Theories of the Policy Process

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PART ONE

Introduction

1

The Need for Better Theories

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In the process of public policymaking, problems are conceptualized and brought to government for solution; governmental institutions formulate alternatives and select policy solutions; and those solutions get implemented, evaluated, and revised.

SIMPLIFYING A COMPLEX WORLD

For a variety of reasons, the policy process involves an extremely complex set of elements that interact over time:

1. There are normally hundreds of actors from interest groups, governmental agencies, legislatures at different levels of government, researchers, journalists, and judges involved in one or more aspects of the process. Each of these actors (either individual or corporate) has potentially different values/interests, perceptions of the situation, and policy preferences.
2. This process usually involves time spans of a decade or more, as that is the minimum duration of most policy cycles, from emergence of a problem through sufficient experience with implementation to render a reasonably fair evaluation of a program's impact (Kirst and Jung 1982; Sabatier and Jenkins-Smith 1993). A number of studies suggest that periods of twenty to forty years may be required to obtain a reasonable understanding of the impact of a variety of socioeconomic conditions and to accumulate scientific knowledge about a problem (Derthick and Quirk 1985; Baumgartner and Jones 1993; Eisner 1993).
3. In any given policy domain, such as air pollution control or health policy, there are normally dozens of different programs involving multiple levels of government that are operating, or are being proposed for operation, in any given locale, such as the state of California or the city

of Los Angeles. Since these programs deal with interrelated subjects and involve many of the same actors, many scholars would argue that the appropriate unit of analysis should be the policy subsystem or domain, rather than a specific governmental program (Hjern and Porter 1981; Ostrom 1983; Sabatier 1986; Rhodes 1988; Jordan 1990).

4. Policy debates among actors in the course of legislative hearings, litigation, and proposed administrative regulations typically involve very technical disputes over the severity of a problem, its causes, and the probable impacts of alternative policy solutions. Understanding the policy process requires attention to the role that such debates play in the overall process.
5. A final complicating factor in the policy process is that most disputes involve deeply held values/interests, large amounts of money, and, at some point, authoritative coercion. Given these stakes, policy disputes seldom resemble polite academic debates. Instead, most actors face enormous temptations to present evidence selectively, to misrepresent the position of their opponents, to coerce and discredit opponents, and generally to distort the situation to their advantage (Riker 1986; Moe 1990a, 1990b; Schlager 1995).

In short, understanding the policy process requires knowledge of the goals and perceptions of hundreds of actors throughout the country involving possibly very technical scientific and legal issues over periods of a decade or more while most of those actors are actively seeking to propagate their specific "spin" on events.

Given the staggering complexity of the policy process, the analyst must find some way of simplifying the situation in order to have any chance of understanding it. One simply cannot look for, and see, everything. Work in the philosophy of science and social psychology has provided persuasive evidence that perceptions are almost always mediated by a set of presuppositions. These perform two critical mediating functions. First, they tell the observer what to look for; that is, what factors are likely to be critically important versus those that can be safely ignored. Second, they define the categories in which phenomena are to be grouped (Kuhn 1970; Lakatos 1971; Brown 1977; Lord, Ross, and Lepper 1979; Hawkesworth 1992; Munro et al. 2002).

To understand the policy process, for example, most institutional rational choice approaches tell the analyst (1) to focus on the leaders of a few critical institutions with formal decisionmaking authority, (2) to assume that these actors are pursuing their material self-interest (e.g., income, power, security), and (3) to group actors into a few institutional categories, for example, legislatures, administrative agencies, and interest groups (Shepsle 1989; Scharpf 1997). In contrast, the advocacy coalition framework tells the analyst to assume (1) that belief systems are more important than institutional affiliation, (2) that actors may

be pursuing a wide variety of objectives, which must be measured empirically, and (3) that one must add researchers and journalists to the set of potentially important policy actors (Sabatier and Jenkins-Smith 1993). Thus, analysts from these two different perspectives look at the same situation through quite different lenses and are likely to see quite different things, at least initially.

STRATEGIES FOR SIMPLIFICATION

Given that we have little choice but to look at the world through a lens consisting of a set of simplifying presuppositions, at least two quite different strategies exist for developing such a lens. On the one hand, the analyst can approach the world in an implicit, ad hoc fashion, using whatever categories and assumptions that have arisen from his or her experience. This is essentially the method of common sense. It may be reasonably accurate for situations important to the analyst's welfare in which she or he has considerable experience. In such situations, the analyst has both the incentive and the experience to eliminate clearly invalid propositions. Beyond that limited scope, the commonsense strategy is likely to be beset by internal inconsistencies, ambiguities, erroneous assumptions, and invalid propositions, precisely because the strategy does not contain any explicit methods of error correction. Since its assumptions and propositions remain implicit and largely unknown, they are unlikely to be subjected to serious scrutiny. The analyst simply assumes they are, by and large, correct—insofar as he or she is even cognizant of their content.

An alternative strategy is that of science. Its fundamental ontological assumption is that a smaller set of critical relationships underlies the bewildering complexity of phenomena. For example, a century ago Darwin provided a relatively simple explanation—summarized under the processes of natural selection—for the thousands of species he encountered on his voyages. The critical characteristics of science are that (1) its methods of data acquisition and analysis should be presented in a sufficiently public manner that they can be replicated by others; (2) its concepts and propositions should be clearly defined and logically consistent and should give rise to empirically falsifiable hypotheses; (3) those propositions should be as general as possible and should explicitly address relevant uncertainties; and (4) both the methods and concepts should be self-consciously subjected to criticism and evaluation by experts in that field (Nagel 1961; Lave and March 1975; King, Keohane, and Verba 1994). The overriding strategy can be summarized in the injunction: Be clear enough to be proven wrong. Unlike "common sense," science is designed to be self-consciously error seeking, and thus self-correcting.

A critical component of that strategy—derived from principles 2–4 above—is that scientists should develop clear and logically interrelated sets of propositions, some of them empirically falsifiable, to explain fairly general sets of phenomena. Such coherent sets of propositions have traditionally been termed theories.

Elinor Ostrom has developed some very useful distinctions among three different sets of propositions (see Chapter 2 of this volume). (1) In her view, a "conceptual framework" identifies a set of variables and the relationships among them that presumably account for a set of phenomena. The framework can provide anything from a modest set of variables to something as extensive as a paradigm. It need not identify directions among relationships, although more developed frameworks will certainly specify some hypotheses. (2) A "theory" provides a denser and more logically coherent set of relationships. It applies values to some of the variables and usually specifies how relationships may vary depending upon the values of critical variables. Numerous theories may be consistent with the same conceptual framework. (3) A "model" is a representation of a specific situation. It is usually much narrower in scope, and more precise in its assumptions, than the underlying theory. Ideally, it is mathematical. Thus, frameworks, theories, and models can be conceptualized as operating along a continuum involving increasing logical interconnectedness and specificity but decreasing scope.

One final point: Scientists should be aware of, and capable of applying, several different theoretical perspectives—not just a single one (Stinchcomb 1968; Loehle 1987). First, knowledge of several different perspectives forces the analyst to clarify differences in assumptions across frameworks, rather than implicitly assuming a given set. Second, multiple perspectives encourage the development of competing hypotheses that should ideally lead to "strong inference" (Platt 1964), or at least to the accumulation of evidence in favor of one perspective over another. Third, knowledge and application of multiple perspectives should gradually clarify the conditions under which one perspective is more useful than another. Finally, multiple perspectives encourage a comparative approach: Rather than asking if theory X produces statistically significant results, one asks whether theory X explains more than theory Y.

Consistent with this multiple-lens strategy, the original edition of this volume discussed seven conceptual frameworks. A few of them—notably, institutional rational choice—have given rise to one or more theories, and virtually all have spawned a variety of models seeking to explain specific situations.

THEORETICAL FRAMEWORKS OF THE POLICY PROCESS

The Stages Heuristic

Until the mid-1980s, the most influential framework for understanding the policy process—particularly among American scholars—was the "stages heuristic," or what Nakamura (1987) termed the "textbook approach." As developed by Lasswell (1956), Jones (1970), Anderson (1975), and Brewer and deLeon (1983), it divided the policy process into a series of stages—usually agenda setting, policy formulation and legitimation, implementation, and evaluation—and discussed some of the factors affecting the process within each stage. The stages heuristic

served a useful purpose in the 1970s and early 1980s by dividing the very complex policy process into discrete stages and by stimulating some excellent research within specific stages—particularly agenda setting (Cobb, Ross, and Ross 1976; Kingdon 1984; Nelson 1984) and policy implementation (Pressman and Wildavsky 1973; Hjern and Hull 1982; Mazmanian and Sabatier 1983).

Beginning in the late 1980s, however, the stages heuristic was subjected to some devastating criticisms (Nakamura 1987; Sabatier 1991; Sabatier and Jenkins-Smith 1993):

1. It is not really a causal theory since it never identifies a set of causal drivers that govern the policy process within and across stages. Instead, work within each stage has tended to develop on its own, almost totally without reference to research in other stages. In addition, without causal drivers there can be no coherent set of hypotheses within and across stages.
2. The proposed sequence of stages is often descriptively inaccurate. For example, evaluations of existing programs affect agenda setting, and policy formulation/legitimation occurs as bureaucrats attempt to implement vague legislation (Nakamura 1987).
3. The stages heuristic has a very legalistic, top-down bias in which the focus is typically on the passage and implementation of a major piece of legislation. This focus neglects the interaction of the implementation and evaluation of numerous pieces of legislation—none of them preeminent—within a given policy domain (Hjern and Hull 1982; Sabatier 1986).
4. The assumption that there is a single policy cycle focused on a major piece of legislation oversimplifies the usual process of multiple, interacting cycles involving numerous policy proposals and statutes at multiple levels of government. For example, abortion activists are currently involved in litigation in the federal courts and most state courts, in new policy proposals in Washington and most of the states, in the implementation of other proposals at the federal and state levels, and in the evaluation of all sorts of programs and proposed programs. They're also continually trying to affect the conceptualization of the problem. In such a situation—which is common—focusing on "a policy cycle" makes very little sense.

The conclusion seems inescapable: The stages heuristic has outlived its usefulness and needs to be replaced with better theoretical frameworks.

MORE PROMISING THEORETICAL FRAMEWORKS

Fortunately, over the past twenty years a number of new theoretical frameworks of the policy process have been either developed or extensively modified. The 1999

edition of this book sought to present some of the more promising ones and to assess the strengths and limitations of each.[1]

Following are the criteria utilized in selecting the frameworks to be discussed. They strike me as relatively straightforward, although reasonable people may certainly disagree with my application of them:

1. Each framework must do a reasonably good job of meeting the criteria of a scientific theory; that is, its concepts and propositions must be relatively clear and internally consistent, it must identify clear causal drivers, it must give rise to falsifiable hypotheses, and it must be fairly broad in scope (i.e., apply to most of the policy process in a variety of political systems).
2. Each framework must be the subject of a fair amount of recent conceptual development and/or empirical testing. A number of currently active policy scholars must view it as a viable way of understanding the policy process.
3. Each framework must be a positive theory seeking to explain much of the policy process. The theoretical framework may also contain some explicitly normative elements, but these are not required.
4. Each framework must address the broad sets of factors that political scientists looking at different aspects of public policymaking have traditionally deemed important: conflicting values and interests, information flows, institutional arrangements, and variation in the socioeconomic environment.

By means of these criteria, seven frameworks were selected for analysis in the 1999 edition of this book. Following is a brief description and justification for each selection.

The Stages Heuristic. Although I have doubts that the stages heuristic meets the first and second criteria above, there is certainly room for disagreement on whether it meets the second. In particular, implementation studies appeared to undergo a revival in the late 1990s (Lester and Goggin 1998). Even were that not the case, I have spent so much time criticizing the stages heuristic that simple fairness required me to provide a forum for its defense. Peter deLeon, one of the earliest proponents of the heuristic, volunteered to be the spokesperson.

Institutional Rational Choice. Institutional rational choice is a family of frameworks focusing on how institutional rules alter the behavior of intendedly rational individuals motivated by material self-interest. Although much of the literature on institutional rational choice focuses on rather specific sets of institutions, such as the relationships between Congress and administrative agencies in the United States (Moe 1984; Shepsle 1989; Miller 1992), the general framework

is extremely broad in scope and has been applied to important policy problems in the United States and other countries (Ostrom 1986, 1990; Ostrom, Schroeder, and Wynne 1993; Ostrom, Gardner, and Walker 1994; Scholz, Twombley, and Headrick 1991; Chubb and Moe 1990; Dowding 1995; Scharpf 1997). It is clearly the most developed of all the frameworks in this volume and is arguably the most utilized in the United States and perhaps in Germany. Elinor Ostrom agreed to write the chapter for this volume.

Multiple-Streams. The multiple-streams framework was developed by John Kingdon (1984) based upon the "garbage can" model of organizational behavior (Cohen, March, and Olsen 1972). It views the policy process as composed of three streams of actors and processes: a problem stream consisting of data about various problems and the proponents of various problem definitions; a policy stream involving the proponents of solutions to policy problems; and a politics stream consisting of elections and elected officials. In Kingdon's view, the streams normally operate independently of each other, except when a "window of opportunity" permits policy entrepreneurs to couple the various streams. If the entrepreneurs are successful, the result is major policy change. Although the multiple-streams framework is not always as clear and internally consistent as one might like, it appears to be applicable to a wide variety of policy arenas and was cited about eighty times annually in the Social Science Citation Index. John Kingdon is the obvious author for this chapter; however, he declined. I then selected Nikolaos Zahariadis, who had utilized the multiple-streams framework extensively in his own research (Zahariadis 1992, 1995, 2003).

Punctuated-Equilibrium Framework. Originally developed by Baumgartner and Jones (1993), the punctuated-equilibrium (PE) framework argues that policymaking in the United States is characterized by long periods of incremental change punctuated by brief periods of major policy change. The latter come about when opponents manage to fashion new "policy images" and exploit the multiple policy venues characteristic of the United States. Originally developed to explain changes in legislation, this framework has been expanded to include some very sophisticated analyses of long-term changes in the budgets of the federal government (Jones, Baumgartner, and True 1998). The PE framework clearly meets all four criteria, at least for systems with multiple policy venues. The chapter for this volume is coauthored by its original proponents, Frank R. Baumgartner and Bryan D. Jones, together with James L. True.

The Advocacy Coalition Framework. Developed by Sabatier and Jenkins-Smith (1988, 1993), the advocacy coalition framework (ACF) focuses on the interaction of advocacy coalitions—each consisting of actors from a variety of institutions who share a set of policy beliefs—within a policy subsystem. Policy change is a function of both competition within the subsystem and events outside

the subsystem. The framework spends a lot of time mapping the belief systems of policy elites and analyzing the conditions under which policy-oriented learning across coalitions can occur. It has stimulated considerable interest throughout the countries of the Organization for Economic Cooperation and Development (OECD)—including some very constructive criticism (Schlager 1995). Paul Sabatier and Hank C. Jenkins-Smith are clearly qualified to assess the implications of these recent applications.

The frameworks discussed thus far have all focused on explaining policy change within a given political system or set of institutional arrangements (including efforts to change those arrangements). The next two frameworks seek to provide explanations of variation across a large number of political systems.

Policy Diffusion Framework. The policy diffusion framework was developed by Berry and Berry (1990, 1992) to explain variation in the adoption of specific policy innovations, such as a lottery, across a large number of states (or localities). It argues that adoption is a function of both the characteristics of the specific political systems and a variety of diffusion processes. Recently, Mintrom and Vergari (1998) integrated this framework with the literature on policy networks. The diffusion framework has thus far been utilized almost exclusively in the United States. It should, however, apply to variation among countries or regions within the European Union, the OECD, or any other set of political systems. The authors of the chapter in this volume were Frances Stokes Berry and William D. Berry, the original developers of the framework.

The Funnel of Causality and Other Frameworks in Large-N Comparative Studies. Finally, we turn to a variety of frameworks that were extremely important in the United States in the 1960s and 1970s in explaining variation in policy outcomes (usually budgetary expenditures) across large numbers of states and localities (Dye 1966, 1991; Sharkansky 1970; Hofferbert 1974). These began as very simple frameworks seeking to apportion the variance among background socioeconomic conditions, public opinion, and political institutions—although they became somewhat more sophisticated over time (Mazmanian and Sabatier 1981; Hofferbert and Urice 1985). Although interest in this approach has declined somewhat in the United States, it is still popular in OECD countries, particularly for explaining variation in social welfare programs (Flora 1986; Klingeman, Hofferbert, and Budge 1994; Schmidt 1996). The author for this chapter is William Blomquist. Although he has contributed to this literature (Blomquist 1991), he is not a major proponent—and thus differs from all the other chapter authors. He was selected because I expected him to be critical of the "black box" features of this framework and to seek to integrate it with other literatures, particularly institutional rational choice. Although those expectations were never communicated to him, he wound up doing a superb job of fulfilling them.

WHAT'S NEW IN THE SECOND EDITION?

The first (1999) edition of this book has been quite successful. It has sold about 1,000 copies per year for seven years. It has generally received favorable reviews (Dudley 2000; Parsons 2000; Radaelli 2000; Skogstad 2001; Theodoulou 2001). It has substantially accomplished what it set out to do: namely, to provide first-rate introductions to a set of the most promising theories of the policy process, together with some insightful comparisons.

Nevertheless, the first edition has been subjected to at least two major criticisms. First, it has been justly taken to task for its "overwhelming focus on the American literature" (Skogstad 2001). All of the authors were American. The only chapter that referenced a significant non-American literature was Ostom, whose IAD framework has largely been used in developing countries. Several of the chapters—particularly those covering the ACF and punctuated equilibrium—implicitly assumed that the basic features of American pluralism (multiple venues, majoritarian rule, weak political parties, politicized bureaucracies) were the norm everywhere. There was no acknowledgment of corporatist and authoritarian regimes, which are prevalent in many European and developing countries.

Second, the first edition was criticized for its narrow selection criteria, particularly for only including frameworks that followed scientific norms of clarity, hypothesis-testing, acknowledgement of uncertainty, etc. Since I am unequivocally a social scientist, this criticism fell on deaf ears (Sabatier 2000). A related criticism was that the first edition ignored social constructionist frameworks, largely on grounds that they don't follow scientific norms. But Helen Ingram and Anne Schneider convinced me that their particular constructionist framework (Schneider and Ingram 1997) met those norms and thus ought to be included in the book.

The second edition addresses these criticisms in a number of ways. In reaction to the charge of American chauvinism, the new edition:

- Adds a new chapter on network analysis written by two Europeans, Hanspeter Kriesi and Silke Adam of the University of Zurich. They were selected over possible competitors (e.g., Knoke and Laumann) because their concepts and arguments are clearer.[2]
- Adds new chapters on network analysis and social construction, both of which are very prominent topics in the European and Commonwealth literature.
- Revises several chapters—particularly those covering the ACF and PE—to no longer assume American pluralism as the norm. Most other chapters increased their coverage of the non-American literature.

As for the neglect of social construction, the new edition adds a chapter on that topic by Ingram and Schneider.

Given my doubts about the utility of the stages heuristic and the need to find space for two more promising frameworks, the chapter on the stages heuristic has been deleted from the second edition.

Finally, since one indicator of a viable research program is evidence that scholars beyond those who initiate the program expand it to other contexts, I have encouraged contributors to this volume to include in their chapter a table or appendix listing published studies employing the model/framework in different situations.[3] Most of the authors have chosen to do so, although the format utilized varies substantially from chapter to chapter.

PLAN OF THE BOOK

With respect to each of the eight theoretical frameworks selected for discussion, I have asked one of its principal proponents to present a brief history, to discuss its underlying principles and propositions, to analyze recent empirical evidence and revisions, to evaluate the strengths and limitations of the framework, and to suggest directions for future development.

After this introductory chapter, the next major section contains analyses of three frameworks that differ substantially concerning their assumptions of individual and collective rationality. Institutional rational choice frameworks assume that policy actors are "intendedly rational"; that is, they seek to realize a few goals efficiently but must overcome some obstacles (including imperfect information) to do so. The assumption is that policy problems and options are relatively well defined, but ascertaining the probable consequences of those alternatives is problematic. In contrast, Kingdon's multiple-streams model assumes that most policy situations are cloaked in "ambiguity," that is, lacking clear problem definitions and goals. In addition, serendipity and chance play a major role in the multiple-streams framework. In the Ingram and Schneider social construction approach, actors' perceptions of reality are strongly influenced by "social constructions" of the worthiness (virtue) and power of various target populations.

The third section presents three frameworks that seek to explain policy change over fairly long periods of time within a policy subsystem/domain: the punctuated-equilibrium framework of Jones et al., the advocacy coalition framework of Sabatier et al., and the policy network analysis of Kriesi et al. Although these three frameworks have similar dependent variables, they differ in several respects—most notably, in the relative importance of the general public versus policy elites, the model of the individual, and the importance of institutional context.

The fourth section contains two frameworks that typically seek to explain variation in policy decisions across large numbers of political systems. I had considered combining these into a single chapter but decided against it for two reasons. First, the diffusion models discussed by Berry and Berry are really a significant addition to the traditional set of state/local system variables discussed by Sharkansky/Dye/Hofferbert. Second, I very much wanted to have a critique of the "black box" character of the Sharkansky et al. models on the record, which I knew I could count on from Blomquist.

The final section contains two concluding chapters. The first is a comparison of the various theoretical frameworks, including comparisons of their dependent variables, the critical independent variables, the strengths and weaknesses of each, and some speculations about how they might be integrated and/or more clearly differentiated. The author is Edella Schlager, who has already revealed herself to be extremely talented at this sort of comparative analysis (Schlager 1995; Schlager and Blomquist 1996). In the last chapter, I suggest several strategies for advancing the state of policy theory.

The goal of this book is to advance the state of policy theory by presenting several of the more promising frameworks and by inviting the reader to compare the strengths and limitations of each. At the end of the day, the reader will hopefully have a repertoire of two or three frameworks that she or he is familiar with and adept at employing.

NOTES

1. Just to show that my tastes are not totally idiosyncratic, the list of "synthetic theories" developed by Peter John (1998) includes the advocacy coalition framework, punctuated equilibrium, and multiple streams. Earlier in the book, he includes socioeconomic approaches, institutions, rational choice, and ideas. I have grouped most of the last into a constructivist paradigm in the next section. My list also overlaps considerably those of Parsons (1996) and Muller and Surel (1998).

2. For example, in Knoke et al. (1996) "interest" is used both for "a topic of concern" and a "goal" (p.13). In addition, the critical discussion of organization interests in specific settings (pp. 21–22) is quite confusing. In contrast, Kriesi's work (Kriesi and Jegen 2001) is very clear.

3. I wish to thank Bill Berry for clarifying this argument.

REFERENCES

Anderson, James. 1975. *Public Policy-Making*. New York: Praeger.

Baumgartner, Frank, and Bryan Jones. 1993. *Agendas and Instability in American Politics*. Chicago: University of Chicago Press.

Berry, Frances Stokes, and William Berry. 1990. "State Lottery Adoptions as Policy Innovations: An Event History Analysis." *American Political Science Review* 84 (June): 397–415.

_____. 1992. "Tax Innovation in the States: Capitalizing on Political Opportunity." *American Journal of Political Science* 36 (August): 715–742.

Blomquist, William. 1991. "Exploring State Differences in Groundwater Policy Adoptions, 1980–89." *Publius* 21:101–115.

Brewer, Gary, and Peter deLeon. 1983. *The Foundations of Policy Analysis*. Monterey, CA: Brooks/Cole.

Brown, Harold. 1977. *Perception, Theory, and Commitment.* Chicago: University of Chicago Press.
Chubb, John, and Terry Moe. 1990. *Politics, Markets, and America's Schools.* Washington, DC: Brookings Institution.
Cobb, Roger, Jennie-Keith Ross, and Marc Ross. 1976. "Agenda Building as a Comparative Political Process." *American Political Science Review* 70 (March): 126–138.
Cohen, Michael, James March, and Johan Olsen. 1972. "A Garbage Can Model of Organizational Choice." *Administrative Science Quarterly* 17 (March): 1–25.
Derthick, Martha, and Paul Quirk. 1985. *The Politics of Deregulation.* Washington, DC: Brookings Institution.
Dowding, Keith. 1995. "Model or Metaphor? A Critical Review of the Policy Network Approach." *Political Studies* 43 (March): 136–159.
Dudley, Geoffrey. 2000. "New Theories and Policy Discontinuities." *Journal of European Public Policy* 7:122–126.
Dye, Thomas. 1966. *Politics, Economics, and Public Policy.* Chicago: Rand McNally.
_____. 1991. *Politics in States and Communities,* 7th ed. Englewood Cliffs, NJ: Prentice-Hall.
Eisner, Marc A. 1993. *Regulatory Politics in Transition.* Baltimore, MD: Johns Hopkins University Press.
Flora, Peter, ed. 1986. *Growth to Limits: The Western European Welfare States Since World War II.* Berlin: deGruyter.
Hawkesworth, Mary. 1992. "Epistemology and Policy Analysis." In William Dunn and Rita Kelly, eds., *Advances in Policy Studies,* pp. 295–329. New Brunswick, NJ: Transaction Books.
Hjern, Benny, and Chris Hull. 1982. "Implementation Research as Empirical Constitutionalism." *European Journal of Political Research* 10:105–115.
Hjern, Benny, and David Porter. 1981. "Implementation Structures: A New Unit of Administrative Analysis." *Organization Studies* 2:211–227.
Hofferbert, Richard. 1974. *The Study of Public Policy.* Indianapolis, IN: Bobbs-Merrill.
Hofferbert, Richard, and John Urice. 1985. "Small-Scale Policy: The Federal Stimulus Versus Competing Explanations for State Funding for the Arts." *American Journal of Political Science* 29 (May): 308–329.
John, Peter. 1998. *Analyzing Public Policy.* London: Pinter.
Jones, Bryan, Frank Baumgartner, and James True. 1998. "Policy Punctuations: U.S. Budget Authority, 1947–1995." *Journal of Politics* 60 (February): 1–33.
Jones, Charles. 1970. *An Introduction to the Study of Public Policy.* Belmont, CA: Wadsworth.
Jordan, A. G. 1990. "Sub-Governments, Policy Communities, and Networks." *Journal of Theoretical Politics* 2:319–338.
King, Gary, Robert Keohane, and Sidney Verba. 1994. *Designing Social Inquiry.* Princeton, NJ: Princeton University Press.
Kingdon, John. 1984. *Agendas, Alternatives, and Public Policies.* Boston: Little, Brown.

Kirst, Michael, and Richard Jung 1982. "The Utility of a Longitudinal Approach in Assessing Implementation." In Walter Williams, ed., *Studying Implementation,* pp. 119–148. Chatham, NJ: Chatham House.
Klingemann, Hans-Dieter, Richard Hofferbert, and Ian Budge. 1994. *Parties, Policies, and Democracy.* Boulder, CO: Westview Press.
Knoke, David, Franz Pappi, Jeffrey Broadbent, and Yutaka Tsujinaka. 1996. *Comparing Policy Networks.* Cambridge, UK: Cambridge University Press.
Kriesi, H., and M. Jegen. 2001. "The Swiss Energy Policy Elite." *European Journal of Political Research* 39:251–287.
Kuhn, Thomas. 1970. *The Structure of Scientific Revolutions,* 2d ed. Chicago: University of Chicago Press.
Lakatos, Imre. 1971. "History of Science and Its Rational Reconstruction." In R. C. Buck and R. S. Cohen, eds., *Boston Studies in the Philosophy of Science,* pp. 91–122. Dordrecht, The Netherlands: D. Reidel.
Lasswell, Harold. 1956. *The Decision Process.* College Park, MD: University of Maryland Press.
Lave, Charles, and James March. 1975. *An Introduction to Models in the Social Sciences.* New York: Harper & Row.
Lester, James, and Malcolm Goggin. 1998. "Back to the Future: The Rediscovery of Implementation Studies." *Policy Currents* 8 (3): 1–10.
Loehle, Craig. 1987. "Hypothesis Testing in Ecology: Psychological Aspects and the Importance of Theory Maturation." *Quarterly Review of Biology* 62:397–409.
Lord, Charles, Lee Ross, and Mark Lepper. 1979. "Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence." *Journal of Personality and Social Psychology* 37:2098–2109.
Mazmanian, Daniel, and Paul Sabatier. 1981. "A Multivariate Model of Public Policy-Making." *American Journal of Political Science* 24 (August): 439–468.
_____. 1983. *Implementation and Public Policy.* Glenview, IL: Scott Foresman. (Reissued in 1989 by University Press of America.)
Miller, Gary. 1992. *Managerial Dilemmas.* Cambridge, England: Cambridge University Press.
Mintrom, Michael, and Sandra Vergari. 1998. "Policy Networks and Innovation Diffusion: The Case of State Educational Reform." *Journal of Politics* 60 (February): 120–148.
Moe, Terry. 1984. "The New Economics of Organization." *American Journal of Political Science* 28 (November): 739–777.
_____. 1990a. "Political Institutions: The Neglected Side of the Story." *Journal of Law, Economics, and Organization* 6:215–253.
_____. 1990b. "The Politics of Structural Choice." In Oliver Williamson, ed., *Organization Theory: From Chester Bernard to the Present and Beyond,* pp. 116–153. Oxford: Oxford University Press.
Muller, Pierre, and Yves Surel. 1998. *L'analyse des politiques publiques.* Paris: Montchrestien.

Munro, Geoffrey D., Peter H. Ditto, Lisa K. Lockhart, Angela Fagerlin, Mitchell Gready, and Elizabeth Peterson. 2002. "Biased Assimilation of Socio-political Arguments." *Basic and Applied Social Psychology* 24:15–26.

Nagel, Ernest. 1961. *The Structure of Science*. New York: Harcourt, Brace, & World.

Nakamura, Robert. 1987. "The Textbook Process and Implementation Research." *Policy Studies Review* 1:142–154.

Nelson, Barbara. 1984. *Making an Issue of Child Abuse*. Chicago: University of Chicago Press.

Ostrom, Elinor. 1983. "A Public Service Industry Approach to the Study of Local Government Structure and Reform." *Policy and Politics* 11:313–341.

_____. 1986. "An Agenda for the Study of Institutions." *Public Choice* 48:3–25.

_____. 1990. *Governing the Commons*. Cambridge, England: Cambridge University Press.

Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, and Common-Pool Resources*. Ann Arbor, MI: University of Michigan Press.

Ostrom, Elinor, Larry Schroeder, and Susan Wynne. 1993. *Institutional Incentives and Sustainable Development*. Boulder, CO: Westview Press.

Parsons, Wayne. 1996. *Public Policy: An Introduction to the Theory and Practice of Policy Analysis*. London: Elgar, Aldershot.

_____. 2000. "When Dogs Don't Bark." *Journal of European Public Policy* 7:126–130.

Platt, John. 1964. "Strong Inference." *Science* 146 (October): 347–353.

Pressman, Jeffrey, and Aaron Wildavsky. 1973. *Implementation*. Berkeley, CA: University of California Press.

Raddaelli, Claudio. 2000. "Public Policy Comes of Age." *Journal of European Public Policy* 7:130–135.

Rhodes, R. A. W. 1988. *Beyond Westminster and Whitehall*. London: Unwin & Hyman.

Riker, William. 1986. *The Art of Political Manipulation*. New Haven, CT: Yale University Press.

Sabatier, Paul. 1986. "Top-Down and Bottom-Up Models of Policy Implementation: A Critical and Suggested Synthesis." *Journal of Public Policy* 6 (January): 21–48.

_____. 1991. "Toward Better Theories of the Policy Process." *PS: Political Science and Politics* 24 (June): 147–156.

_____. 2000. "Clear Enough to Be Wrong." *Journal of European Public Policy* 7:1335–140.

Sabatier, Paul, and Hank Jenkins-Smith, eds. 1988. "Special Issue: Policy Change and Policy-Oriented Learning: Exploring an Advocacy Coalition Framework." *Policy Sciences* 21:123–272.

_____. 1993. *Policy Change and Learning: An Advocacy Coalition Approach*. Boulder, CO: Westview Press.

Scharpf, Fritz. 1997. *Games Policy Actors Play*. Boulder, CO: Westview Press.

Schlager, Edella. 1995. "Policy-Making and Collective Action: Defining Coalitions within the Advocacy Coalition Framework." *Policy Sciences* 28:243–270.

Schlager, Edella, and William Blomquist. 1996. "Emerging Political Theories of the Policy Process: Institutional Rational Choice, the Politics of Structural Choice, and Advocacy Coalitions." *Political Research Quarterly* 49 (September): 651–672.

Schmidt, Manfred. 1996. "When Parties Matter." *European Journal of Political Research* 30 (September): 155–183.

Schneider, Anne, and Helen Ingram. 1997. *Policy Design for Democracy*. Lawrence, KS: University Press of Kansas.

Schneider, Mark, Paul Teske, Michael Mintrom, and Sam Best. 1993. "Establishing the Micro Foundations for Macro-Level Theory." *American Political Science Review* 87:702–716.

Scholz, John, James Twombley, and Barbara Headrick. 1991. "Street Level Political Controls over Federal Bureaucrats." *American Political Science Review* 85 (September): 829–858.

Sharkansky, Ira. 1970. *Policy Analysis in Political Science*. Chicago: Markham

Shepsle, Kenneth. 1989. "Studying Institutions: Some Lessons from the Rational Choice Approach." *Journal of Theoretical Politics* 1:131–147.

Skogstad, Grace. 2001. Review of *Theories of the Policy Process*, by Paul A. Sabatier. *Canadian Journal of Political Science* 34:419–420.

Stinchcombe, Arthur. 1968. *Constructing Social Theories*. Chicago: University of Chicago Press.

Theodoulou, Stella. 2001. Review of *Theories of the Policy Process*, by Paul A. Sabatier. *American Political Science Review* 95:107–1008.

Zahariadis, Nikolaos. 1992. "To Sell or Not to Sell? Telecommunications Policy in Britain and France." *Journal of Public Policy* 12:355–376.

_____. 1995. *Markets, States, and Public Policy: Privatization in Britain and France*. Ann Arbor, MI: University of Michigan Press.

_____. 2003. *Ambiguity and Choice in Public Policy*. Washington, DC: Georgetown University Press.

PART TWO

Alternative Views of the Role of Rationality in the Policy Process

2

Institutional Rational Choice

An Assessment of the Institutional Analysis and Development Framework

ELINOR OSTROM

When Paul Sabatier asked me to do an assessment of institutional rational choice, I responded that the field was too big for one person to do an assessment of all the work that might be covered by the term. Instead of trying an assessment of such a broad array of literature, I focus more specifically on the institutional analysis and development (IAD) framework that has evolved out of the work of many colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University. Undertaking an overview and assessment of the IAD framework proves to be quite a challenge in 2006 given all of the attention paid to it in recent years.

The publication of "The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches" (Kiser and Ostrom 1982) represents the initial published attempt to develop a general framework to help integrate work undertaken by political scientists, economists, anthropologists, geographers, lawyers, social psychologists, and others interested in how institutions affect the incentives confronting individuals and their resultant behavior.[1] During the two plus decades since this publication, the framework has been further developed and applied to the analysis of a diversity of empirical settings (see Table 2.1). After many requests, I have finally devoted an entire book to explication of the full framework as it has developed over the years (E. Ostrom 2005). The elements involved in the framework are closely related to concepts that play an important role in related theories, such as those represented in the work of Douglass C.

North, Oliver Williamson, and others in the "new institutional economics" tradition (see Eggertsson 1990, 2005).

Two important aspects of the IAD framework were developed in the initial article with Larry Kiser. One aspect is the distinction among three tiers of decision making and the relations among them: constitutional, collective choice, and operational decisions. The second is the elucidation of the fundamental elements that can be used for analysis of outcomes and their evaluation at any of the three tiers of decision making. In this chapter, I will present an updated version of the framework in light of the additional work undertaken since 1982 and of theories and models consistent with this framework. I will conclude with a brief assessment of the utility of this tool for institutional analysis. Before I do this, however, I wish to indicate some of the difficulties that confront those interested in understanding incentives, institutions, and outcomes.

CHALLENGES

Various aspects of the IAD approach are clarified by becoming aware of the difficulties to be overcome in undertaking any form of institutional analysis. Here is an initial list of what I consider the key difficulties involved in studying institutions:

1. The term "institution" refers to many different types of entities, including both organizations and the rules used to structure patterns of interaction within and across organizations.
2. Although the buildings in which organized entities are located are quite visible, institutions themselves are invisible.
3. To develop a coherent approach to studying diverse types of institutional arrangements, including markets, hierarchies, firms, families, voluntary associations, national governments, and international regimes, one needs multiple inputs from diverse disciplines.
4. Given the multiple languages used across disciplines, a coherent institutional framework is needed to allow for expression and comparison of diverse theories and models of theories applied to particular puzzles and problem settings.
5. Decisions made about rules at any one level are usually made within a structure of rules existing at a different level. Thus, institutional studies need to encompass multiple levels of analysis.
6. At any one level of analysis, combinations of rules, attributes of the world, and communities of individuals involved are combined in a configural rather than an additive manner.

Let us briefly discuss these issues before turning to the IAD approach.

Multiple Definitions of Institutions

It is hard to make much progress in the study of institutions if scholars define the term "institution" as meaning almost anything. A major confusion exists between scholars who use the term to refer to an organizational entity such as the U.S. Congress, a business firm, a political party, or a family, and scholars who use the term to refer to the rules, norms, and strategies adopted by individuals operating within or across organizations. In this chapter, I will use the term "institution" in the latter sense, to refer to the shared concepts used by humans in repetitive situations organized by rules, norms, and strategies (see Crawford and Ostrom 2005). By rules, I mean shared prescriptions (must, must not, or may) that are mutually understood and predictably enforced in particular situations by agents responsible for monitoring conduct and for imposing sanctions. By norms, I mean shared prescriptions that tend to be enforced by the participants themselves through internally and externally imposed costs and inducements. By strategies, I mean the regularized plans that individuals make within the structure of incentives produced by rules, norms, and expectations of the likely behavior of others in a situation affected by relevant physical and material conditions.[2]

Invisibility of Institutions

One of the most difficult problems to overcome in the study of institutions is how to identify and measure them. Because institutions are fundamentally shared concepts, they exist in the minds of the participants and sometimes are shared as implicit knowledge rather than in an explicit and written form. One of the problems facing scholars and officials is learning how to recognize the presence of institutions on the ground. The primitive physical structures that embed property-rights systems that farmers have constructed over time look flimsy to an engineer who considers real only structures built out of concrete and iron. These flimsy structures, however, are frequently used by individuals to allocate resource flows to participants according to rules that have been devised in tough constitutional and collective-choice bargaining situations over time.

In training researchers to identify and measure institutions, we stress the concept of rules-in-use rather than focusing on rules-in-form. Rules-in-use are referred to whenever someone new (such as a new employee or a child) is being socialized into an existing rule-ordered system of behavior. They are the dos and don'ts that one learns on the ground that may not exist in any written document. In some instances, they may actually be contrary to the dos and don'ts written in formal documents. Being armed with a set of questions concerning how X is done here and why Y is not done here is a very useful way of identifying rules-in-use, shared norms, and operational strategies.

Multiple Disciplines—Multiple Languages

Because regularized human behavior occurs within a wide diversity of rule-ordered situations that share structural features such as markets, hierarchies or firms, families, voluntary associations, national governments, and international regimes, no single discipline addresses all questions important for the study of human institutions. Understanding the kinds of strategies and heuristics that humans adopt in diverse situations is enhanced by the study of anthropology, economics, game theory, history, law, philosophy, political science, psychology, public administration, and sociology. Scholars within these disciplines learn separate technical languages. Meaningful communication across the social sciences can be extremely difficult to achieve (E. Ostrom 2006). When social scientists need to work with biologists and/or physical scientists, communication problems are even more difficult. One of the reasons for developing the IAD framework has been, therefore, to develop a common set of linguistic elements that can be used to analyze a wide diversity of problems.

Multiple Levels of Analysis

When individuals interact in repetitive settings, they may be in operational situations that directly affect the world, or they may be making decisions at other levels of analysis that eventually impinge on operational decision-making situations (Shepsle 1989). Multiple sources of structure are located at diverse analytical levels as well as diverse geographic domains. Biologists took several centuries to learn how to separate the diverse kinds of relevant structures needed to analyze both communities and individual biological entities. Separating phenotypical structure from genotypical structure was part of the major Darwinian breakthrough that allowed biologists to achieve real momentum and cumulation during the past century. The nested structure of rules within rules, within still further rules, is a particularly difficult analytical problem to solve for those interested in the study of institutions. Studies conducted at a macro level (see Kaminski 1992; V. Ostrom 1997; Allen 2005; Loveman 1993; Sawyer 1992, 2005) focus on constitutional structures. These affect collective-choice decisions as they eventually impinge on the day-to-day decisions of citizens and/or subjects. Studies conducted at a micro level (Firmin-Sellers 1996; Gibson, Williams, and Ostrom 2005) focus more on operational-level decisions as they are, in turn, affected by collective-choice and constitutional-choice rules, some, but not all, of which are under the control of those making operational decisions. Finding ways to communicate across these levels is a key challenge for all institutional theorists.

Configural Relationships

Successful analysis can cumulate rapidly when scholars have been able to examine a problem by separating it into component parts that are analyzed independently

and then recombining these parts additively. Many puzzles of interest to social scientists can be torn apart and recombined. Frequently, however, the impact on incentives and behavior of one type of rule is not independent of the configuration of other rules. Thus, the impact of changing one of the current rules that is part of a "welfare system" depends on which other rules are also in effect. Changing the minimum outside income that one can earn before losing benefits from one program, for example, cannot be analyzed independently of the effect of income on benefits derived from other programs.[3] Similarly, analyzing the impact of changing the proportion of individuals who must agree prior to making an authoritative collective choice (e.g., 50 percent plus one) depends on the quorum rule in force. If a quorum rule specifying a low proportion of members is in effect, requiring two-thirds agreement may be a less stringent decision rule than a simple majority rule combined with a quorum rule requiring a high proportion of members. Ceteris paribus conditions are always essential for doing any theoretical work involving institutions. In the case of institutional analysis, one needs to know the value of other variables rather than simply asserting that they are held constant. This configural nature of rules makes institutional analysis a more difficult and complex enterprise than studies of phenomena that are strictly additive.

INSTITUTIONAL FRAMEWORKS, THEORIES, AND MODELS

Given the need for multiple disciplines, and hence multiple disciplinary languages, and given the multiple levels of analysis involved in studying configural relationships among rules, relevant aspects of the world, and cultural phenomena, the study of institutions does depend on theoretical work undertaken at three levels of specificity that are often confused with one another. These essential foundations are (1) frameworks, (2) theories, and (3) models. Analyses conducted at each level provide different degrees of specificity related to a particular problem.

The development and use of a general framework helps to identify the elements and relationships among these elements that one needs to consider for institutional analysis. Frameworks organize diagnostic and prescriptive inquiry. They provide the most general list of variables that should be used to analyze all types of institutional arrangements. Frameworks provide a metatheoretical language that can be used to compare theories. They attempt to identify the universal elements that any theory relevant to the same kind of phenomena would need to include. Many differences in surface reality can result from the way these variables combine or interact with one another. Thus, the elements contained in a framework help analysts generate the questions that need to be addressed when they first conduct an analysis.

The development and use of theories enable the analyst to specify which elements of the framework are particularly relevant to certain kinds of questions and to make general working assumptions about these elements. Thus, theories focus on a framework and make specific assumptions that are necessary for an analyst to diagnose a phenomenon, explain its processes, and predict outcomes. Several

theories are usually compatible with any framework. Economic theory, game theory, transaction cost theory, social choice theory, covenantal theory, and theories of public goods and common-pool resources are all compatible with the IAD framework discussed in this chapter. In this chapter, I illustrate the framework primarily with reference to our work on the theory of common-pool resources.

The development and use of models make precise assumptions about a limited set of parameters and variables. Logic, mathematics, game theory, experimentation and simulation, and other means are used to explore systematically the consequences of these assumptions in a limited set of outcomes. Multiple models are compatible with most theories. An effort to understand the strategic structure of the games that irrigators play in differently organized irrigation systems, for example, developed four families of models just to begin to explore the likely consequences of different institutional and physical combinations relevant to understanding how successful farmer organizations arranged for monitoring and sanctioning activities (Weissing and Ostrom 1991). This is one of the models we have developed for the precise analysis of a subpart of the theory of common-pool resources.

For policymakers and scholars interested in issues related to how different governance systems enable individuals to solve problems democratically, the IAD framework helps to organize diagnostic, analytical, and prescriptive capabilities. It also aids in the accumulation of knowledge from empirical studies and in the assessment of past efforts at reforms. Markets and hierarchies are frequently presented as fundamentally different "pure types" of organization. Not only are these types of institutional arrangements perceived to be different, but each is presumed to require its own explanatory theory. Scholars who attempt to explain behavior within markets use microeconomic theory, whereas scholars who attempt to explain behavior within hierarchies use political and sociological theory. Such a view precludes a more general explanatory framework and closely related theories that help analysts make cross-institutional comparisons and evaluations.

Without the capacity to undertake systematic, comparative institutional assessments, recommendations of reform may be based on naive ideas about which kinds of institutions are "good" or "bad" and not on an analysis of performance. One needs a common framework and family of theories to address questions of reforms and transitions. Particular models then help the analyst deduce specific predictions about likely outcomes of highly simplified structures. Models are useful in policy analysis when they are well tailored to the particular problem at hand. Models can be used inappropriately when applied to the study of problematic situations that do not closely fit the assumptions of the model.

THE INSTITUTIONAL ANALYSIS AND DEVELOPMENT FRAMEWORK

As indicated earlier, an institutional framework should identify the major types of structural variables present to some extent in all institutional arrangements,

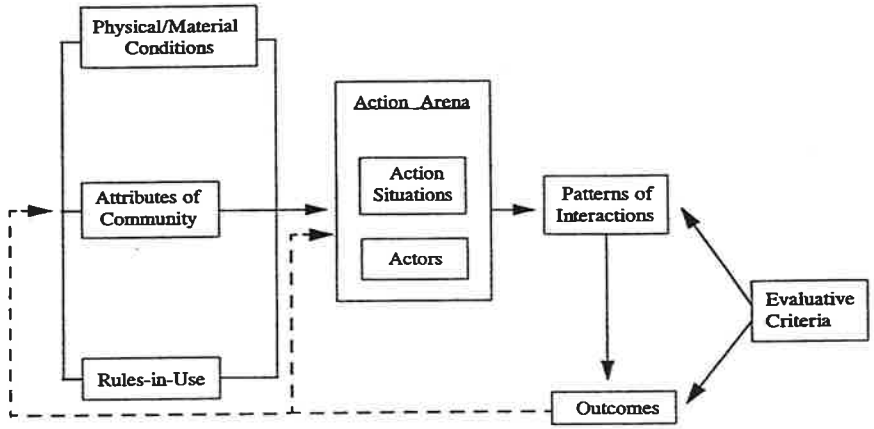

FIGURE 2.1 A Framework for Institutional Analysis
SOURCE: Adapted from E. Ostrom, Gardner, and Walker (1994, p. 37)

but whose values differ from one type of institutional arrangement to another. The IAD framework is a multitier conceptual map (see Figure 2.1). One part of the framework is the identification of an action arena and the resulting patterns of interactions and outcomes and the evaluation of these outcomes (see right half of Figure 2.1). The problem could be at an operational tier where actors interact in light of the incentives they face to generate outcomes directly in the world. Examples of operational problems include:

- the task of designing the incentives of a voluntary environmental action group so as to overcome to some extent the free-rider problem;
- the challenge of organizing local users of a forest to contribute resources to the protection of local watersheds to improve soil quality and water storage; and
- the question of how to invest in irrigation infrastructures so that capital investments enhance, rather than detract from, the organizational capabilities of local farmers.

The problem could also be at a policy (or collective-choice) tier where decision makers repeatedly have to make policy decisions within the constraints of a set of collective-choice rules. The policy decisions then affect the structure of arenas where individuals are making operational decisions and thus directly impacting a physical world. The problem could as well be at a constitutional tier where decisions are made about who is eligible to participate in policymaking and about the rules that will be used to undertake policymaking.

The first step in analyzing a problem is to identify a conceptual unit—called an action arena—that can be utilized to analyze, predict, and explain behavior within institutional arrangements. Action arenas include an action situation and the actors in that situation. An action situation can be characterized by means of seven clusters of variables: (1) participants, (2) positions, (3) outcomes, (4) action-outcome linkages, (5) the control that participants exercise, (6) information, and (7) the costs and benefits assigned to outcomes. An actor (an individual or a corporate actor) includes assumptions about four clusters of variables:

1. 1. the resources that an actor brings to a situation;
2. 2. the valuation actors assign to states of the world and to actions;
3. 3. the way actors acquire, process, retain, and use knowledge contingencies and information; and
4. 4. the processes actors use for selection of particular courses of action.

The term action arena refers to the social space where individuals interact, exchange goods and services, solve problems, dominate one another, or fight (among the many things that individuals do in action arenas). A major proportion of theoretical work stops at this level and takes as givens the variables specifying the situation and the motivational and cognitive structure of an actor. Analysis proceeds toward the prediction of the likely behavior of individuals in such a structure.

An institutional analyst can take two additional steps after making an effort to understand the initial structure of an action arena. One step digs deeper and inquires into the factors that affect the structure of an action arena. From this vantage point, the action arena is viewed as a set of variables dependent upon other factors. These factors affecting the structure of an action arena include three clusters of variables: (1) the rules used by participants to order their relationships, (2) the attributes of states of the world that are acted upon in these arenas, and (3) the structure of the more general community within which any particular arena is placed (see Kiser and Ostrom 1982). The next section of this chapter explicitly examines how shared understandings of rules, states of the world, and nature of the community affect the values of the variables characterizing action arenas. Then one can move outward from action arenas to consider methods for explaining complex structures that link sequential and simultaneous action arenas to one another (see the left side of Figure 2.1).

DIAGNOSIS AND EXPLANATION WITHIN THE FRAME OF AN ACTION ARENA

As mentioned earlier, the term "action arena" refers to a complex conceptual unit containing one set of variables called an action situation and a second set of

variables called an actor. One needs both components—the situation and the actors in the situation—to diagnose, explain, and predict actions and results.

An Action Situation

The term "action situation" is used to refer to an analytic concept that enables an analyst to isolate the immediate structure affecting a process of interest for the purpose of explaining regularities in human actions and results, and potentially to reform them. A common set of variables used to describe the structure of an action situation includes (1) the set of participants, (2) the specific positions to be filled by participants, (3) the set of allowable actions and their linkage to outcomes, (4) the potential outcomes that are linked to individual sequences of actions, (5) the level of control each participant has over choice, (6) the information available to participants about the structure of the action situation, and (7) the costs and benefits—which serve as incentives and deterrents—assigned to actions and outcomes. In addition, whether a situation will occur once, a known finite number of times, or indefinitely affects the strategies of individuals. When one is explaining actions and cumulated results within the framework of an action arena, these variables are the "givens" that one works with to describe the structure of the situation. These are the common elements used in game theory to construct formal game models.

Most operational activities related to natural resources can be conceptualized as involving provision, production, appropriation, and assignment (see E. Ostrom, Gardner, and Walker 1994; E. Ostrom, Schroeder, and Wynne 1993). In an analysis of appropriation problems concerning overharvesting from a common-pool resource situation, for example, answers to the following questions are needed before analysis:

- The set of participants: Who and how many individuals withdraw resource units (e.g., fish, water, fodder) from this resource system?
- The positions: What positions exist (e.g., members of an irrigation association, water distributors-guards, and a chair)?
- The set of allowable actions: Which types of harvesting technologies are used (e.g., are chainsaws used to harvest timber; are there open and closed seasons; do fishers return fish smaller than some limit to the water)?
- The potential outcomes: What geographic region and what events in that region are affected by participants in these positions? What chain of events links actions to outcomes?
- The level of control over choice: Do appropriators take the above actions on their own initiative, or do they confer with others (e.g., before entering the forest to cut fodder, does an appropriator obtain a permit)?

- The information available: How much information do appropriators have about the condition of the resource itself, about other appropriators' cost and benefit functions, and about how their actions cumulate into joint outcomes?
- The costs and benefits of actions and outcomes: How costly are various actions to each type of appropriator, and what kinds of benefits can be achieved as a result of various group outcomes?

The Actor: Theories and Models of the Individual

The actor in a situation can be thought of as a single individual or as a group functioning as a corporate actor. The term "action" refers to those human behaviors to which the acting individual attaches a subjective and instrumental meaning. All analysts of microbehavior use an implicit or explicit theory or model of the actors in situations to derive inferences about the likely behavior of each actor in a situation (and thus about the pattern of joint results that may be produced). The analyst must make assumptions about how and what participants value; what resources, information, and beliefs they have; what their information-processing capabilities are; and what internal mechanisms they use to decide upon strategies.

For many problems, it is useful to accept the classical political economy view that an individual's choice of strategy in any particular situation depends on how he or she perceives and weighs the benefits and costs of various strategies and their likely outcomes (Radnitzky 1987). The most well-established formal model of the individual used in institutional analysis is Homo economicus as developed in neoclassical economics and game theory. To use Homo economicus, one assumes that actors have complete and well-ordered preferences and complete information, and that they maximize the net value of expected returns to themselves. All of these assumptions are controversial and are being challenged on many fronts. Many institutional analysts tend to use a broader conception of individual actors. Many stress that perceived costs and benefits include the time and resources devoted to establishing and maintaining relationships (Williamson 1979), as well as the value that individuals attach to establishing a reputation for being reliable and trustworthy (Breton and Wintrobe 1982).

Alternatively, one could assume that the individuals who calculate benefits and costs are fallible learners who vary in terms of the number of other persons whose perceived benefits and costs are important to them and in terms of their personal commitment to keeping promises and honoring forms of reciprocity extended to them (E. Ostrom 1998, 2005). Fallible learners can, and often do, make mistakes. Settings differ, however, in whether the institutional incentives involved encourage people to learn from these mistakes. Fallibility and the capacity to learn can thus be viewed as assumptions of a more general theory of the individual. One can then presume that the various institutional arrangements

that individuals use in governing and managing common-pool resources (or other problematic situations) offer them different incentives and opportunities to learn. In some settings, the incentives lead them to repeat the mistakes of the past. In others, the rate of effective learning about how to make a resource sustainable over time is rapid. In all cases, the repertoire of institutional design principles known to individuals also affects their capacity to change their institutions to improve learning and other outcomes when faced with repeated failures.

When fallible, learning individuals interact in frequently repeated and simple situations, it is possible to model them as if they had complete information about the variables relevant to making choices in those situations. In highly competitive environments, we can make the further assumption that the individuals who survive the selective pressure of the environment act as if they are maximizers of a key variable associated with survival in that environment (e.g., profits or fitness) (Alchian 1950; Dosi and Egidi 1987). When individuals face a relatively simple decision situation where institutions generate accurate information about the variables relevant to a particular problem, that problem can be adequately represented as a straightforward, constrained maximization problem.

The most fully developed, explicit theories of individual choice compatible with the IAD framework—game theory and neoclassical economic theory—involve extreme assumptions such as unlimited computational capability and full maximization of net benefits. For some field settings, these theories generate empirically confirmed explanatory and diagnostic results. When analyzing commodity auction markets run repeatedly in a setting where property rights are well defined and enforced at a relatively low cost to buyers and sellers, theories of market behavior and outcome based on complete information and maximization of profits predict outcomes very well. Using these assumptions about individual choice turns out to be a very useful way of doing institutional analysis when the problematic settings closely approximate this type of very constrained and competitive choice.

Many of the situations of interest in understanding common-pool resources, however, are uncertain and complex and lack the selective pressure and information-generating capabilities of a competitive market. Therefore, one can substitute the assumption of bounded rationality—that persons are intendedly rational but only limitedly so—for the assumptions of perfect information and utility maximization used in axiomatic choice theory (see Simon 1965, 1972; Williamson 1985; E. Ostrom, Gardner, and Walker 1994, chap. 9; B. Jones 2001). Information search is costly, and the information-processing capabilities of human beings are limited. Individuals, therefore, often must make choices based on incomplete knowledge of all possible alternatives and their likely outcomes. With incomplete information and imperfect information-processing capabilities, all individuals may make mistakes in choosing strategies designed to realize a set of goals (V. Ostrom 2007a). Over time, however, they can acquire a greater understanding of their situation and adopt strategies that result in higher returns. Reciprocity

may develop, rather than strictly narrow, short-term pursuit of self-interest (Hyden 1990; Oakerson 1993).

Individuals do not always have access to the same information known by others with whom they interact. For example, how much any one individual contributes to a joint undertaking is often difficult for others to judge. When joint outcomes depend on multiple actors contributing inputs that are costly and difficult to measure, incentives exist for individuals to behave opportunistically (Williamson 1975). Opportunism—deceitful behavior intended to improve one's own welfare at the expense of others—may take many forms, from inconsequential, perhaps unconscious shirking to a carefully calculated effort to defraud others with whom one is engaged in ongoing relationships. The opportunism of individuals who may say one thing and do something else further compounds the problem of uncertainty in a given situation. Moreover, the level of opportunistic behavior that may occur in any setting is affected by the norms and institutions used to govern relationships in that setting, as well as by attributes of the decision environment itself.

Predicting Outcomes Within an Action Arena

Depending upon the analytical structure of a situation and the particular assumptions about the actor used, the analyst makes strong or weak inferences about results. In tightly constrained, one-shot action situations under conditions of complete information, where participants are motivated to select particular strategies or chains of actions that jointly lead to stable equilibria, an analyst can frequently make strong inferences and specific predictions about likely patterns of behavior and outcomes.

When there is no limit on the number of appropriators from a common-pool resource or on the amount of harvesting activities they undertake, for example, one can develop a mathematical model of an open-access, common-pool resource (see, for example, E. Ostrom, Gardner, and Walker 1994). When the net benefits of harvesting to each entrant increase for the initial set of resource units sought and decrease thereafter, each appropriator acting independently tends to make individual decisions that jointly yield a deficient (but stable) equilibrium. A model of an open-access, common-pool resource generates a clear prediction of a race to use up the resource, leading to high social costs. Both field research and laboratory experimental research strongly support the predictions of overuse and potential destruction of open-access, common-pool resources when appropriators do not share access to collective-choice arenas in which to change the open-access structure they face (E. Ostrom, Gardner, and Walker 1994).

Many arenas, however, do not generate such unambiguous results. Instead of making completely independent or autonomous decisions, individuals may be embedded in communities where initial norms of fairness and conservation may change the structure of the situation dramatically. Within these situations,

participants may adopt a broader range of strategies. Further, they may change their strategies over time as they learn about the results of past actions. The institutional analyst examining these more open, less-constrained situations makes weaker inferences and predicts patterns of outcomes that are more-or-less likely to result from a particular type of situation. In laboratory experiments, for example, giving subjects in a common-pool resource situation opportunities to communicate generally increases the joint outcomes they achieve (see E. Ostrom, Gardner, and Walker 1994, and citations contained therein). In field settings, one cannot just assume that helping individuals engage in face-to-face discussions in a few meetings will increase the probability of improved outcomes. There are many factors that affect the likelihood of successful long-term governance of resources. In Dietz, Ostrom, and Stern (2003), for example, we present strong evidence for government-owned forests that fail as well as succeed. Similarly, we find private and common-property forests that are severely overharvested as well as ones that are sustainably managed. Instead of the formal ownership that has been the focus of so much policy analyses, we find that agreement about the legitimacy of boundaries and reliable monitoring are far more likely to lead to higher levels of cooperation by users and to better-governed resources.

In field settings, it is hard to tell where one action arena starts and another stops. Life continues in what appears to be a seamless web as individuals move from home to market to work (action situations typically characterized by reciprocity, by exchange, or by team problem solving or command). Further, within arenas, choices of actions within a set of rules as contrasted to choices among future rules are frequently made without a recognition that the level of action has shifted. So, when a "boss" says to an "employee," "How about changing the way we do X?" and the two discuss options and jointly agree upon a better way, they have shifted from taking actions within previously established rules to making decisions about the rules structuring future actions. In other words, in IAD language, they have shifted to a collective-choice arena.

Evaluating Outcomes

In addition to predicting outcomes, the institutional analyst may evaluate the outcomes that are being achieved as well as the likely set of outcomes that could be achieved under alternative institutional arrangements. Evaluative criteria are applied to both the outcomes and the processes of achieving outcomes. Although there are many potential evaluative criteria, let us briefly focus on (1) economic efficiency, (2) equity through fiscal equivalence, (3) redistributional equity, (4) accountability, (5) conformance to general morality, and (6) adaptability.

Economic Efficiency. Economic efficiency is determined by the magnitude of the change in the flow of net benefits associated with an allocation or reallocation

of resources. The concept of efficiency plays a central role in studies estimating the benefits and costs or rates of return to investments, which are often used to determine the economic feasibility or desirability of public policies. When considering alternative institutional arrangements, therefore, it is crucial to consider how revisions in the rules affecting participants will alter behavior and hence the allocation of resources.

Fiscal Equivalence. There are two principal means of assessing equity: (1) on the basis of the equality between individuals' contributions to an effort and the benefits they derive and (2) on the basis of differential abilities to pay. The concept of equity that underlies an exchange economy holds that those who benefit from a service should bear the burden of financing that service. Perceptions of fiscal equivalence or a lack thereof can affect the willingness of individuals to contribute toward the development and maintenance of resource systems.

Redistributional Equity. Policies that redistribute resources to poorer individuals are of considerable importance. Thus, although efficiency would dictate that scarce resources be used where they produce the greatest net benefit, equity goals may temper this objective; the result is the provision of facilities that benefit particularly needy groups. Likewise, redistributional objectives may conflict with the goal of achieving fiscal equivalence.

Accountability. In a democratic polity, officials should be accountable to citizens concerning the development and use of public facilities and natural resources. Concern for accountability need not conflict greatly with efficiency and equity goals. Indeed, achieving efficiency requires that information about the preferences of citizens be available to decision makers, as does achieving accountability. Institutional arrangements that effectively aggregate this information assist in realizing efficiency at the same time that they serve to increase accountability and to promote the achievement of redistributional objectives.

Conformance to General Morality. In addition to accountability, one may wish to evaluate the level of general morality fostered by a particular set of institutional arrangements. Are those who are able to cheat and go undetected able to obtain very high payoffs? Are those who keep promises more likely to be rewarded and advanced in their careers? How do those who repeatedly interact within a set of institutional arrangements learn to relate to one another over the long term?

Adaptability. Finally, unless institutional arrangements are able to respond to ever-changing environments, the sustainability of resources and investments is likely to suffer. Rural areas of developing countries are often faced with natural

disasters and highly localized special circumstances. If an institutional arrangement is too inflexible to cope with these unique conditions, it is unlikely to prosper. For example, if an irrigation system is centrally controlled and allocates only a specific amount of resources to annual and periodic maintenance, it may not be able to meet the special needs associated with a major flood that destroys a section of the canal system.

Trade-offs are often necessary in using performance criteria as a basis for selecting from alternative institutional arrangements. It is particularly difficult to choose between the goals of efficiency and redistributional equity. The trade-off issue arises most explicitly in considerations of alternative methods of funding public projects. Economically efficient pricing of the use of an existing resource or facility should reflect only the incremental maintenance costs and any external or social costs associated with its use. This is the well-known, efficiency-pricing principle that requires that prices equal the marginal costs of usage. The principle is especially problematic in the case of goods with nonsubtractability attributes. In such instances, the marginal cost of another user's utilizing the good is zero; hence, the efficient price is also zero. Zero user prices, however, require that all sources of resource mobilization be tax-based and thereby induce other kinds of perverse incentives and potential inefficiencies. Evaluating how institutional arrangements compare across overall criteria is quite a challenge. Analytical examination of the likely trade-offs between intermediate costs is valuable in attempts to understand comparative institutional performance (see E. Ostrom, Schroeder, and Wynne 1993, chap. 5).

EXPLANATION: VIEWING ACTION ARENAS AS DEPENDENT VARIABLES

Underlying the way analysts conceptualize action arenas are implicit assumptions about the rules individuals use to order their relationships, about attributes of states of the world and their transformations, and about the attributes of the community within which the arena occurs. Some analysts are not interested in the role of these underlying variables and focus only on a particular arena whose structure is given. On the other hand, institutional analysts may be more interested in one factor affecting the structure of arenas than they are interested in others. Sociologists tend to be more interested in how shared value systems affect the ways humans organize their relationships with one another. Environmentalists tend to focus on various ways that physical and biological systems interact and create opportunities or constraints on the situations human beings face. Political scientists tend to focus more on how specific combinations of rules affect incentives. Rules, states of the world, and the nature of the community all jointly affect the types of actions that individuals can take, the benefits and costs of these actions and resulting outcomes, and the likely outcomes achieved.

The Concept of Rules

Rules are shared understandings among those involved that refer to enforced prescriptions about what actions (or states of the world) are required, prohibited, or permitted.[4] All rules are the result of implicit or explicit efforts to achieve order and predictability among humans by creating classes of persons (positions) that are then required, permitted, or forbidden to take classes of actions in relation to required, permitted, or forbidden states of the world (Crawford and Ostrom 2005; V. Ostrom 1991).

With governance, one needs to ask where the rules that individuals use in action situations originate. In an open and democratic governance system, there are many sources of the rules individuals use in everyday life. It is not considered illegal or improper for individuals to organize themselves and craft their own rules, if the activities they engage in are legal. In addition to the legislation and regulations of a formal central government, there are apt to be laws passed by regional, local, and special governments. Within private firms and voluntary associations, individuals are authorized to adopt many different rules about who is a member of the firm or association, how profits (benefits) are to be shared, and how decisions will be made. Each family constitutes its own rule-making body.

When individuals genuinely participate in the crafting of multiple layers of rules, some of that crafting will occur using pen and paper. Much of it, however, will occur as problem-solving individuals interact to figure out how to do a better job in the future than they have done in the past. Colleagues in a work team are crafting their own rules when they might say to one another, "How about if you do A in the future, and I will do B, and before we ever make a decision about C again, we both discuss it and make a joint decision?" In a democratic society, problem-solving individuals do this all the time. They also participate in less fluid decision-making arrangements, including elections to select legislators.

Thus, when we do a deeper institutional analysis, we attempt first to understand the working rules that individuals use in making decisions. Working rules are the set of rules to which participants would make reference if asked to explain and justify their actions to fellow participants. Although following a rule may become a "social habit," it is possible to make participants consciously aware of the rules they use to order their relationships. Individuals can consciously decide to adopt a different rule and change their behavior to conform to such a decision. Over time, behavior in conformance with a new rule may itself become habitual (see Shimanoff 1980; Toulmin 1974; Harré 1974). The capacity of humans to use complex cognitive systems to order their own behavior at a relatively subconscious level makes it difficult for empirical researchers to ascertain what the working rules for an ongoing action arena may be.

Once we understand the working rules, then, we attempt to understand where those rules come from. In a system governed by a "rule of law," the general legal framework in use will have its source in actions taken in constitutional, legislative,

and administrative settings augmented by decisions taken by individuals in many different particular settings. In other words, the rules-in-form are consistent with the rules-in-use (Sproule-Jones 1993). In a system that is not governed by a "rule of law," there may be central laws and considerable effort made to enforce them, but individuals attempt to evade rather than obey the law.

Rule-following or conforming actions are not as predictable as biological or physical behavior explained by scientific laws. All rules are formulated in human language. Therefore, rules share the problems of lack of clarity, misunderstanding, and change that typify any language-based phenomenon (V. Ostrom 1997, 1999). Words are always more simple than the phenomenon to which they refer.

The stability of rule-ordered actions depends upon the shared meaning assigned to the words used to formulate a set of rules. If no shared meaning exists when a rule is formulated, confusion will result about what actions are required, permitted, or forbidden. Regularities in actions cannot result if those who must repeatedly interpret the meaning of a rule within action situations arrive at multiple interpretations. "[R]ules are not self-formulating, self-determining, or self-enforcing" (V. Ostrom 1999, p. 383), thus human agents must formulate them, apply them in particular situations, and attempt to enforce performance consistent with them. Even if shared meaning exists at the time of the acceptance of a rule, transformations in technology, in shared norms, and in general circumstances change the events to which rules apply: "Applying language to changing configurations of development increases the ambiguities and threatens the shared criteria of choice with an erosion of their appropriate meaning" (V. Ostrom 1999, p. 383).

What rules are important for institutional analysis? A myriad of specific rules are used in structuring complex action arenas. Scholars have been trapped into endless cataloging of rules unrelated to any method of classification useful for theoretical explanations. But classification is a necessary step in developing a science. Anyone attempting to define a useful typology of rules must be concerned that the classification is more than a method for imposing superficial order onto an extremely large set of seemingly disparate rules. The way we have tackled this problem using the IAD framework is to classify rules according to their impact on the elements of an action situation.

Rule Configurations

A first step toward identifying the working rules can be made, then, by overtly examining how working rules affect each of the variables of an action situation. A set of working rules that affects these variables should constitute the minimal but necessary set of rules needed to offer an explanation of actions and results used by participants to order their relationships within an action arena. Because states of the world and their transformations and the nature of a community also affect the structure of an action situation, working rules alone never provide both a necessary and a sufficient explanation of the structure of an action situation and results.

If this view of the task is adopted, seven types of working rules can be said to affect the structure of an action situation. These are entry and exit rules, position rules, scope rules, authority (or choice) rules, aggregation rules, information rules, and payoff rules. The cumulative effect of these seven types of rules affects the seven elements of an action situation.

Entry and exit rules affect the number of participants, their attributes and resources, whether they can enter freely, and the conditions they face for leaving. Position rules establish positions in the situation. Authority rules assign sets of actions that participants in positions at particular nodes must, may, or may not take. Scope rules delimit the potential outcomes that can be affected and, working backward, the actions linked to specific outcomes. Authority rules, combined with the scientific laws about the relevant states of the world being acted upon, determine the shape of the decision tree, that is, the action-outcome linkages. Aggregation rules affect the level of control that a participant in a position exercises in the selection of an action at a node. Information rules affect the knowledge-contingent information sets of participants. Payoff rules affect the benefits and costs that will be assigned to particular combinations of actions and outcomes, and they establish the incentives and deterrents for action. The set of working rules is a configuration in the sense that the effect of a change in one rule may depend upon the other rules-in-use.

Let us return to the example of conducting an analysis of common-pool resources discussed earlier. Now we will focus on a series of questions that are intended to assist the analyst to get at the rules-in-use that help structure an action situation. Thus, to understand these rules, one would begin to ask questions such as:

- Entry and exit rules: Are the appropriators from this resource limited to local residents; to one group defined by ethnicity, race, caste, gender, or family structure; to those who win a lottery; to those who have obtained a permit; to those who own required assets (such as a fishing berth or land); or, in some other way, to a class of individuals that is bounded? Is a new participant allowed to join a group by some kind of entry fee or initiation? Must an appropriator give up rights to harvest upon migrating to another location?
- Position rules: How does someone move from being just a "member" of a group of appropriators to someone who has a specialized task, such as a water distributor-guard?
- Scope rules: What understandings do these appropriators and others have about the authorized or forbidden geographic or functional domains? Do any maps exist showing who can appropriate from which region? Are there understandings about resource units that are "off-limits" (e.g., the historical rules in some sections of Africa that particular acacia trees could not be cut down even on land owned privately or communally)?

- Authority rules: What understandings do appropriators have about mandatory, authorized, or forbidden harvesting technologies? For fishers, must net size be of a particular grossness? Must forest users use some cutting tools and not others? What choices do various types of monitors have related to the actions they can take?
- Aggregation rules: What understandings exist concerning the rules affecting the choice of harvesting activities? Do certain actions require prior permission from, or agreement of, others?
- Information rules: What information must be held secret, and what information must be made public?
- Payoff rules: How large are the sanctions that can be imposed for breaking any of the rules identified above? How is conformance to rules monitored? Who is responsible for sanctioning nonconformers? How reliably are sanctions imposed? Are any positive rewards offered to appropriators for any actions they can take (e.g., is someone who is an elected official relieved of labor duties)?

The problem for the field researcher is that many rules-in-use are not written down. Nor can the field researcher simply take surveys, asking a random sample of respondents about their rules. Many of the rules-in-use are not even conceptualized by participants as rules. In settings where the rules-in-use have evolved over long periods of time and are understood implicitly by participants, obtaining information about rules-in-use requires spending time at a site and learning how to ask nonthreatening, context-specific questions about rule configurations.[5]

Attributes of States of the World: Physical and Material Conditions

Although a rule configuration affects all of the elements of an action situation, some of the variables of an action situation are also affected by attributes of the physical and material world. What actions are physically possible, what outcomes can be produced, how actions are linked to outcomes, and what is contained in the actors' information sets are affected by the world being acted upon in a situation. The same set of rules may yield entirely different types of action situations depending upon the types of events in the world being acted upon by participants.

The attributes of states of the world and their transformation are explicitly examined when the analyst self-consciously asks a series of questions about how the world being acted upon in a situation affects the outcome, action sets, action-outcome linkages, and information sets in that situation. The relative importance of the rule configuration and states of the world in structuring an action situation varies dramatically across different types of settings. The rule configuration almost totally constitutes some games, like chess, where physical attributes are relatively unimportant. The relative importance of working rules to attributes of the world also varies dramatically within action situations

considered part of the public sector. Rules define and constrain voting behavior inside a legislature more than attributes of the world. Voting can be accomplished by raising hands, by paper ballots, by calling for the ayes and nays, by marching before an official counter, or by installing computer terminals for each legislator, on which votes are registered. However, in regard to organizing communication within a legislature, attributes of the world strongly affect the available options. The principle that only one person can be heard and understood at a time in any one forum strongly affects the capacity of legislators to communicate effectively with one another (see V. Ostrom 2007a, 2007b).

Let us consider several attributes frequently used to distinguish goods and services that are more effectively provided by diverse institutional arrangements. Goods that are generally considered "public goods" yield nonsubtractive benefits that can be enjoyed jointly and simultaneously by many people who are hard to exclude from obtaining these benefits. Common-pool resources yield benefits where beneficiaries are hard to exclude, but each person's use of a resource system subtracts units of that resource from a finite total available for harvesting.

Excludability and the Free-Rider Problem. When it is difficult or costly to exclude beneficiaries from a good once it is produced, it is frequently assumed that such a good must be provided publicly, rather than privately. When the benefits of a good are available to a group, whether or not members of the group contribute to the provision of the good, that good is characterized by problems with excludability. Where exclusion is costly, those wishing to provide a good or service face a potential free-rider or collective-action problem (Olson 1965). Individuals who gain from the maintenance of an irrigation system, for example, may not wish to contribute labor or taxes to maintenance activities, hoping that others will bear the burden. This is not to say that all individuals will free-ride whenever they can. A strong incentive exists, however, to be a free-rider in all situations where potential beneficiaries cannot easily be excluded for failing to contribute to the provision of a good or service.

When it is costly to exclude individuals from enjoying benefits from a common-pool resource or an infrastructure facility, private, profit-seeking entrepreneurs, who must recoup their investments through quid pro quo exchanges, have few incentives to provide such services on their own initiative. Excludability problems can thus lead to the problem of free-riding, which in turn leads to underinvestment in capital and its maintenance.

Public sector provision of common-pool resources or infrastructure facilities raises additional problems in determining preferences and organizing finances. When exclusion is of low cost to the supplier, preferences are revealed as a result of many quid pro quo transactions. Producers learn about preferences through the consumers' willingness to pay for various goods offered for sale. Where exclusion is difficult, designing mechanisms that honestly reflect beneficiaries' preferences and their willingness to pay is complex, regardless of whether the providing

unit is organized in the public or the private sphere. In very small groups, those affected are usually able to discuss their preferences and constraints face-to-face and to reach a rough consensus. In larger groups, decisions about infrastructure are apt to be made through mechanisms such as voting or the delegation of authority to public officials. The extensive literature on voting systems demonstrates how difficult it is to translate individual preferences into collective choices that adequately reflect individual views (Arrow 1951; Shepsle 1979; Buchanan and Tullock 1962).

Another attribute of goods with excludability problems is that, once they are provided, consumers may have no choice whatsoever as to whether they will consume them. An example is the public spraying of insects. If an individual does not want this public service to be provided, there are even stronger incentives not to comply with a general tax levy. Thus, compliance with a broad financing instrument may, in turn, depend upon the legitimacy of the public-choice mechanism used to make provision decisions.

Subtractability of the Flow. Jointly used infrastructure facilities can generate a flow of services entirely subtractable upon consumption by one user; in other instances, consumption by one does not subtract from the flow of services available to others. The withdrawal of a quantity of water from an irrigation canal by one farmer means that there is that much less water for anyone else to use. Most agricultural uses of water are fully subtractive, whereas many other uses of water—such as for power generation or navigation—are not. Most of the water that passes through a turbine to generate power, for instance, can be used again downstream. When the use of a flow of services by one individual subtracts from what is available to others, and when the flow is scarce relative to demand, users will be tempted to obtain as much as they can of the flow for fear that it will not be available later.

Effective rules are required if scarce, fully subtractive service flows are to be allocated productively. Charging prices for subtractive services obviously constitutes one such allocation mechanism. Sometimes, however, it is not feasible to price services. In these instances, some individuals will be able to grab considerably more of the subtractive services than others, thereby leading to noneconomic uses of the flow and high levels of conflict among users.

Allocation rules also affect the incentives of users to maintain a system. Farmers located at the tail end of an irrigation system that lacks effective allocation rules have little motivation to contribute to the maintenance of that system because they only occasionally receive their share of water. Similarly, farmers located at the head of such a system are not motivated to provide maintenance services voluntarily because they will receive disproportionate shares of the water whether or not the system is well maintained (E. Ostrom 1996b).

Consequently, for common-pool resources whose flows are highly subtractive, institutional arrangements related to the allocation of the flow of services are

intimately tied to the sustainability of the resource. It is highly unlikely that one can achieve sustainability without careful attention to the efficiency, fairness, and enforceability of the rules specifying who can appropriate how much of the service flow, at what times and places, and under what conditions. Furthermore, unless responsibilities are linked in a reasonable fashion to benefits obtained, the beneficiaries themselves will resist efforts to insist that they take on responsibilities.

Additional Attributes. In addition to these general attributes of physical and material conditions affecting the incentives of participants, resource systems are also characterized by a diversity of other attributes that affect how rules combine with physical and material conditions to generate positive or negative incentives. Whether resource units are mobile or stationary and whether storage is available somewhere in a system affect the problems that individuals governing and managing common-pool resources face (Schlager, Blomquist, and Tang 1994). The problems of regulating a lobster fishery, for example, are much simpler than those of regulating a salmon fishery. Similarly, allocating water predictably and efficiently is easier to achieve when there is some storage in the system than when it is a run-of-the-river system.

If a natural resource system is renewable, such as many groundwater basins, the relevant time horizon for sustaining use is very long, and achieving appropriate rules may mean the difference between creating a sustainable conjunctive-use system and destroying a groundwater basin. Devising an effective set of rules for regulating the use of an oil pool, on the other hand, involves determining an optimal path for mining a resource. The cost of withdrawing the last units of oil will be much higher if producers have not coordinated their withdrawal patterns, but the lack of a future may produce insufficient incentives to achieve adequate regulation early in the development phase.

The size of a resource system can also have a major impact on the incentives facing participants. The length and slope of a main canal of an irrigation system affect not only the cost of its maintenance but also the strategic bargaining that exists between those at the head and those at the end of an irrigation system (Lam 1998; E. Ostrom 1996b). Increasing the number of participants is associated with increased transaction costs. How steeply the costs rise depends, to a large extent, on the rules-in-use and the heterogeneity of the users.

The productivity, predictability, and patchiness of a resource affect the likelihood that private-property arrangements will be successful and enhance the likelihood that common-property arrangements will be necessary (Netting 1982). Similarly, the resilience of a multispecies ecosystem affects the sensitivity of the system both to the rules used to govern the particular system and to changes in economic or environmental conditions elsewhere (Holling 1994). These additional attributes are slowly being integrated into a body of coherent theory about the impact of physical and material conditions on the structure of

the situations that individuals face and their resulting incentives and behavior. Analysts diagnosing resource problems need to be sensitive to the very large difference among resource settings and the need to tailor rules to diverse combinations of attributes rather than trying to achieve some assumed uniformity across all resources in a particular sector within a country.

Attributes of the Community

A third set of variables that affect the structure of an action arena relates to the community. The attributes of a community that are important in the structure of an action arena include the norms of behavior generally accepted in the community, the level of common understanding that potential participants share about the structure of particular types of action arenas, the extent of homogeneity in the preferences of those living in a community, and the distribution of resources among those affected. The term "culture" is frequently applied to this bundle of variables.

For example, when all appropriators from a common-pool resource share a common set of values and interact with one another in a multiplex set of arrangements, the probabilities of their developing adequate rules and norms to govern resources are much greater (Taylor 1987). The importance of building a reputation for keeping one's word is important in such a community, and the cost of developing monitoring and sanctioning mechanisms is relatively low. If the appropriators from a resource come from many different communities and are distrustful of one another, the task of devising and sustaining effective rules is substantially more difficult.

Whether individuals use a written vernacular language to express their ideas, develop a common understanding, share learning, and explain the foundation of their social order is also a crucial variable of relevance to institutional analysis (V. Ostrom 1997). Without a written vernacular language, individuals face considerably more difficulties in accumulating their own learning in a usable form to transmit from one generation to the next.

LINKING ACTION ARENAS

In addition to analysis that digs deeper into the factors affecting individual action arenas, an important development in institutional analysis is the examination of linked arenas. Whereas the concept of a "single" arena may include large numbers of participants and complex chains of action, most of social reality is composed of multiple arenas linked sequentially or simultaneously. The chapters in this volume that address policy subsystems examine multiple linked action arenas at all three levels of analysis (see Chapter 7 by Sabatier and Weible).

When individuals wish to change the structure of incentives and deterrents faced by participants in socially constructed realities to guide (or control) participants

toward a different pattern of results, they do so by attempting to change the rules participants use to order their interactions within particular types of action arenas. Some interesting and important institutional arrangements for coordinating complex chains of actions among large numbers of actors involve multiple organizations competing with one another according to a set of rules. Markets are the most frequently studied institutional arrangements that achieve coordination by relying primarily on rule-governed competitive relationships among organizations. Rule-governed competition among two or more political parties is considered by many analysts an important requisite for a democratic polity. Less studied, but potentially as important a means for achieving responsiveness and efficiency in producing public goods and services, are arrangements that allow rule-ordered competition among two or more potential producers of public goods and services.

MULTIPLE LEVELS OF ANALYSIS

Besides multiple and nested action arenas at any one level of analysis, nesting of arenas also occurs across several levels of analysis. All rules are nested in another set of rules that define how the first set of rules can be changed. The nesting of rules within rules at several levels is similar to the nesting of computer languages at several levels. What can be done at a higher level will depend on the capabilities and limits of the rules (or the software) at that level and at a deeper level. Whenever one addresses questions about institutional change, as contrasted to action within institutional constraints, it is necessary to recognize the following:

1. Changes in the rules used to order action at one level occur within a currently "fixed" set of rules at a deeper level.
2. Changes in deeper-level rules usually are more difficult and more costly to accomplish; thus, there is an increased stability in the mutual expectations of individuals interacting according to a set of rules.

It is useful to distinguish three levels of rules that cumulatively affect the actions taken and outcomes obtained in any setting (Kiser and Ostrom 1982). Operational rules directly affect day-to-day decisions made by the participants in any setting. Collective-choice rules affect operational activities and results through their effects in determining who is eligible and the specific rules to be used in changing operational rules. Constitutional-choice rules affect operational activities and their effects in determining who is eligible and the rules to be used in crafting the set of collective-choice rules that in turn affect the set of operational rules. There is even a "metaconstitutional" level underlying all the others that is not frequently analyzed. One can think of the linkages among these rules and the related level of analysis as shown in Figure 2.2.

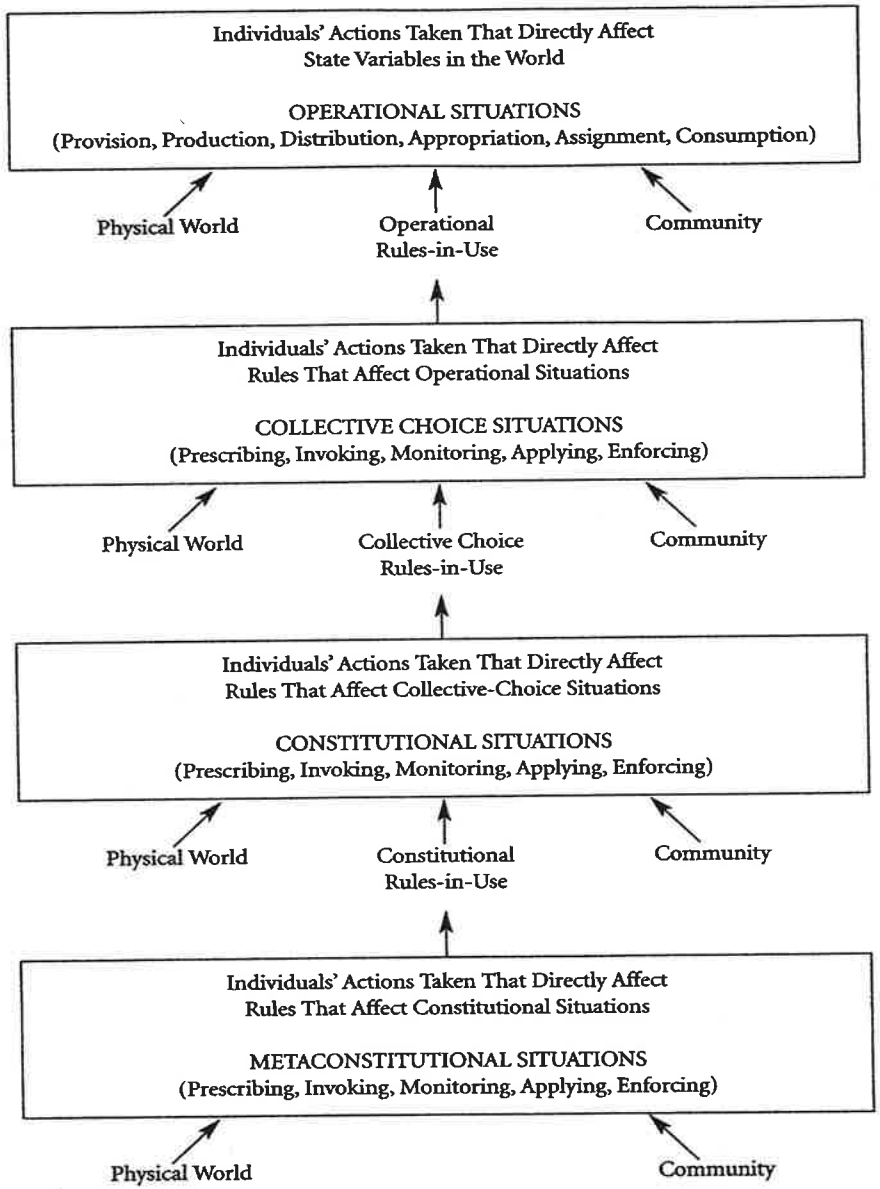

FIGURE 2.2 Levels of Analysis and Outcomes

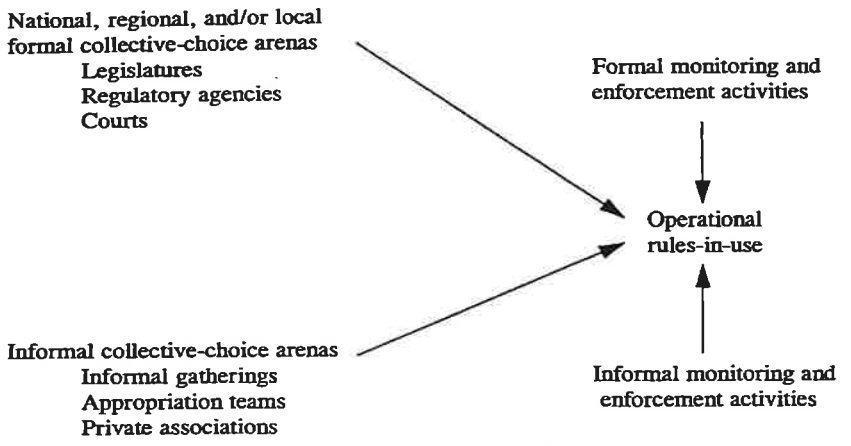

FIGURE 2.3 Relationships of Formal and Informal Collective-Choice Arenas
SOURCE: E. Ostrom (1990, p. 53)

At each level of analysis, there may be one or more arenas in which the types of decisions made at that level will occur. In the collective-choice, constitutional, and metaconstitutional situations, activities involve prescribing, invoking, monitoring, applying, and enforcing rules (Lasswell and Kaplan 1950). The concept of an arena, as described earlier, does not imply a formal setting but can include such formal settings as legislatures and courts. Policymaking (or governance) regarding the rules that will be used to regulate operational-level choices is usually carried out in one or more collective-choice arenas, as shown in Figure 2.3.

USES OF THE IAD FRAMEWORK

The IAD framework is thus a general language about how rules, physical and material conditions, and attributes of community affect the structure of action arenas, the incentives that individuals face, and the resulting outcomes. It has been used extensively in teaching (see, for example, Auer 2006; and Y673 syllabus for Fall 2006 at http://www.indiana.edu/~workshop/seminars/y673_fall_2006_syllabus.pdf). In addition to seminars regularly offered for PhD students and visiting scholars at the Workshop, we are pleased to note the large number of doctoral dissertations written by students at Indiana University and at other universities applying the IAD framework to a broad diversity of topics.[6]

In the early 1970s, when the IAD framework was first being developed, we were trying to understand how the diverse paradigms in political science affected the way we conceptualized both public administration and metropolitan organization (see V. Ostrom and Ostrom 1971; E. Ostrom 1972). Then, for a decade and a

half, we used the nascent framework as a foundation for the conduct of an extensive number of empirical studies of police service delivery in metropolitan areas.

In crafting empirical studies using the IAD framework, a key question has always been the appropriate units and levels of analysis for any particular type of question (see Gregg 1974). For example, when we studied police services, the police department was only one of the units of analysis included in our work. Instead of assuming that the entire department was the appropriate unit, we tried to understand who the actors involved were in diverse service situations, such as immediate response services, homicide investigation, laboratory analysis, training, and communication services. We found different sets of actors involved in each of the service situations. In some, citizens as well as police officers as street-level bureaucrats were key participants. In others, we found participants from many different urban service agencies. We had to examine interorganizational arrangements to understand patterns of interaction and results. Using this perspective, we found highly structured patterns of relationships where others had found only chaos.

The highest levels of police performance existed, for example, in those metropolitan areas where small-scale, immediate-response units worked along with large-scale investigatory, laboratory, and communication units (Parks 1985). Ongoing research by Roger B. Parks in the Indianapolis area is providing strong evidence that many of the patterns we observed in the 1970s and 1980s were still in evidence in the 1990s. Efforts to understand who was involved in producing public safety led us to formulate a theory of coproduction of urban public services (Parks et al. 1982; Percy 1984; Kiser 1984; Whitaker 1980). The theory of coproduction has now been applied to a wider set of phenomena (Lam 1996; Pritchett and Filmer 1997; E. Ostrom 1996b). In light of the extensive empirical research, colleagues were able to achieve a far better understanding of the patterns of metropolitan organization and local government more generally (ACIR 1987, 1988; V. Ostrom, Bish, and Ostrom 1988; Oakerson and Parks 1988; Parks and Oakerson 1989; Stein 1990). More recently, colleagues at other universities have returned to the study of metropolitan organization, and their findings are in large part consistent with our earlier work (Carr and Feiock 2004).

The second broad area in which the IAD framework has played an important organizing role has been the study of common-pool resources. In the mid-1980s, the National Research Council (NRC) organized a research panel on the study of common property (National Research Council 1986). Ronald Oakerson (1992) wrote a framework paper for the panel that was used in the organization of a series of case studies on how diverse people had devised institutional arrangements related to common-pool resources (see also Thomson, Feeny, and Oakerson 1992; E. Ostrom 1992). Oakerson's presentation of the framework has influenced an untold number of studies of common-property regimes in many diverse sectors in all regions of the world. After that conference, we began building a library and bibliography on the commons that continue to this day.[7] The NRC returned

to the study of common-pool resources to provide an important update of cumulative knowledge with its report on *The Drama of the Commons* in 2002. The intellectual productivity stimulated by the work of the NRC panels has led to the formation of an International Association for the Study of Common Property (IASCP). More than eight hundred scholars attended the biennial meeting of the association held in Oaxaca, Mexico, in August 2004, and a similar number attended the meeting in Bali, Indonesia, in June of 2006.

Colleagues at Indiana University have developed a theory of common-pool resources and a series of theoretical models of appropriation from a common-pool resource and have tested these in the field as well as in the experimental laboratory setting (see E. Ostrom, Gardner, and Walker 1994; E. Ostrom, Walker, and Gardner 1992; Walker and Gardner 1992; Hackett, Schlager, and Walker 1994). Weissing and Ostrom (1991, 1993) developed a series of models focusing on how actions taken by appropriators were monitored. Predictions from these models have been independently tested by other scholars in their own experimental laboratories or by conducting field experiments (Casari and Plott 2003; Cardenas 2000; Falk, Fehr, and Fischbacher 2002). When laboratory subjects are not allowed to communicate, their behavior closely approximates the behavior that is predicted by finitely repeated, noncooperative game theory. When subjects are allowed to communicate or to use sanctioning mechanisms, the behavior observed in the lab is not consistent with these theoretical models but is similar to what we have observed in field settings. It is also important to note that the impact of a system imposed from outside tends to crowd the benefits of a self-imposed set of sanctions (Cardenas, Stranlund, and Willis 2000). We have consequently developed a theory of how boundedly rational individuals use heuristics such as "measured responses" to stabilize agreements achieved in settings where there are no external enforcers to impose rules on participants (E. Ostrom, Gardner, and Walker 1994).

The IAD framework has now been used to develop three major databases related to the study of common-pool resources and diverse property regimes. The first "Common-Pool Resource (CPR) Database" drew on the cases produced for the NRC panel and on the extremely large number of individual case studies that we discovered had been written by historians, sociologists, engineers, political scientists, anthropologists, and students of environmental science (Hess 2006). We used the IAD framework overtly to create a structured database for appropriation and collective-choice arenas. Schlager (1994) and Tang (1991, 1992) studied approximately fifty inshore fisheries and irrigation systems, respectively, and were able to isolate key rules that were positively associated with higher performance levels. In *Governing the Commons* (1990), I was able to draw on the framework and on an analysis of the extensive case studies we were all reading at that time to elucidate some aspects of a theory of common-pool resources. In particular, I examined the key design principles that characterized robust, self-organized institutions for achieving sustainable resource use of very long periods of time as well as for developing an initial theory of institutional change.

The second database focused entirely on irrigation systems and has been used to code more than 175 irrigation systems in Nepal (Benjamin et al. 1994). That database has enabled us to test many propositions growing out of both our own theoretical efforts and those of development scholars more generally (see Adhikari, Pandit, and Schweik 1997; Lam 1998; E. Ostrom, Lam, and Lee 1994; E. Ostrom and Gardner 1993; E. Ostrom 1994, 1996a). We have been able to challenge many of the empirical assumptions used by development scholars who have presumed that farmers are unable to self-organize and engage in costly collective action without the imposition of rules from external authorities (see also Thomson 1992). We have found that farmer-managed irrigation systems in Nepal are able to outperform agency-managed systems in regard to agricultural productivity when we have controlled for factors such as size of group, length of canal, and type of terrain (Lam 1998; Shivakoti and Ostrom 2002). Our findings are supported by research conducted in other countries of Asia (Shivakoti and Ostrom, forthcoming).

The third database is an integral part of the International Forestry Resources and Institutions (IFRI) research program, which is a major, ongoing research program coordinated by the Workshop in Political Theory and Policy Analysis, the Center for the Study of Institutions, Population, and Environmental Change (CIPEC) at Indiana University, and the School of Natural Resources and the Environment at the University of Michigan. This research program is designed to address knowledge and information gaps about how institutions affect the incentives of forest users that result in substantial levels of deforestation in some locations, whereas forest conditions are improving in other locations (E. Ostrom and Wertime 2000). Collaborative research centers have now been established in Bolivia, Colombia, Guatemala, India, Kenya, Mexico, Nepal, Tanzania, Thailand, Uganda, and the United States.

In Uganda, Banana and Gombya-Ssembajjwe (2000) showed in their initial studies that the only forests where deforestation is not extensive are those where local institutional arrangements are viewed by local residents as legitimate and are monitored extensively. In their study of a *comuna* in Ecuador, Gibson and Becker (2000) documented the importance of distance from a forest as it affects the costs that villagers have to pay to actively monitor and enforce rules even when they have full authority to make and enforce their own rules. In India, Agrawal (2000) provided an empirical challenge to the presumption of many scholars that collective action becomes progressively more difficult as the size of the group increases from a very small face-to-face group. He showed that moderate-sized villages are better able to generate the labor needed to protect local forests than are very small villages. Schweik (2000) examined the geographic distribution of *Shorea robusta*, a highly valued species in Nepal. He found that neither the population density of the villages adjacent to the three forests he studied in Nepal nor predictions by optimal foraging theory adequately predicted the spatial distribution of the species. The most robust

explanation for the distribution of this species relates to the institutional rules that allow higher-caste villagers to access their "own" forests as well as forests located near the villages where lower-caste villagers live, but not vice versa.

Many of our initial studies of single sites were brought together in Gibson, McKean, and Ostrom (2000), where we also outlined the research methods used by the IFRI research program. Now, more studies are able to examine multiple sites within a single country (Varughese and Ostrom 2001). Agrawal and Ostrom (2001) compare the decentralization programs in India and Nepal related to forests. Andersson (2004) analyzes the results of decentralization of policies related to forests for local municipalities in Bolivia. He finds that one of the most important factors affecting the success of decentralization is when municipal-level officials are in strong contact with *both* national-level officials (the level above) and user groups and/or NGOs at a local level (the level below). Without recognizing the multiple levels involved in most policy arenas, the important findings of this study would not have been achieved, because one has to have an appropriate framework for asking the right questions of the right people at the right levels.

Recent studies of close to two hundred forests throughout the world have provided some strong evidence on the importance of the users of a forest—rather than an official guard hired by government agencies—undertaking regular monitoring of forest users and sanctioning of those who break accepted rules (Gibson, Williams, and Ostrom 2005). Hayes and Ostrom (2005) strongly challenge the presumption that the best way to bring deforestation under control is to impose national government ownership. In our cross-national comparison of forest vegetation density as measured in seventy-six legally designated, government-owned and protected areas and contrasted to eighty-seven forests that are not so designated, we found no statistical difference between parks and non-parks. The official parks that were best protected were those that authorized the users themselves to make and enforce some of their own rules. Poteete and Ostrom (2004a, 2004b) compare the findings from multiple IFRI studies with a specific focus on the role of heterogeneity and group size on collective action. They find that a simple relationship between these attributes of groups and outcomes is not present across multiple IFRI studies. Rather, institutional arrangements affect whether there is a positive or negative relationship or no relationship at all.

In addition to the aforementioned research programs, the IAD framework has also influenced a variety of other studies, including those developing models of social-choice situations and then subjecting them to empirical tests in experimental laboratories (Herzberg 1986; Wilson and Herzberg 1987; Herzberg and Wilson 1988; Herzberg and Ostrom 1991). Other empirical questions include the study of rural infrastructure in developing countries (E. Ostrom, Schroeder, and Wynne 1993); privatization processes (S. Walker 1994a, 1994b); development processes more generally (V. Ostrom, Feeny, and Picht 1993; Wunsch and Olowu 1995; Shivakumar 2005); constitutional dynamics in the American federal system (Jillson and Wilson 1994; V. Ostrom 1991, 2006, 2007b), as well as in the Canadian federal system (Sproule-Jones 1993); and the linking of local and global commons (McGinnis and Ostrom, forthcoming; Keohane and Ostrom 1995).

In recent years, the IAD framework has proved useful in analyzing several new domains. Among these new foci are: the study of social-ecological systems (Imperial 1999; Anderies, Janssen, and Ostrom 2004); the use of agent-based models of behavior within diverse institutional arrangements (Janssen 2002), including behavior within experimental laboratories (Jager and Janssen 2002); the potential role of bioprospecting in preserving biodiversity (Polski 2005); the study of micro-biological commons (Dedeurwaerdere, forthcoming); the study of the success and failure of cooperatives (E. Jones 2003); the study of fisheries policy (Imperial and Yandle 2005); reviews of the knowledge commons in a digital age (Hess and Ostrom 2003, 2007; Schweik 2005); the development of partnerships among public agencies (Lubell et al. 2002; Heikkila and Gerlak 2005); the role of entrepreneurship in collective action (Kuhnert 2001); and the role of institutional incentives in the relationship of international aid agencies and recipient countries (Gibson, Andersson, et al. 2005).

The IAD framework has thus influenced the analysis of a wide diversity of questions, including how institutions are organized for the provision and production of urban policing and education, primary health care, fertilizer, coffee, roads, irrigation, fisheries, forest resources, and common-pool resources more generally. Empirical work has been carried on in Bangladesh, Bolivia, Brazil, Cameroon, China, Ecuador, Ghana, Guatemala, Hong Kong, India, Indonesia, Ivory Coast, Kenya, Liberia, Madagascar, Mali, Mexico, Nepal, Nigeria, Norway, Poland, Sweden, Taiwan, Uganda, and the United States.

ASSESSING THE VALUE OF THE IAD FRAMEWORK

Obviously those of us who have worked hard to develop the IAD framework over the years and have applied it to many policy questions in both public and private sectors see substantial value in having a common meta-theoretical language for analyzing and testing hypotheses about behavior in diverse situations at multiple levels of analysis. At an earlier time, our work was not well understood or received, and it was somewhat difficult to publish books by Workshop authors with distinguished presses. As shown in Table 2.1, however, the recent publication record of Workshop colleagues has been substantial. Thirty-three books have been published by Workshop authors using institutional analysis since the first publication of Paul Sabatier's *Theories of the Policy Process.*

TABLE 2.1 Books Published Since 1999 by Workshop Colleagues Applying Institutional Analysis*

Author	Topic
1. McGinnis, 1999a, 1999b, 2000	Collected Workshop papers on many topics
2. Oakerson, 1999	Governance of local public economies
3. Prakash, 2000	Corporate responses to environmental challenges
4. Gibson, McKean, and Ostrom, 2000	Applies IAD to comparative study of forests and institutions
5. Costanza et al., 2001	Analyzing ecosystem–human system interactions
6. Bickers and Williams, 2001	Public policy text with integrating institutional analysis
7. Sabetti, 2002	Village politics and the mafia in Sicily
8. Koontz, 2002	Comparative study of national and state resource policies
9. Ayo, 2002	Entrepreneurship and institutions of the Yoruba people of Nigeria
10. Janssen, 2002	Use of agent-based models to study complex ecosystems
11. E. Ostrom and Walker, 2003	Experimental research related to trust and reciprocity
12. Obolonsky, 2003	Institutional analysis of change in Russian political history
13. Acheson, 2003	Institutions for governing Maine's lobster industry
14. Polski, 2003	Banking reform in the United States
15. E. Ostrom and Ahn, 2003	Foundations of social capital
16. Dolšak and Ostrom, 2003	The commons in the new millennium
17. Olowu and Wunsch, 2004	Democratic decentralization in Africa
18. Blomquist, Schlager, and Heikkila, 2004	Water institutions and policy in Arizona, California, and Colorado
19. Ghate, 2004	Community-initiated forest resources management in India
20. Agrawal, 2005	Environmental policy focused on forest institutions in India
21. Allen, 2005	Foundations of Tocqueville's analysis of covenant and democracy
22. Eggertsson, 2005	Limits of institutional reform
23. Gellar, 2005	Tocquevillian analysis of democracy in Senegal
24. Gibson et al., 2005	Political economy of international development assistance
25. Moran and Ostrom, 2005	Human-environment interactions in forested ecosystems
26. E. Ostrom, 2005	Explication of the IAD framework
27. Shivakoti et al., 2005	Asian irrigation in transition
28. Sawyer, 2005	Struggle to gain democratic governance in Liberia
29. Shivakumar, 2005	Potential for creating bottom-up institutions in developing countries
30. Ørebech et al., 2005	Role of customary law related to sustainable development
31. Guha-Khasnobis, Kanbur, and Ostrom, 2006	Relation of formal and informal institutions in developing countries
32. Hess and Ostrom, 2007	Understanding knowledge as a commons
33. Webb and Shivakoti, 2007	Community adaptations under changing forest policy

* Faculty associates at Indiana University and elsewhere, visiting scholars, and workshop doctoral students.

Two recent conferences organized by colleagues at other universities provide substantial evidence regarding the usefulness of the IAD framework and related concepts for scholars in diverse disciplines. Peter J. Boettke of the Mercatus Center at George Mason University organized a conference on "Polycentric Political Economy: Essays in Honor of Elinor and Vincent Ostrom" in November 2004. This was on the occasion of a lifetime achievement award to both Ostroms by the Fund for the Study of Spontaneous Orders. Boettke has now edited a special issue of the *Journal of Economic Behavior and Organization* published in June of 2005. In that journal issue, Boettke and Coyne (2005) wrote a general introduction to the research program of the Workshop in Political Theory and Policy Analysis, and Paul Aligica (2005) extended their analysis to apply more generally to economic development policies. Richard Wagner (2005) then focused in on Vincent Ostrom's work on self-governance, polycentrism, and federalism, and Tom Dietz (2005) examined the Darwinian trope in the drama of the commons. Excellent replies and commentaries were made by Michael McGinnis, Roberta Herzberg, Sujai Shivakumar, Clark Gibson, Mark Sproule-Jones, Amos Sawyer, and Peter Leeson. Scholars wishing to gain an introductory overview of the institutional analysis approach would find this issue of the *Journal of Economic Behavior and Organization* of considerable interest. Those wishing an in-depth presentation of the IAD framework may wish to tackle my recent book (E. Ostrom 2005).

The second conference was organized in January of 2005 on "Institutional Analysis for Environmental Decision-Making" at the Fort Collins Science Center by scholars associated with the U.S. Geological Survey in Fort Collins. In addition to a focus on the IAD framework, the conference organizers also wanted participants to examine the Legal-Institutional Analysis Model (LIAM) and the Advocacy Coalition Framework (ACF). The focus of the conference was on environmental decision making. The organizers hoped "to advance social science theory and methods and improve practical applications for natural resource and environmental managers and planning teams" by exploring the tools of institutional analysis contained in a large number of papers presented at the meeting. It was intended that the results from the meeting would be published as a Scientific Investigations Report of the U.S. Geological Survey. At this time, it appears likely that the IAD framework will continue to provide a foundation for a variety of policy studies and itself be subject to improvement over the years.

NOTES

This chapter was originally based on a paper presented at the 1996 Annual Meeting of the American Political Science Association, San Francisco Hilton and Towers, San Francisco, August 29–September 1, 1996. A still earlier version of part of this paper was presented to the Economic Development Institute of the World Bank, Curriculum Development Workshop, Washington, DC, December 6–7, 1995. The author appreciates the support provided by the National Science Foundation, the Ford Foundation, and the

MacArthur Foundation. Useful comments by Kathryn Firmin-Sellers, Maurice Garnier, Clark Gibson, Vincent Ostrom, Roger Parks, Margaret Polski, Eric Rasmusen, Paul Sabatier, Edella Schlager, James Walker, Tjip Walker, and Xin Zhang on earlier drafts are deeply appreciated. The thoughtful editing of Patty Lezotte and David Price has helped improve the manuscript. Without Charlotte Hess's bibliographic knowledge, I would not even know of some of the recent applications of the IAD framework.

1. Elements of the framework have been used in teaching both graduate and undergraduate courses at Indiana University since the mid-1970s (see historical file of materials on the IAD framework, Workshop Library).

2. In formal game-theoretical analysis, such strategies would be those identified as equilibrium strategies. Shared strategies may, however, take the form of heuristics adopted by most individuals in a society when they find themselves in particular situations.

3. I am more appreciative of these configural relationships because of a very insightful colloquium presentation made by Professor Lloyd Orr, Department of Economics, Indiana University, at the Workshop in Political Theory and Policy Analysis in November 1995.

4. This section draws heavily on E. Ostrom, Gardner, and Walker (1994, pp. 38–41).

5. The International Forestry Resources and Institutions (IFRI) research program has faced this problem by developing research protocols that enable a network of research scholars to gather the "same" information from a sample of forestry sites located in multiple countries of the world. The recording forms can be structured and filled in by the research teams in the evening after in-depth group and individual discussions, but there cannot be a standard way of asking the questions. Anthropologists have looked upon the individuals with whom they talk as "informants," the stance one has to take in any effort to elucidate any information about rules-in-use (see E. Ostrom and Wertime 2000).

6. In E. Ostrom (2005, p. 9), I list fifteen dissertations completed at Indiana University since 1989 that apply the IAD framework. In recent years, graduate students from other universities have sent us copies of their master's or PhD theses to be placed on file in the extensive Workshop Library. These include the following: (1) Maria Baggetta, 2005, master's thesis, Arizona State University; (2) Krishna Gupta, 2001, PhD diss., State University of New York at Stony Brook; (3) Kim Lemky, 2002, PhD diss., University of Waterloo, Canada; (4) Richard McElreath, 2001, PhD diss., University of California, Los Angeles; (5) Bertrand Meinier, 2002, MRM thesis, Simon Fraser University, Canada; (6) Jamey L. Pavey, 2005, PhD diss., University of Tennessee, Knoxville; (7) Nicholas Alan Pinhey, 2003, PhD diss., University of Southern California; (8) Carl Rova, 1999, PhD diss., Lulea University of Technology; and (9) Ruben van Wendel de Joode, 2005, PhD diss., Delft University of Technology, The Netherlands.

7. See Hess (2005). This bibliography incorporates the original volumes *Common Pool Resources and Collective Action: A Bibliography* (Martin 1989/1992; Hess 1996) and the CD-ROM (Hess 1999), which is now available online (open access) and updated yearly.

REFERENCES

Acheson, James. 2003. *Capturing the Commons: Devising Institutions to Manage the Maine Lobster Industry.* Hanover, NH: University Press of New England.

Adhikari, Keshav R., Kala N. Pandit, and Charles M. Schweik. 1997. "Integration of GIS and GPS Techniques in Irrigation and Forest Resources Mapping: Lessons Learned." In Ganesh Shivakoti et al., eds., *Participation, People, and Sustainable Development.* Bloomington, IN, and Rampur, Nepal: Indiana University and Institute of Agriculture and Animal Sciences.

ACIR (Advisory Commission on Intergovernmental Relations) (Ronald J. Oakerson). 1987. *The Organization of Local Public Economies.* Washington, DC: ACIR.

ACIR (Advisory Commission on Intergovernmental Relations) (Ronald J. Oakerson, Roger B. Parks, and Henry A. Bell). 1988. *Metropolitan Organization: The St. Louis Case.* Washington, DC: ACIR.

Agrawal, Arun. 2000. "Small Is Beautiful, but Is Larger Better? Forest-Management Institutions in the Kumaon Himalaya, India." In Clark Gibson, Margaret McKean, and Elinor Ostrom, eds., *People and Forests: Communities, Institutions, and Governance,* pp. 57–86. Cambridge, MA: MIT Press.

_____. 2005. *Environmentality: Technologies of Government and the Making of Subjects.* Durham, NC: Duke University Press.

Agrawal, Arun, and Elinor Ostrom. 2001. "Collective Action, Property Rights, and Decentralization in Resource Use in India and Nepal." *Politics and Society* 29 (December): 485–514.

Alchian, Armen A. 1950. "Uncertainty, Evolution, and Economic Theory." *Journal of Political Economy* 58 (3): 211–221.

Aligica, Paul Dragos. 2005. "Institutional Analysis and Economic Development Policy: Notes on the Applied Agenda of the Bloomington School." *Journal of Economic Behavior and Organization* 57 (2): 159–165.

Allen, Barbara. 2005. *Tocqueville, Covenant, and the Democratic Revolution: Harmonizing Earth with Heaven.* Lanham, MD: Lexington Books.

Anderies, J. Marty, Marco Janssen, and Elinor Ostrom, 2004. "A Framework to Analyze the Robustness of Social-Ecological Systems from an Institutional Perspective." *Ecology and Society* 9 (1): 18.

Andersson, Krister. 2004. "Who Talks with Whom? The Role of Repeated Interactions in Decentralized Forest Governance." *World Development* 32 (2): 233–249.

Arrow, Kenneth. 1951. *Social Choice and Individual Values.* 2nd ed. New York: Wiley.

Auer, Matthew. 2006. "Contexts, Multiple Methods, and Values in the Study of Common-Pool Resources." *Journal of Policy Analysis and Management* 25 (1): 215–227.

Ayo, S. Bamidele. 2002. *Public Administration and the Conduct of Community Affairs among the Yoruba in Nigeria.* San Francisco: Institute for Contemporary Studies Press.

Banana, Abwoli Y., and William Gombya-Ssembajjwe. 2000. "Successful Forest Management: The Importance of Security of Tenure and Rule Enforcement in Ugandan Forests." In Clark Gibson, Margaret McKean, and Elinor Ostrom, eds., *People and Forests: Communities, Institutions, and Governance,* pp. 87–98. Cambridge, MA: MIT Press.

Benjamin, Paul, Wai Fung Lam, Elinor Ostrom, and Ganesh Shivakoti. 1994. *Institutions, Incentives, and Irrigation in Nepal. Decentralization: Finance and Management Project Report.* Burlington, VT: Associates in Rural Development.

Bickers, Kenneth, and John Williams. 2001. *Public Policy Analysis: A Political Economy Approach.* Boston, MA: Houghton Mifflin.

Blomquist, William, Edella Schlager, and Tanya Heikkila. 2004. *Common Waters, Diverging Streams: Linking Institutions and Water Management in Arizona, California, and Colorado.* Washington, DC: Resources for the Future.

Boettke, Peter J., and Christopher J. Coyne. 2005. "Methodological Individualism, Spontaneous Order and the Research Program of the Workshop in Political Theory and Policy Analysis." *Journal of Economic Behavior and Organization* 57 (2): 145–158.

Breton, Albert, and Ronald Wintrobe. 1982. *The Logic of Bureaucratic Conduct: An Economic Analysis of Competition, Exchange, and Efficiency in Private and Public Organizations.* Cambridge: Cambridge University Press.

Buchanan, James M., and Gordon Tullock. 1962. *The Calculus of Consent.* Ann Arbor: University of Michigan Press.

Cardenas, Juan-Camilo. 2000. "How Do Groups Solve Local Commons Dilemmas? Lessons from Experimental Economics in the Field." *Environment, Development and Sustainability* 2:305–322.

Cardenas, Juan-Camilo, John K. Stranlund, and Cleve E. Willis. 2000. "Local Environmental Control and Institutional Crowding-Out." *World Development* 28 (10): 1719–1733.

Carr, Jered B., and Richard C. Feiock, eds. 2004. *City-County Consolidation and Its Alternatives: Reshaping the Local Government Landscape.* New York: M.E. Sharpe.

Casari, Marco, and Charles R. Plott. 2003. "Decentralized Management of Common Property Resources: Experiments with a Centuries-Old Institution." *Journal of Economic Behavior and Organization* 51:217–247.

Costanza, Robert, Bobbi Low, Elinor Ostrom, and James Wilson, eds. 2001. *Institutions, Ecosystems, and Sustainability.* New York: Lewis Publishers.

Crawford, Sue E .S., and Elinor Ostrom. 2005. "A Grammar of Institutions." In Elinor Ostrom, ed., *Understanding Institutional Diversity,* pp. 137–174. Princeton, NJ: Princeton University Press. Originally published in *American Political Science Review* 89 (September 1995): 582–600.

Dedeurwaerdere, Tom. Forthcoming. "The Institutional Economics of Sharing Biological Information." *International Social Science Journal.*

Dietz, Thomas. 2005. "The Darwinian Trope in the Drama of the Commons: Variations on Some Themes by the Ostroms." *Journal of Economic Behavior and Organization* 57 (2): 205–225.

Dietz, Thomas, Elinor Ostrom, and Paul Stern. 2003. "The Struggle to Govern the Commons." *Science* 302:1907–1912.

Dolŝak, Nives, and Elinor Ostrom, eds. 2003. *The Commons in the New Millennium: Challenges and Adaptations.* Cambridge, MA: MIT Press.

Dosi, Giovanni, and Massimo Egidi. 1987. "Substantive and Procedural Uncertainty: An Exploration of Economic Behaviours in Complex and Changing Environments." Paper prepared at the International Workshop on Programmable Automation and New Work Modes, Paris, April 2–4.

Eggertsson, Thráinn. 1990. *Economic Behavior and Institutions.* New York: Cambridge University Press.

———. 2005. *Imperfect Institutions: Possibilities and Limits of Reform.* Ann Arbor: University of Michigan Press.

Falk, Armin, Ernst Fehr, and Urs Fischbacher. 2002. "Appropriating the Commons: A Theoretical Explanation." In National Research Council, Committee on the Human Dimensions of Global Change, Elinor Ostrom, Thomas Dietz, Nives Dolŝak, Paul C. Stern, Susan Stonich, and Elke Weber, eds., *The Drama of the Commons,* pp. 157–192. Washington, DC: National Academy Press.

Firmin-Sellers, Kathryn. 1996. *The Transformation of Property Rights in the Gold Coast: An Empirical Study Applying Rational Choice Theory.* New York: Cambridge University Press.

Gellar, Sheldon. 2005. *Democracy in Senegal: Tocquevillian Analytics in Africa.* New York: Palgrave Macmillan.

Ghate, Rucha. 2004. *Uncommons in the Commons: Community Initiated Forest Resource Management.* New Delhi, India: Concept Publishing.

Gibson, Clark, Krister Andersson, Elinor Ostrom, and Sujai Shivakumar. 2005. *The Samaritan's Dilemma: The Political Economy of Development Aid.* New York: Oxford University Press.

Gibson, Clark, and C. Dustin Becker. 2000. "A Lack of Institutional Demand: Why a Strong Local Community in Western Ecuador Fails to Protect Its Forest." In Clark Gibson, Margaret McKean, and Elinor Ostrom, eds., *People and Forests: Communities, Institutions, and Governance,* pp. 135–162. Cambridge, MA: MIT Press.

Gibson, Clark, Margaret McKean, and Elinor Ostrom, eds. 2000. *People and Forests: Communities, Institutions, and Governance.* Cambridge, MA: MIT Press.

Gibson, Clark, John Williams, and Elinor Ostrom. 2005. "Local Enforcement and Better Forests." *World Development* 33 (2): 273–284.

Gregg, Phillip M. 1974. "Units and Levels of Analysis: A Problem of Policy Analysis in Federal Systems." *Publius* 4 (Fall): 59–86.

Guha-Khasnobis, Basudeb, Ravi Kanbur, and Elinor Ostrom, eds. 2006. *Linking the Formal and Informal Economy: Concepts and Policies.* Oxford: Oxford University Press.

Hackett, Steven, Edella Schlager, and James Walker. 1994. "The Role of Communication in Resolving Commons Dilemmas: Experimental Evidence with Heterogenous Appropriators." *Journal of Environmental Economics and Management* 27:99–126.

Harré, R. 1974. "Some Remarks on 'Rule' as a Scientific Concept." In T. Mischel, ed., *Understanding Other Persons.* Oxford: Basil Blackwell.

Hayes, Tanya, and Elinor Ostrom. 2005. "Conserving the World's Forests: Are Protected Areas the Only Way?" *Indiana Law Review* 38 (3): 595–619.

Heikkila, Tanya, and Andrea K. Gerlak. 2005. "The Formation of Large-Scale Collaborative Resource Management Institutions: Clarifying the Roles of Stakeholders, Science, and Institutions." *Policy Studies Journal* 33 (4): 583–612.

Herzberg, Roberta. 1986. "Blocking Coalitions and Policy Change." In Gerald C. Wright, Leroy Rieselbach, and Larry Dodd, eds., *Congress and Policy Change,* pp. 201–222. New York: Agathon Press.

Herzberg, Roberta, and Vincent Ostrom. 1991. "Votes and Vetoes." In Franz-Xaver Kaufmann, ed., *The Public Sector—Challenge for Coordination and Learning,* pp. 441–450. Berlin and New York: Walter de Gruyter.

Herzberg, Roberta, and Rick Wilson. 1988. "Results on Sophisticated Voting in an Experimental Setting." *Journal of Politics* 50 (2): 471–486.

Hess, Charlotte. 1996. *Common-Pool Resources and Collective Action: A Bibliography*, vol. 3. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.

_____. 1999. *A Comprehensive Bibliography of Common Pool Resources*. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis. CD-ROM.

_____. 2005. *The Comprehensive Bibliography of the Commons*. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis. http://dlc.dlib.indiana.edu/cpr/index.php.

_____. 2006. "Institutional Analysis and Development Framework." Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis. (Bibliographies from the Workshop Library) http://www.indiana.edu/~workshop/wsl/iad.html.

Hess, Charlotte, and Elinor Ostrom. 2003. "Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource." *Law and Contemporary Problems* 66 (Winter/Spring): 111–145.

_____. 2007. *Understanding Knowledge as a Commons: From Theory to Practice*. Cambridge, MA: MIT Press.

Holling, C. S. 1994. "An Ecologist View of the Malthusian Conflict." In K. Lindahl-Kiessling and H. Landberg, eds., *Population, Economic Development, and the Environment*, pp. 79–103. New York: Oxford University Press.

Hyden, Goran. 1990. "Reciprocity and Governance in Africa." In James Wunsch and Dele Olowu, eds., *The Failure of the Centralized State: Institutions and Self-Governance in Africa*, pp. 245–269. Boulder, CO: Westview Press.

Imperial, Mark T. 1999. "Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework." *Environmental Management* 24 (4): 449–465.

Imperial, Mark, and Tracy Yandle. 2005. "Taking Institutions Seriously: Using the IAD Framework to Analyze Fisheries Policy." *Society and Natural Resources* 18 (6): 493–509.

Jager, Wander, and Marco Janssen. 2002. "Using Artificial Agents to Understand Laboratory Experiments of Common-Pool Resources with Real Agents." In Marco Janssen, ed., *Complexity and Ecosystem Management: The Theory and Practice of Multi-Agent Systems*, pp. 75–103. Cheltenham, UK: Edward Elgar.

Janssen, Marco A., ed. 2002. *Complexity and Ecosystem Management: The Theory and Practice of Multi-Agent Systems*. Cheltenham, UK: Edward Elgar.

Jillson, Calvin C., and Rick K. Wilson. 1994. *Congressional Dynamics: Structure, Coordination, and Choice in the First American Congress, 1774–1789*. Stanford, CA: Stanford University Press.

Jones, Bryan. 2001. *Politics and the Architecture of Choice: Bounded Rationality and Governance*. Chicago: University of Chicago Press.

Jones, Eric C. 2003. "Building on Ostrom's 'The Rudiments of a Theory of the Origins, Survival and Performance of Common-Property Institutions.'" *Journal of Ecological Anthropology* 7:65–72.

Kaminski, Antoni. 1992. *An Institutional Theory of Communist Regimes: Design, Function, and Breakdown*. San Francisco: Institute for Contemporary Studies Press.

Keohane, Robert O., and Elinor Ostrom, eds. 1995. *Local Commons and Global Interdependence: Heterogeneity and Cooperation in Two Domains*. London: Sage.

Kiser, Larry L. 1984. "Toward an Institutional Theory of Citizen Coproduction." *Urban Affairs Quarterly* 19 (June): 485–510.

Kiser, Larry L., and Elinor Ostrom. 1982. "The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches." In Elinor Ostrom, ed., *Strategies of Political Inquiry*, pp. 179–222. Beverly Hills, CA: Sage.

Koontz, Tomas M. 2002. *Federalism in the Forest: National versus State Natural Resource Policy*. Washington, DC: Georgetown University Press.

Kuhnert, Stephan. 2001. "An Evolutionary Theory of Collective Action: Schumpeterian Entrepreneurship for the Common Good." *Constitutional Political Economy* 12:13–29.

Lam, Wai Fung. 1996. "Institutional Design of Public Agencies and Coproduction: A Study of Irrigation Associations in Taiwan." *World Development* 24 (June): 1039–1054.

_____. 1998. *Governing Irrigation Systems in Nepal: Institutions, Infrastructure, and Collective Action*. San Francisco: Institute for Contemporary Studies Press.

Lasswell, Harold, and Abraham Kaplan. 1950. *Power and Society: A Framework for Political Inquiry*. New Haven, CT: Yale University Press.

Loveman, Brian. 1993. *The Constitution of Tyranny: Regimes of Exception in Spanish America*. Pittsburgh: University of Pittsburgh Press.

Lubell, Mark, Mark Schneider, John T. Scholz, and Mihriye Mete. 2002. "Watershed Partnerships and the Emergence of Collective Action Institutions." *American Journal of Political Science* 46 (1): 148–163.

Martin, Fenton. 1989/1992. *Common-Pool Resources and Collective Action: A Bibliography*, vols. 1 and 2. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.

McGinnis, Michael, ed. 1999a. *Polycentric Governance and Development: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.

_____, ed. 1999b. *Polycentricity and Local Public Economies: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.

_____, ed. 2000. *Polycentric Games and Institutions: Readings from the Workshop in Political Theory and Policy Analysis*. Ann Arbor: University of Michigan Press.

McGinnis, Michael, and Elinor Ostrom. Forthcoming. "Will Lessons from Small-Scale Social Dilemmas Scale Up?" In Anders Biel, Daniel Eck, Tommy Gärling, and Mathias Gustafsson, eds., *New Issues and Paradigms in Research on Social Dilemmas*. Berlin: Springer.

Moran, Emilio, and Elinor Ostrom, eds. 2005. *Seeing the Forest and the Trees: Human-Environment Interactions in Forest Ecosystems*. Cambridge, MA: MIT Press.

National Research Council. 1986. *Proceedings of the Conference on Common Property Resource Management*. Washington, DC: National Academy Press.

_____. 2002. *The Drama of the Commons*. Committee on the Human Dimensions of Global Change. Elinor Ostrom, Thomas Dietz, Nives Dolŝak, Paul Stern, Susan Stonich, and Elke Weber, eds. Washington, DC: National Academy Press.

Netting, Robert McC. 1982. "Territory, Property, and Tenure." In R. McC. Adams, N. J. Smelser, and D. J. Treiman, eds., *Behavioral and Social Science Research: A National Resource*, pp. 446–501. Washington, DC: National Academy Press.

Oakerson, Ronald J. 1992. "Analyzing the Commons: A Framework." In Daniel W. Bromley et al., eds., *Making the Commons Work: Theory, Practice, and Policy*, pp. 41–59. San Francisco: Institute for Contemporary Studies Press.

_____. 1993. "Reciprocity: A Bottom-Up View of Political Development." In Vincent Ostrom, David Feeny, and Hartmut Picht, eds., *Rethinking Institutional Analysis and Development: Issues, Alternatives, and Choices*, pp.141–158. San Francisco: Institute for Contemporary Studies Press.

_____. 1999. *Governing Local Public Economies: Creating the Civic Metropolis.* Oakland, CA: ICS Press.

Oakerson, Ronald J., and Roger B. Parks. 1988. "Citizen Voice and Public Entrepreneurship: The Organizational Dynamic of a Complex Metropolitan County." *Publius* 18 (Fall): 91–112.

Obolonsky, Alexander. 2003. *The Drama of Russian Political History: System against Individuality.* College Station: Texas A&M University Press.

Olowu, Dele, and James S. Wunsch. 2004. *Local Governance in Africa: The Challenges of Democratic Decentralization.* Boulder, CO: Lynne Rienner.

Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups.* Cambridge, MA: Harvard University Press.

Ørebech, Peter, Fred Bosselman, Jes Bjarup, David Callies, Martin Chanock, and Hanne Petersen. 2005. *The Role of Customary Law in Sustainable Development.* Cambridge: Cambridge University Press.

Ostrom, Elinor. 1972. "Metropolitan Reform: Propositions Derived from Two Traditions." *Social Science Quarterly* 53 (December): 474–493.

_____. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action.* New York: Cambridge University Press.

_____. 1992. "The Rudiments of a Theory of the Origins, Survival, and Performance of Common-Property Institutions." In Daniel W. Bromley et al., eds., *Making the Commons Work: Theory, Practice, and Policy*, pp. 293–318. San Francisco: Institute for Contemporary Studies Press.

_____. 1994. "Neither Market Nor State: Governance of Common-Pool Resources in the Twenty-First Century." International Food Policy Research Institute Lecture Series no. 2. Washington, DC: IFPRI.

_____. 1996a. "Crossing the Great Divide: Coproduction, Synergy, and Development." *World Development* 24 (June): 1073–1087.

_____. 1996b. "Incentives, Rules of the Game, and Development." In *Proceedings of the Annual World Bank Conference on Development Economics 1995*, pp. 207–234. Washington, DC: World Bank.

_____. 1998. "A Behavioral Approach to Rational Choice Theory of Collective Action." *American Political Science Review* 92 (March): 1–22.

_____. 2005. *Understanding Institutional Diversity.* Princeton, NJ: Princeton University Press.

_____. 2006. "Converting Threats into Opportunities." *PS: Political Science and Politics* 39 (January): 3–12.

Ostrom, Elinor, and T. K. Ahn, eds. 2003. *Foundations of Social Capital.* Cheltenham, UK: Edward Elgar.

Ostrom, Elinor, and Roy Gardner. 1993. "Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work." *Journal of Economic Perspectives* 7 (Fall): 93–112.

Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, and Common-Pool Resources.* Ann Arbor: University of Michigan Press.

Ostrom, Elinor, Wai Fung Lam, and Myungsuk Lee. 1994. "The Performance of Self-Governing Irrigation Systems in Nepal." *Human Systems Management* 14 (3): 87–108.

Ostrom, Elinor, Larry Schroeder, and Susan Wynne. 1993. *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective.* Boulder, CO: Westview Press.

Ostrom, Elinor, and James Walker, eds. 2003. *Trust and Reciprocity: Interdisciplinary Lessons from Experimental Research.* New York: Russell Sage Foundation.

Ostrom, Elinor, James Walker, and Roy Gardner. 1992. "Covenants with and without a Sword: Self-Governance Is Possible." *American Political Science Review* 86 (June): 404–417.

Ostrom, Elinor, and Mary Beth Wertime. 2000. "IFRI Research Strategy." In Clark Gibson, Margaret McKean, and Elinor Ostrom, eds. *People and Forests: Communities, Institutions and Governance*, pp. 243–268. Cambridge, MA: MIT Press.

Ostrom, Vincent. 1991. *The Meaning of American Federalism: Constituting a Self-Governing Society.* San Francisco: Institute for Contemporary Studies Press.

_____. 1997. *The Meaning of Democracy and the Vulnerability of Democracies: A Response to Tocqueville's Challenge.* Ann Arbor: University of Michigan Press.

_____. 1999. "Artisanship and Artifact." In Michael McGinnis, ed., *Polycentric Governance and Development: Readings from the Workshop in Political Theory and Policy Analysis*, pp. 377–393. Ann Arbor: University of Michigan Press.

_____. 2006. "Citizen-Sovereigns: The Source of Contestability, the Rule of Law, and the Conduct of Public Entrepreneurship." *PS: Political Science and Politics* 39 (January): 13–17.

_____. 2007a. *The Intellectual Crisis in American Public Administration.* 3rd ed. Tuscaloosa: University of Alabama Press. First published in 1989.

_____. 2007b. *The Political Theory of a Compound Republic: Designing the American Experiment.* 3rd ed. Lanham, MD: Lexington Books. First published in 1987.

Ostrom, Vincent, Robert Bish, and Elinor Ostrom. 1988. *Local Government in the United States.* San Francisco: Institute for Contemporary Studies Press.

Ostrom, Vincent, David Feeny, and Hartmut Picht, eds. 1993. *Rethinking Institutional Analysis and Development: Issues, Alternatives, and Choices.* 2nd ed. San Francisco: Institute for Contemporary Studies Press.

Ostrom, Vincent, and Elinor Ostrom. 1971. "Public Choice: A Different Approach to the Study of Public Administration." *Public Administration Review* 13 (March/April): 203–216.

Parks, Roger B. 1985. "Metropolitan Structure and Systematic Performance: The Case of Police Service Delivery." In Kenneth Hanf and Theo A. J. Toonen, eds., *Policy*

Implementation in Federal and Unitary Systems, pp. 161–191. Dordrecht, The Netherlands: Martinus Nijhoff.

Parks, Roger B., Paula C. Baker, Larry L. Kiser, Ronald J. Oakerson, Elinor Ostrom, Vincent Ostrom, Stephen L. Percy, Martha Vandivort, Gordon P. Whitaker, and Rick Wilson. 1982. "Coproduction of Public Services." In Richard C. Rich, ed., *Analyzing Urban-Service Distributions*, pp. 185–199. Lexington, MA: Lexington Books.

Parks, Roger B., and Ronald J. Oakerson. 1989. "Metropolitan Organization and Governance: A Local Public Economy Approach." *Urban Affairs Quarterly* 25 (September): 18–29.

Percy, Stephen L. 1984. "Citizen Participation in the Coproduction of Urban Services." *Urban Affairs Quarterly* 19 (June): 431–446.

Polski, Margaret M. 2003. *The Invisible Hands of U.S. Commercial Banking Reform: Private Action and Public Guarantees.* Boston, MA: Kluwer.

_____. 2005. "The Institutional Economics of Biodiversity, Biological Materials, and Bioprospecting." *Ecological Economics* 53 (June): 543–557.

Poteete, Amy, and Elinor Ostrom. 2004a. "Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management." *Development and Change* 35 (June): 435–461.

_____. 2004b. "In Pursuit of Comparable Concepts and Data about Collective Action." *Agricultural Systems* 82 (December): 215–232.

Prakash, Aseem. 2000. *Greening the Firm: The Politics of Corporate Environmentalism.* Cambridge: Cambridge University Press.

Pritchett, Lant, and Deon Filmer. 1997. "What Education Production Functions *Really* Show: A Positive Theory of Educational Expenditures." *Economics of Education Review* 18:233–239.

Radnitzky, Gerard. 1987. "Cost-Benefit Thinking the Methodology of Research: The 'Economic Approach' Applied to Key Problems to the Philosophy of Science." In Gerard Radnitzky and Peter Bernholz, eds., *Economic Imperialism: The Economic Approach Applied Outside the Field of Economics*, pp. 283–334. New York: Paragon House.

Sabetti, Filippo. 2002. *Village Politics and the Mafia in Sicily.* 2nd ed. Oakland, CA: ICS Press.

Sawyer, Amos. 1992. *The Emergence of Autocracy in Liberia: Tragedy and Challenge.* San Francisco: Institute for Contemporary Studies Press.

_____. 2005. *Beyond Plunder: Toward Democratic Governance in Liberia.* Boulder, CO: Lynne Rienner.

Schlager, Edella. 1994. "Fishers' Institutional Responses to Common-Pool Resource Dilemmas." In Elinor Ostrom, Roy Gardner, and James Walker, eds., *Rules, Games, and Common-Pool Resources*, pp. 247–266. Ann Arbor: University of Michigan Press.

Schlager, Edella, William Blomquist, and Shui Yan Tang. 1994. "Mobile Flows, Storage, and Self-Organized Institutions for Governing Common-Pool Resources." *Land Economics* 70 (August): 294–317.

Schweik, Charles M. 2000. "Optimal Foraging, Institutions, and Forest Change: A Case from Nepal." In Clark Gibson, Margaret McKean, and Elinor Ostrom, eds., *People and Forests: Communities, Institutions, and Governance*, pp. 57–85. Cambridge, MA: MIT Press.

_____. 2005. "An Institutional Analysis Approach to Studying Libre Software Commons." *Upgrade: The European Journal for the Informatics Professional* 3 (June): 17–27.

Shivakoti, Ganesh, Douglas Vermillion, Wai-Fung Lam, Elinor Ostrom, Ujjwal Pradhan, and Robert Yoder, eds. 2005. *Asian Irrigation in Transition: Responding to Challenges.* New Delhi: Sage.

Shepsle, Kenneth A. 1979. "The Role of Institutional Structure in the Creation of Policy Equilibrium." In Douglas W. Rae and Theodore J. Eismeier, eds., *Public Policy and Public Choice*, pp. 249–283. *Sage Yearbooks in Politics and Public Policy*, vol. 6. Beverly Hills, CA: Sage.

_____. 1989. "Studying Institutions: Some Lessons from the Rational Choice Approach." *Journal of Theoretical Politics* 1:131–149.

Shimanoff, Susan B. 1980. *Communication Rules: Theory and Research.* Beverly Hills, CA: Sage.

Shivakoti, Ganesh, and Elinor Ostrom, eds. 2002. *Improving Irrigation Governance and Management in Nepal.* Oakland, CA: ICS Press.

_____. Forthcoming. "Facilitating Decentralized Policies for Sustainable Governance and Management of Forest Resources in Asia." In Edward Webb and Ganesh Shivakoti, eds. *Decentralization, Forests and Rural Communities: Policy Outcomes in South and Southeast Asia.* London: Sage.

Shivakumar, Sujai. 2005. *The Constitution of Development: Crafting Capabilities for Self-Governance.* New York: Palgrave Macmillan.

Simon, Herbert A. 1965. *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization.* New York: Free Press. Originally published in 1947.

_____. 1972. "Theories of Bounded Rationality." In C. B. McGuire and Roy Radner, eds., *Decision and Organization: A Volume in Honor of Jacob Marschak*, pp. 161–176. Amsterdam: North Holland.

Sproule-Jones, Mark. 1993. *Governments at Work: Canadian Parliamentary Federalism and Its Public Policy Effects.* Toronto: University of Toronto Press.

Stein, Robert. 1990. *Urban Alternatives: Public and Private Markets in the Provision of Local Services.* Pittsburgh: University of Pittsburgh Press.

Tang, Shui Yan. 1991. "Institutional Arrangements and the Management of Common-Pool Resources." *Public Administration Review* 51 (January/February): 42–51.

_____. 1992. *Institutions and Collective Action: Self-Governance in Irrigation.* San Francisco: Institute for Contemporary Studies Press.

Taylor, Michael. 1987. *The Possibility of Cooperation.* New York: Cambridge University Press.

Thomson, James T. 1992. *A Framework for Analyzing Institutional Incentives in Community Forestry.* Rome: Food and Agriculture Organization of the United Nations, Forestry Department, Via delle Terme di Caracalla.

Thomson, James T., David Feeny, and Ronald J. Oakerson. 1992. "Institutional Dynamics: The Evolution and Dissolution of Common-Property Resource Management." In Daniel W. Bromley et al., eds., *Making the Commons Work: Theory, Practice, and Policy*, pp. 129–160. San Francisco: Institute for Contemporary Studies Press.

Toulmin, S. 1974. "Rules and Their Relevance for Understanding Human Behavior." In T. Mischel, ed., *Understanding Other Persons*. Oxford: Basil Blackwell.

Varughese, George, and Elinor Ostrom. 2001. "The Contested Role of Heterogeneity in Collective Action: Some Evidence from Community Forestry in Nepal." *World Development* 29 (May): 747–765.

Wagner, Richard E. 2005. "Self-Governance, Polycentrism, and Federalism: Recurring Themes in Vincent Ostrom's Scholarly Oeuvre." *Journal of Economic Behavior and Organization* 57 (2): 173–188.

Walker, James, and Ray Gardner. 1992. "Probabilistic Destruction of Common-Pool Resources: Experimental Evidence." *Economic Journal* 102 (September): 1149–1161.

Walker, S. Tjip. 1994a. *Crafting a Market: A Case Study of USAID's Fertilizer Sub-Sector Reform Program. Decentralization: Finance and Management Project Report*. Burlington, VT: Associates in Rural Development.

_____. 1994b. *Pitfalls of Privatization: A Case Study of the European Community's Programme Spécial d'Importation d'Engrais. Decentralization: Finance and Management Project Report*. Burlington, VT: Associates in Rural Development.

Webb, Edward, and Ganesh Shivakoti, eds. 2007. *Decentralization, Forests and Rural Communities: Policy Outcomes in South and Southeast Asia*. New Delhi: Sage.

Weissing, Franz J., and Elinor Ostrom. 1991. "Irrigation Institutions and the Games Irrigators Play: Rule Enforcement without Guards." In Reinhard Selten, ed., *Game Equilibrium Models II: Methods, Morals, and Markets*, pp. 188–262. Berlin: Springer-Verlag.

_____. 1993. "Irrigation Institutions and the Games Irrigators Play: Rule Enforcement on Government- and Farmer-Managed Systems." In Fritz W. Scharpf, ed., *Games in Hierarchies and Networks: Analytical and Empirical Approaches to the Study of Governance Institutions*, pp. 387–428. Frankfurt am Main: Campus Verlag; Boulder, CO: Westview Press.

Whitaker, Gordon P. 1980. "Coproduction: Citizen Participation in Service Delivery." *Public Administration Review* 40 (July/August): 309–317.

Williamson, Oliver E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.

_____. 1979. "Transaction Cost Economics: The Governance of Contractual Relations." *Journal of Law and Economics* 22 (October): 233–261.

_____. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.

Wilson, Rick, and Roberta Herzberg. 1987. "Negative Decision Powers and Institutional Equilibrium: Experiments on Blocking Coalitions." *Western Political Quarterly* 40 (December): 593–609.

Wunsch, James S., and Dele Olowu, eds. 1995. *The Failure of the Centralized State: Institutions and Self-Governance in Africa*. 2nd ed. San Francisco: Institute for Contemporary Studies Press.

3

The Multiple Streams Framework

Structure, Limitations, Prospects

NIKOLAOS ZAHARIADIS

Multiple streams (MS) is a lens, perspective, or framework—I use the terms interchangeably—that explains how policies are made by national governments under conditions of ambiguity. Although it could conceivably be extended to cover the entire process of policy making at various levels of government, it is examined here only in its capacity to explain policy formation (agenda setting and decision making).

A good theory of choice provides answers to three questions (Simon 1983):

- How is attention rationed?
- How and where is the search for alternatives conducted?
- How is selection biased?

MS does this by assuming a temporal order—i.e., the adoption of specific alternatives depends on when policies are made—and by proposing a theory of political manipulation. Three streams are identified as flowing through the policy system: problems, policies, and politics. Each is conceptualized as largely separate from the others, with its own dynamics and rules. At critical points in time, termed policy windows, the streams are coupled by policy entrepreneurs. The combination of all three streams into a single package dramatically enhances the chances that a specific policy will be adopted by policy makers.

The first section provides a panoramic view of the lens by presenting its assumptions and guiding logic. The second section outlines the main structural elements of the framework. The third section discusses the various processes by which