in such matters. It is perfectly possible that members of the research community will simply ignore my efforts and proceed to carry on with business as usual. But the problem is real, and it may be that the research community is more receptive to the development of this sort of common structure today than it has been in the past.

Interestingly, the need to strike a balance between common structure and personal niches is largely taken for granted among natural scientists who are socialized from an early stage in their training to accept the discipline required to produce cumulative knowledge. In fact, this sort of socialization is so effective that natural scientists seldom debate such matters and may not even be conscious of their participation in joint or collaborative endeavors. But this is not the case in the social sciences which have long been the province of the creative individual and which

tend to reward those who devote themselves to formulating effective critiques of the conceptual or analytic frameworks of others and who seek to replace existing frameworks (or paradigms) with new ones of their own making. No doubt, this streak of individualism will continue to operate in the social sciences during the foreseeable future. Yet I think it is fair to say that there is a growing awareness, at least among some subgroups of social scientists, of the limits that this mode of operation imposes on the results that can be achieved. Partly, this is a matter of inner-directed feelings of frustration among social scientists seeking to contribute to the handling of pressing public concerns. In part, it is a matter of other-directed desires on the part of social scientists to form partnerships with natural scientists who are working on related issues and who take a willingness to accept common structures for granted. Nowhere is this more apparent than in the field of global environmental change where both of these reasons to think hard about the balance between common structure and personal niches are clearly in play.

The organization of my effort to devise a common structure to guide the efforts of participants in IDGEC is straightforward. Chapters 1 and 2 deal with conceptual issues and the construction of models designed to illuminate the causal roles that institutions play. To be more specific, Chapter 1 introduces the idea of the institutional dimensions of environmental change, identifies the principal science questions arising in this realm, and describes the major analytic challenges facing those seeking to answer these questions. Chapter 2 then turns to one of the central puzzles facing this field of research. How can institutions, which are not actors in their own right, influence the course of human/environment relations? Is it possible to amalgamate or, at least, to combine the perspectives of those who look at institutions through the lenses of economics, public choice, and decision theory and

think in terms of collective-action models with the perspectives of those whose thinking is rooted in anthropology, ethnography, and sociology and whose ideas are expressed in social-practice models?

Chapters 3 through 6, which form the heart of the book, explore the cutting-edge themes or analytic frontiers identified as research priorities in the IDGEC Science Plan. In the terminology of the project, these themes are known as the problems of fit, interplay, and scale. They center, respectively, on the congruence between the properties of biogeophysical systems and the attributes of institutions, on interactions between and among discrete institutions, and on the prospects for scaling up/down in the dimensions of space and time in our efforts to understand the roles that institutions play in causing and confronting environmental change.

Chapter 7 turns to the links between theory and practice. It introduces the idea of usable knowledge and discusses alternative strategies for applying knowledge about the roles that institutions play to the concerns of those in the policy community who are seeking effective ways to avoid or mitigate environmental changes or to adapt to such changes once it becomes apparent that they are unavoidable. This final chapter offers a critique of the idea of design principles as a way of organizing thinking about the issue of usable knowledge (Ostrom 1990). It goes on to propose a procedure known as institutional diagnostics as a means of bridging the gap between science and policy in this realm.

Throughout the book, I turn to largescale environmental changes, such as the depletion of stratospheric ozone, climate change, the degradation of large marine and terrestrial ecosystems, and losses of biological diversity, to illustrate my

arguments. The result is a particular interest in the role of international institutions as sources of environmental change and the prospects for establishing international regimes as mechanisms for solving or ameliorating the resultant problems. But the roles that institutions play in causing and confronting environmental changes are not limited to international society. On the contrary, institutions loom large in accounts of environmental changes occurring at all levels of social organization. Even global environmental changes are often products of large numbers of smallscale actions (e.g. actions that degrade critical habitat) or interactions between human actions at the local or subnational level (e.g. the combustion of fossil fuels) and the behavior of global ecosystems (e.g. the Earth's climate system). It follows that any study of the role of institutions in causing and confronting environmental changes must take into account human actions occurring at multiple levels of social organization.

IDGEC itself is now properly launched as a productive international research program. As an initial set of priorities, the project's Scientific Steering Committee has chosen flagship activities centering on the institutional dimensions of carbon management, the performance of exclusive economic zones, and the political economy of boreal and tropical forests. There is also an emerging interest in several issues that cut across these topics, such as compliance and the links between institutions and knowledge. Each of these activities raises a range of questions relating to matters of fit, interplay, and scale. In the first instance, then, I am hopeful that this book will prove helpful to the growing community of researchers conducting empirical research under the aegis of IDGEC. But the same generic concerns arise in many other quarters as well. With luck, the contributions of this book will prove useful far beyond the confines of the IDGEC family.