Rethinking Institutional Analysis: Interviews with Vincent and Elinor Ostrom

With introductions
by Vernon Smith & Gordon Tullock

Commemorating a Lifetime of Achievement

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Introductory Notes

It is my honor on this occasion to celebrate Elinor Ostrom whose unique and refreshing studies of the capacity of human groups to evolve spontaneous self governing institutions for the commons has changed the way many of us think about the so-called "problem" of common property resources. Her approach is methodologically Coasian, only in that Ronald Coase, seeing that economic theorists had said much about the inevitable failure of decentralized mechanisms to solve public good incentive problems, and seeing that a favorite example used was the light house, asked a simple question: "Let's have a look at how people have organized the delivery of light house services." The answer, as is well known, is that they were privately funded, and people found ways to make sure that the ships that benefited paid for it when they stopped at ports!

Elinor, however, has examined a great variety of functionally and regionally distinct collective action systems for resource management—grazing commons, fisheries, irrigation systems, to name a few—to better understand what makes them succeed or fail. All have the important characteristic that they utilize local knowledge, articulate rules that are subject to modification over time—sometimes centuries, and involve much trial and error experimentation. If this results in something functional it is not a consequence of a rational construction from the top down, but rather an ecological evolution sensitive to the fact that any viable solution depends on information not given to any one mind or authority.

Elinor is a remarkable scholar, internally driven by a need to understand human forms of social organization, who finds it completely natural to look for the wisdom and learning captured in human social exchange forms. She is ever in learning mode, knowledgeable in both game theory and laboratory methodologies, and seeks to blend then with empirical studies that have enriched traditional political science and economic thinking.

She is a model for us all at any time or age.

Vernon Smith
Professor of Economics and Law, George Mason University
2002 Nobel Laureate, Economics

The outstanding characteristic of Vincent Ostrom's work on institutions is that they're more complicated than we thought. He emphasizes that we must rethink many of our ideas on any given institution and then makes a good start in such rethinking himself.

The use of broad categories such as markets, states, or socialism do not take us very far by themselves. Vincent has not only emphasized this, but also provided a language, which fits the world better. One of his main contributions has been to challenge the emphasis on government as a unitary command structure and to develop an alternative analytical framework based on the notion of "polycentricity." For example, he points out that the structure may depend upon high levels of coordination between different institutional levels.

Therefore, examining the theory of government by itself doesn't get us very far. Empirical examination is also necessary. Since the author of this brief introductory note is primarily a theorist this might seem to put us in opposition. In fact, however, Vincent and his wife, have done a great deal of theoretical work as well as empirical. Indeed, the theory is usually based on practical work. On the other hand, their practical empirical studies are firmly based on theory.

Theorists like myself can learn by studying both their empirical and their theoretical contributions. Thus, public choice is advanced on two fronts.

Gordon Tullock
Professor of Law, George Mason University

RETHINKING INSTITUTIONAL ANALYSIS AND DEVELOPMENT: THE BLOOMINGTON SCHOOL

RETHINKING THE TERMS OF CHOICE

Interview with Vincent Ostrom

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PAUL ALIGICA: In his article, "Virginia, Rochester, and Bloomington: Twenty-five Years of Public Choice and Political Science," published in Public Choice in 1988, William C. Mitchell wrote: "Aside from the family analogy, it seems that three schools of thought have appeared in public choice and that they are sufficiently different to warrant distinctive labels. Mine are taken from their geographical locations: Virginia (Charlottesville; Blacksburg; Fairfax), Rochester, and Bloomington. At each of these institutions, one or two dominant figures led and continue to lead in the effort to construct theories of collective choice: Riker at Rochester, Buchanan and Tullock at various Virginia universities, and the Ostroms at Indiana." Fifteen years after Mitchell's article was published, Bloomington has not only consolidated its position as one of the preeminent centers of the Rational Choice movement but also has become one of the most dynamic and productive centers of theory and scholarly innovation in the social sciences in general. Moreover, besides being the home of a remarkable, unique and extremely successful combination of interdisciplinary theoretical approaches and hard-nosed empiricism, Bloomington is also a very efficient organization, and the heart of a truly international network of scholars. In your view, what explains the success of the Bloomington research program, and how is it distinctive and original?

VINCENT OSTROM: Probably the best way to characterize our approach would be to start with one of our most influential themes: the idea that broad concepts such as "markets" and "states," or "socialism" and "capitalism," do not take us very far in thinking about patterns of order in human society. For example, when some "market" economists speak of "capitalism," they fail to distinguish between an open, competitive market economy and a state-dominated mercantile economy. In this, they follow Marx. He argued that "capitalism" has a competitive dynamic that leads to market domination by a few large monopoly or monopoly-like enterprises. But what Marx called "capitalism," Adam Smith called "mercantilism." Similarly, many authors who write about "capitalism" fail to recognize the complexity of capitalist economic institutions. They overlook the rich structures of communal and public enterprises in societies with open and highly competitive market economies.

Instead, we should expect to find some combination of market and non-market structures in every society, and we should recognize the complex configuration of institutions behind labels such as "capitalism." We might usefully think about combinations of private and public economies existing side by side. However, it's important to stress that not all forms of public enterprise are, or need to be, state-owned and operated. Various forms of communal or public ownership may exist apart from state ownership. Markets are diverse and complex entities. Markets for different types of goods and services may take on quite different characteristics. Some may work well under the most impersonal conditions. Others may depend upon personal considerations involving high levels of trust among trading partners. In other words, the options are much greater than we imagine, and we can see this is true if we don't allow our minds to be trapped within narrowly constrained intellectual horizons.

PA: The Workshop in Political Theory and Policy Analysis is the organizational expression of the Bloomington research program. What does the Workshop do, and how do you do it?

VO: The Workshop was organized with distinctive teaching and research goals in mind. We called it a "workshop" to communicate a commitment to artisanship and collaboration. Colleagues and students work with one another in conceptualizing the task to be undertaken and in the conduct of inquiry itself. One of the main objectives of the Workshop is to challenge the prevailing emphasis on government as a unitary command structure. The first programmatic articulation of the argument was in a paper I wrote with Tiebout and Warren, "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry" (1961). During the 1960s, several very important works with similar emphases were published contemporaneously: James Buchanan and Gordon Tullock's *The Calculus of Consent: The Logical Foundations of Constitutional Democracy* (1962) and Mancur Olson's *The Logic of Collect Action: Public Goods and the Theory of Groups* (1965). Buchanan and Tullock were concerned with the logic of constitutional choice in establishing the legal framework for collective action. Mancur Olson clarified the logical dilemma entailed in collective action and public entrepreneurship. My work as an advisor to the Alaska Constitutional Convention, and Elinor's dissertation work on "Public Entrepreneurship: A Case Study in Ground Water Basin Development" (1965), added to this burst of theoretical and conceptual creativity regarding theories of goods, public economies, and the constitution of order in human societies. My books *The Intellectual Crisis in American Public Administration* ([1973] 1989), and *The Political Theory of a Compound Republic: Designing the American Experiment* ([1971] 1987), and Elinor's *Governing the Commons: The Evolution of Institutions for Collective Action* (1990) resulted from the intellectual stimulus created by the organization of the Public Choice Society.

One of the distinctive features of our approach is our method for evaluating institutional performance. In our first generation of studies, conducted by graduate and undergraduate students, we compared performance of police in neighborhoods served by Unigov, the consolidated government of Indianapolis and Marion County, with the performance of police in three municipalities in Marion County that had remained independent. This led to a decade of work on policing and governance, including a major study of 80 metropolitan areas sponsored by the National Science Foundation. This work was later extended to include other issues, governance systems and geographical areas.

The possibility that systems of governance could be organized in different ways and yield different patterns of performance could be verified only by empirical analysis. So, we formulated the various positions on the issues as competing hypotheses, gathered empirical data, and created a database that would support in-depth statistical analysis. As the project expanded in scope, we paid very close attention to the way we gathered data and the way we structured it in our databases so that we could derive useful statistical measures. We've since faced a number of similar challenges in gathering data and organizing databases. We've studied the organization of irrigation systems in Nepal, and institutional arrangements for forest management in Nepal, East Africa, and Latin America, to name a few examples. We were able to take the results of these studies and model the institutions formally in game-theoretical terms. These formal results were then used in turn to design laboratory experiments that help to clarify the logic of choice confronting persons in different institutional structures.

PA: Is there a specific approach in the mode of analysis employed by the Bloomington school?

VO: We try to combine formal approaches, fieldwork and experiments in order to "penetrate" social reality rather than to use formal techniques to "distance" ourselves from it, as Walter Eucken once expressed the difference. We seek to find a fit between the conceptual framework used by the researcher and the framework used and shared by the people we are trying to study. The researcher or observer needs to take into account the way people think about and experience themselves and their situation.

If a human group is bound together by a shared purpose or identity, then it has a set of understandings that order the relationships among the members of the group in common. No such group is entirely freestanding; each embraces or is embraced by other groups and other configurations of human relationships, and these configurations each have their own structure or logic. We use these structured social relationships—these overlapping sets of shared understandings—to coordinate our behavior over space and time. It follows that all human choices and actions will be to some extent socially or culturally conditioned. But this does not prevent us from identifying certain human universals, or from drawing comparisons across cultures. There are aspects of human nature, and certain features of social interaction, that can be expected to show up in all human societies. The analysis of particular groups or associations, then, can be placed in a comparative context. We can seek to understand how culturally singular groups come together and strive to solve universal problems.

As I said, we need to address problems of institutional analysis and development with methods that allow us to penetrate social reality rather than distance ourselves from it. A critical dialogue between the observers and those being observed can reduce the potential for observer error. Rethinking the terms of choice that apply both to observers and to the observed remains a continuing challenge for exploring the relationship of human institutions to potentials for development. Working with both students and visiting scholars from different parts of the world is essential to our understanding the constitution of order in human societies.

PA: Your work and the work done at the Workshop illuminates complex institutional configurations only partially captured by the standard ways of thinking and talking about institutions in public discussion and even the social sciences. For instance, you have repeatedly warned of the limits of approaches analyzing social reality exclusively in terms of polar concepts such as "market" and "state." Does that mean that your approach could be described as an attempt to go conceptually beyond "states" and "markets"? In other words, is your vision the foundation of a sort of theoretical "Third Way"?

VO: I would be very reluctant to say that. I see my approach as a set of theoretical lenses. They are better lenses, I hope, than those that compel us to perceive social reality in terms of just two ideal types: states and markets. Dichotomies should be avoided in the social sciences. Regarding the market, in my view, the market has a crucial and unique role in a complex social order. The perspective developed by the Workshop, helps, I hope, to better locate and understand the market in the context of the broader, complex social order. Competitive market structures play a vital role in achieving high degrees of commensurability in the use of money as a measure of value. In the absence of those conditions, money prices give distorted information regarding commensurabilities. This is a fundamental issue. Price provides diagnostic tools for social change and adjustment processes which lead to development. Using price signals, individuals can begin to understand why problems of distortion in pricing arise and thus solve the problems generating those distortions.

PA: In your approach, market prices and the opportunities and choices they signal should be seen in the broader context of an entire universe of choices and opportunities. The implication is that while keeping an eye on the market processes we should pay equal attention to the rest of that universe of opportunities and choices and the institutions and processes they engender.

VO: Indeed. Modern society is remarkably complex. For instance, there are millions of different variations in economic goods. Each variation is the result of a particular kind of production process by which factors are transformed into products. The way human beings relate to one another in the production, exchange, and consumption of diverse goods and services requires an extraordinary variety in patterns of organization.

We should understand this broader way that prices signal opportunities and avenues of choice. When we set about to choose institutional arrangements, we are thus confronted with establishing how price signals indicate the relative

advantages of the available institutional alternatives. Price, in its most general sense, can be defined as the terms on which alternatives are available. Some estimate of the terms on which alternatives are available, or might become available, is necessary before one can begin to estimate the demand for alternative institutional arrangements. Rather than choosing on the basis of money prices for discrete commodities, the choice here is at a different level. It is the choice of configurations of rule-ordered relationships—the choice of institutions— that is at stake. The relative merits of alternative institutional arrangements are much more difficult to assess than are those of commodities on the market. Nevertheless, choices regarding institutions still need to be made.

When people exercise their prerogatives as citizens under a properly constituted system of government, they are able to take into account how their decisions may affect the productive and consumptive possibilities that will be available to them under the institutions they fashion. This implies that individual choice is not limited to choice on the basis of price in a market, but involves a broader range of calculations extending to the choice of terms on which alternatives become available under diverse institutional arrangements, including both market and non-market institutions.

PA: Turning from the issue of the "market" to the one of the "government," I think it is safe to say that you approach the "government" issue using the same broad vision that you apply to the analysis of markets—a vision defined by concepts of "opportunity" and "choice."

VO: We need not think of "government" or "governance" as something provided by states alone. Families, voluntary associations, villages, and other forms of human association all involve some form of self-government. Rather than looking only to states, we need to give much more attention to building the kinds of basic institutional structures that enable people to find ways of relating constructively to one another and of resolving problems in their daily lives. Which, in addition, also connect to more encompassing communities and patterns of interaction. People can rely on self-help in arranging their institutions, rather than depending upon "the elite decision makers of government." By relying upon principles of self-governance to apply to diverse units of government in fashioning a highly federalized and decentralized system, people can begin to alter, in a significant way, the price that applies to the supply of institutional arrangements in self-governing societies.

When an individual within a local economy can help to provide the infrastructure of communal services—develop public thoroughfares, provide for the security of persons and property in a local community, arrange effective sanitation facilities, fire services, and healthful water supplies, etc., while at the same time extending the range of his or her own entrepreneurial opportunities to reach out to larger economic horizons—he or she can create indigenous patterns of economic and political development. In such circumstances, each person can learn how both to serve his or her own interests and, at the same time, to serve others in their communities. Democratic societies cannot be fashioned without such roots of self-governance. Nor can democracies survive in military struggles for power, whether within nation-states or between nation-states. For this reason, the basic architecture of modern societies must, as Tocqueville has argued, draw upon a science of association to fashion rules of social interaction that apply from the level of the village to the level of the nation-state and beyond.

PA: An important part of your work is dedicated to the examination of the conditions under which such communities could form institutions and organizations that reflect their own choices and the opportunities facing them.

VO: Yes, I've dedicated a large part of my work to understanding the conditions affecting the way human beings relate to one another and those that generate a functional social order. Some of these conditions, and consequently my work, refer to very concrete institutional structures. For instance, the viability of market relationships depends upon the availability of public or quasi-public goods and services. Most operating economies will thus be mixed economies, containing both public and private enterprises. However, the work done at the Workshop demonstrates that public

services need not be provided by a central government or the state. Many streets, roads, and other thoroughfares; fire protection; police services; and other such services may be arranged by local communities. These arrangements may rely on private entrepreneurs, but under terms and conditions that are communally specified.

Other, perhaps deeper, conditions for social order include shared beliefs and norms within communities about how they regard one another, what they consider to be fair, how they distinguish right from wrong, and how they see society and nature as wholes coming together to constitute a universal order. If there were no bases for trust, and no shared community of understanding about the meaning of right and wrong, then the terms of trade in exchange relationships, or the patterns of reciprocity in communal and social relationships, would become extraordinarily precarious. Such societies could not "develop." This is why it is necessary to see the role of religious institutions, for instance, as blending with and contributing to the economic, social, and political institutions in a society.

PA: In your own work you also put a special emphasis on the role of ideas...

VO: There are numerous ways in which ideas influence social order and institutional arrangements. Lord Bauer, for instance, makes the very interesting point that the success of the market order is challenged everywhere because it "provides no mechanism for its own survival." Success in the market, Bauer argues, "requires concentration on concrete problems of production and marketing." These problems require a devotion of time and energy that does not leave room for people to develop "sustained and perceptive interests in general issues and their analysis." They lack a clear idea of the market, its functioning, and its implications for the general institutional performance of the social system. This is much the same issue that Tocqueville raised when he expressed concern that the pursuit of wealth, in a democratic society, might come at the cost of citizenship. Individuals who pay attention only to market prices in determining their choices may soon become vulnerable to political arguments such as that "workers and peasants" could achieve greater advantage by expropriating private property and instituting a socialist society. The naive maximizer might select the option offered by those who make the biggest promises.

Bauer's "workers and peasants" need to be aware of the benefits of a market order. They would then understand the naivete of revolutionary rhetoric and the likelihood that radical political intervention in the market order will lead to increasing oppression and deteriorating conditions of life.

Real revolutionary potential exists when people establish processes of decision making that specify the terms and conditions of government where citizens reserve to themselves fundamental authority that applies to the governance of society including the authority to set the terms and conditions of government. When people exercise the prerogatives of constitutional choice we can view people as citizens exercising, at the constitutional level, the basic prerogatives that control the other aspects of institutional choice that may be exercised by instrumentalities of government. When such conditions prevail we might think of people becoming self-governing.

PA: What could be done in order to create such conditions for self-governance?

VO: The answer to this question has many dimensions. The most basic is that people would need to know more than how to make decisions on the basis of the prices that are available in markets. They would also need to know, as Tocqueville has suggested, the science and art of association. In order to secure the advantages that come both from working together in diverse types of cooperative enterprise, and that come from systems of government where no one exercises unlimited authority, and where all officials can be held to account for the proper discharge of the public trust, people need to know, to some extent, how these things work and why they are important. Each individual would then be a knowledgeable actor in a self-governing society where opportunity is a function of both organizational diversity and complexity. A Tocquevillian science of association—a body of knowledge that helps us to under-

stand the nature of social order, and the forms of social interaction that lead to mutual advantage—is the foundation for choosing among the institutional alternatives open to us. Now, it remains to be determined whether human beings can actually use such methods of discussion, reflection, and choice to fashion the future course of human civilization. There is some basis for an affirmative response to the question posed by Alexander Hamilton in the opening paragraph of the first essay in The Federalist Papers: "whether societies of men are really capable or not of establishing good government from reflection and choice . . ." Now, all societies remain vulnerable to failure. The conditions for an open society, as expounded by Karl Popper, such as legal due process or opportunities for constitutional revision, are necessary but not sufficient for societies to achieve "good government" from reflection and choice. Some degree of institutional weakness and failure is likely in all societies. However, it seems possible that our institutions will become increasingly subject to reflection and choice as new patterns of communication and interaction spread throughout the human population. So, to answer Hamilton, as new opportunities for reflection and choice become more widespread among humankind, we need not be confined only to exigencies of accident and force.

PA: What do you consider to be the most important intellectual challenge confronting the scholars exploring the "science of association"?

VO: We create conceptual distinctions in order to think and communicate about complex orders. Language always simplifies. Yet, recourse to overly abstract simplifications such as "states" and "markets," "capitalism" and "socialism," the "modern" and the "less developed," is becoming increasingly useless. We must take car not reify concepts and conceptual models—to treat them as though they are realities. We should avoid simple dichotomies. The conditions for public entrepreneurship require reflection and choice grounded in the requirements of liberty and justice as well as those for economic efficiency. Our goals must meet multiple standards of acceptability. The question, then, is how can we come to terms with institutional analysis and development that is pertinent to the problems of choice confronting people in different parts of the contemporary world?

PA: How do you see the current scholarly contributions inspired by or related to your vision? How vibrant is scholarly contribution to the "science of association" these days?

VO: There are emerging communities of scholars in all parts of the world who share many of the aforementioned perspectives and presuppositions. These scholars view conceptual, cultural, economic, ethical, and political considerations as closely linked. The work of these scholars is variously referred to as studying "public choice," the "new institutional economics," "transaction-cost economics," "institutional analysis and development," and the "new political economy." This work is creating a fresh understanding of the options that are available to people in different parts of the world, and new tools for analysts who are trying to come to a better understanding of human potential.

One of the most important aspects of this work is the emphasis on the range of choices available for constituting ordered social relationships. The command of the sovereign is not the only way to achieve an ordered way of life. Most societies, most of the time, have relied upon some combination of command structures and consensual arrangements. If we are to create alternatives to imperial orders, we must grapple with the problem of constituting systems of government that operate with the consent of the governed. The scholars working in these areas are contributing to a better understanding of that simple, crucial and so much neglected issue.

RETHINKING INSTITUTIONAL ANALYSIS AND DEVELOPMENT: THE BLOOMINGTON SCHOOL

RETHINKING GOVERNANCE SYSTEMS AND CHALLENGING DISCIPLINARY BOUNDARIES

Interview with Elinor Ostrom

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PA: For most people, your name is associated with your well-known research on "common-pool resources": groundwater basins, irrigation systems, fisheries, grazing areas, and communal forests. In the absence of special institutional arrangements for their management, these resources are in danger of being overused, overgrazed, etc., and depleted. Your research on common pool resources has been defined by disciplinary and methodological pluralism with a very focused empirical and policy concern. This approach has become an identifying mark of the Bloomington Workshop in Political Theory and Policy Analysis, and has become a model for cutting-edge social-science research. Less well known is that your work on common-pool resources is part of a broader research program that uses this distinctive approach to institutional analysis to challenge currently existing disciplinary boundaries and to advance the study of collective action and governance systems.

EO: Indeed, the Workshop's research on common-pool resources is part of a broader effort to develop an empirically supported theory of self-organizing and self-governing forms of collective action. The nature of the task demands an interdisciplinary approach. A great deal of contemporary policy tends to recommend Smith's concept of market order for all private goods and Hobbes's conception of the Leviathan—now called "the sovereign State"—for all collective goods. The poverty of the oppositions between private and public, market and state, stems, to some extent, from the separation of political economy into two disciplines, political science and economics, which have developed along separate paths. While academic specialization has advantages, overspecialization has dangers. Part of the unfortunate legacy of overspecialization is this kind of sweeping policy prescription based on overly stylized ideas about the institutional possibilities.

On the one hand, when economists show that market arrangements fail, they are frequently willing to make simple recommendations that "the" State should take care of these problems without asking how incentives are generated within State bureaucracies to improve performance. The existing theory of collective action, which underlies the work of all political economists, has accentuated the presumed necessity of the State as an alternative to the Market, since the accepted theory predicts that voluntary self-organization to provide public goods or manage common-pool resources is highly unlikely. On the other hand, when political scientists and policy analysts show that over-centralized governmental units fail to perform, they sometimes recommend "privatization" without working through the logic of how to create a set of private incentives that increases performance and accountability.

My academic career has been devoted to the development of empirically grounded theories to cross the great divide between economics and the other social sciences in the conduct of comparative institutional analysis. In the 70's and early 80's, we conducted extensive research on how institutional arrangements affect the output, efficiency, and adaptability of urban service delivery in American metropolitan areas. Our more recent research on common-pool

resources is relatively well recognized, while the theoretical dimensions of this effort are less known. My hope is, however, that the examination and analysis of common-pool resources in the field, in the experimental laboratory, and in theory, contribute to the development of an empirically valid theory of self-organization and self-governance.

PA: You mentioned the analytical and theoretical relevance of the problem of the "commons." However, doesn't the "commons" as a phenomenon have relevance that goes beyond institutional analysis?

EO: Many think the commons problem refers to self-organized governance and management of various natural resource systems by communities of the past. They endow these communities with a sort of archaic or exotic aura. Others think that they will slowly disappear—relics of a dying past, to be taken over by modern institutions. To those who doubt the viability of commons governance institutions in the modem age, let me point out that many such institutions exist and are proliferating, and not only in the area of natural resources management.

The modern corporation is itself a case in point. Since the foundational work of Ronald Coase, students of industrial organization understand that that a firm shares many aspects with other common-property institutions. A contemporary housing condominium is also a commons institution. While individual families own the apartments in a "condo," they have joint rights and duties in relationship to the buildings and the grounds of the condominium complex. Some of the most imaginative work on enhancing urban neighborhoods relates to helping tenants of public housing projects acquire joint ownership and management of these projects. This is a shift from government ownership to a common-property arrangement. The Internet is another commons that is certainly relevant to modern life. So the problem of the commons has an ongoing practical relevance.

Let me go back to the notion that the commons is a "relic." Local, self-organized institutions are a significant asset in the institutional portfolio of humankind, and need to survive into the twenty-first century. Many indigenous institutions that developed to govern and manage local common-pool resources have proven themselves capable of enabling individuals to use these resources intensively over the long run. Some have survived centuries or even millennia without destroying the delicate resource base on which individuals depend for their livelihood. International donors and nongovernmental organization, as well as national governments and charities, have often acted, under the banner of environmental conservation, in a way that has unwittingly destroyed the very social capital—shared relationships, norms, knowledge, and understanding—that has been used by resource users to sustain the productivity of natural capital over the ages. The effort to preserve biodiversity should not lead to the destruction of institutional diversity. We have yet to adequately recognize how the wide diversity of rules groups have devised through the ages work to protect the resources on which they rely. These institutions are most in jeopardy when central government officials assume that they do not exist (or are not effective) simply because the government has not put them in place.

Thus, in response to your question, my answer is straightforward: Indeed the commons have an enormous relevance beyond theory. If we do not find the means to develop and enhance the capabilities to govern and manage common-pool situations effectively, the absence of such institutions in the twenty-first century will lead to fundamental social and economic problems. Commons governance institutions are by no means relics of the past. The more we learn about them over time, the more likely it is that future policy-making will build more effectively on the strengths of these forms of institutions, and avoid some of the errors of the past.

PA: In your work, you stress the danger of using models and metaphors unchecked by comparison to empirical reality. One of your major concerns about the treatment of commons and collective action problems in the literature was that the dominant models and metaphors were misleading.

EO: In general, I am not opposed to modeling and using models for policy analysis. I am opposed to the persistent reliance upon models like the "Prisoners' dilemma" or the metaphor of "the tragedy of the commons" after years of

empirical research in both the lab and the field that has called their universal applicability into question. Many researchers drawing on these models have concluded that the participants in a commons dilemma are trapped in an inexorable process from which they cannot extract themselves. It is then inferred that external authorities are necessary to impose rules and regulations on local resource users who are otherwise incapable of saving themselves. This vision of the problem, according to which resource users are trapped in a tragedy of their own making, was consistent with early textbooks on resource economics, and with predictions derived from non-cooperative game theory for finitely repeated dilemmas. Contemporary policy analysts also share the belief that it is possible to design and impose optimal rules for the management of common-pool resources from the top down. Because common-pool resources, and their users, are viewed as relatively similar to one another, and because of the simplicity of the models, officials (assumed to be acting in the public interest) are thought to be capable of devising uniform and effective rules for an entire region. Prescriptions calling for central governments to impose uniform regulations over most natural resources are thus consistent with important bodies of theoretical work.

However, empirical research does not support the idea that a central agency could solve all resource problems for a large region with simple, top-down directives. Field studies in all parts of the world have found that local groups of resource users, sometimes by themselves and sometimes with the assistance of external actors, have created a wide diversity of institutional arrangements for cooperating with common-pool resources. Field studies have also found multiple cases where resource users have failed to self organize.

Thus, the core empirical and theoretical question is why self-organization is successfully undertaken in some cases and not in others. With better knowledge about what enhances local self-governance, it is possible to design larger-scale institutional arrangements that generate accurate information, provide open and fair conflict-resolution mechanisms, share risk, and back up efforts at local and regional levels.

PA: One important feature of your approach is the role of fieldwork and case studies in testing the models and theories you employ. The conclusion that overuse and destruction of common-pool resources is not an inescapable outcome, but that users facing a commons dilemma can voluntarily devise effective management strategies, is the result of extensive empirical evidence gathered in the field. For instance you have traveled to Nepal:

EO: The study of irrigation systems in Nepal found that irrigation systems built and governed by the farmers themselves are on average in better repair, deliver more water, and have higher agricultural productivity than those provided and managed by a government agency. Also we found greater equity of water delivery in traditional, farmer-managed systems than in more modern, agency-managed systems. Therefore, one of the questions we have studied has been: How is it possible that "primitive" irrigation systems significantly outperform systems that have been improved by the construction of modern, permanent, concrete-and-iron head-works, funded largely by donors, and constructed by professional engineering firms?

Many factors contribute to these counterintuitive results. But most of them relate to the different incentives faced by key participants in the finance, design, construction, operation, and maintenance of farmer-governed and agency-run systems. On farmer-governed irrigation systems, farmers craft their own rules, which frequently offset the perverse incentives they face in their particular physical and cultural settings. These rules may be almost invisible to outsiders, especially when they are well accepted by participants who do not even think of them as especially noteworthy. To discover this diversity of locally designed rules, to understand how the institutional arrangements work given the biophysical conditions of a resource, and the culture of the users, you have no other choice but to go there and do field work. I have also been blessed by the opportunity to work with wonderful colleagues and graduate students who have together spent many years in the field. We are now working with a network of Collaborating Research Centers in Africa, Asia, and Latin America to study the rules used in government managed, privately managed, and communally managed forests and their impact on forest sustainability.

PA: The conclusions of the Bloomington research program have very significant implications for economic development policy:

EO: Academics, aid donors, international nongovernmental organizations, central governments, and local citizens need to learn and relearn that no government can develop the full array of knowledge, institutions and social capital needed to govern development efficiently and sustainably. The sheer variety of cultural and biological adaptations to diverse ecological conditions is so great that I am willing to make the following assertion: Any single, comprehensive set of formal laws intended to govern a large expanse of territory containing diverse ecological niches is bound to fail in many of the areas where it is applied.

Improving the abilities of those directly engaged in the particulars of their local conditions to organize themselves in deeply nested enterprises is potentially a more successful strategy for solving resource problems than attempting to implement idealized, theoretically optimal institutional arrangements. There is plenty that national government officials can do to help a self-governing society. They can provide efficient, fair, and honest court systems, effective property right systems, and large-scale infrastructure projects – such as national highways – that cannot be provided locally.

Probably one of the most telling illustrations of this issue comes from the work I just mentioned on irrigation systems. Irrigation systems are pivotal for sustainable growth in the developing world. Most efforts to develop irrigation focus on physical capital in the form of dams, aqueducts, diversion weirs, and canals. The development of adequate physical capital is, of course, a necessary step in achieving enhanced benefits. But many technically advanced irrigation systems have not been sustainable. Underlying all these problems is a variety of perverse incentives and institutional failures. The initial plans for many of the major irrigation projects in developing countries focused almost exclusively on engineering designs for the physical systems and ignored organizational questions. This engineering bias leads to the neglect of proper incentives. Project engineers, for example, face strong pressures to focus on the design of physical works while ignoring social infrastructure, and to focus on larger rather than smaller projects. Few engineering schools offer any courses on property rights or institutional arrangements. So, engineers are trained to think that physical infrastructure is the "whole bag."

Farmers on large-scale projects often face perverse incentives. Because they lack of control over water availability, there is a substantial temptation to refrain from contributing resources to maintenance. Moreover, when very large sums are channeled through politicians who use the process to enhance their power and wealth, project plans cannot be expected to accurately reflect conditions on the ground. When engineers assigned to operations and maintenance hold low-status positions, are underpaid, and are not dependent on the farmers of a system for budgetary support or career advancement, large government-managed systems cannot be expected to perform very well. And, one can expect major problems of corruption.

Performance is good where the incentive systems for operations and maintenance units reward engineers for drawing on local knowledge and working directly with farmers. The irrigation agency's budget is not even loosely linked to system performance when the revenue received is not linked to taxes levied on the value of crop yield, or the amount of water taken. Where fees are imposed in name only, and do not represent an important source of revenue to the units operating and maintaining systems, and where hiring, retention, and promotion of employees are in no way connected with the performance of a public facility, nothing offsets the dependency of the community on insulated officials. Thus, while some improvements in the operation of irrigation systems can come from building better physical structures, the key problems relate to the incentives facing officials and farmers.

Over the next several decades, the most important consideration in irrigation development will be that of institutional design—the process of developing a set of rules that participants in a process understand, agree upon, and are willing to follow, so long as they know that most other participants are also following them or face sanctions for non-compliance.

Therefore, while it is essential to understand the physical side of development projects, the emphasis should be on the institutional side. Crafting an institution is a process that must directly involve the users throughout. The term "crafting" emphasizes the artisanship required to devise institutions that both match the unique combinations of variables present in any one system and can adapt to changes in these variables over time. Involving users directly in this process increases the likelihood of institutions that are well matched to the local physical, economic, and cultural environment.

Experience with organizing farmers over the last several decades has shown that simply giving individuals organizational blueprints is not enough to change the incentives and behavior of those individuals. Nor is the problem simply one of organizing farmers. The failure to achieve sustainability and the failure to organize farmers are symptoms of pervasive ignorance about how effective institutions are crafted over time and about the role donor institutions and governments should play in that process.

PA: The role proposed for central governmental officials and for donor agencies is quite different from that proposed by earlier approaches that called for the top-down creation of institutions and organizations based on a single institutional blueprint.

EO: Crafting development-enhancing institutions is an ongoing process that must directly involve the users. Instead of designing a single blueprint for all places and circumstances, officials need to enhance the capability of social actors to design their own institutions. The incentives facing farmers, villagers, and officials are more important in determining long-term performance than is the engineering of the physical systems. When farmers select—and compensate—their own officials to govern and manage an irrigation system that the farmers own and operate, the incentives faced by the officials are closely aligned to the incentives of farmers in the system, while the performance of the system is linked to that of the officials. In many centralized, national government systems, no such linkage exists.

Donor agencies need to direct their efforts toward enhancing the productive capabilities of a larger proportion of the local community rather than simply trying to replace primitive infrastructures with modern, technically sophisticated ones. Showering a region with funds is a poor investment if that serves mainly to bolster political careers and builds little at the ground level. It makes more sense to invest modest levels of donor funds in local projects in which the recipients are willing to invest some of their own resources. If the level of external funding becomes very large without being strongly tied to a responsibility for repayment over time, local efforts at participation may be directed more at rent seeking than at productive investment activities.

PA: It is noteworthy that the ability to overcome local collective action problems and build functional institutions requires an internal capacity of communities to mobilize, organize and cooperate.

EO: That is why the Workshop puts special emphasis on the concept of "public entrepreneurship." Entrepreneurship is not limited to the private sector. When there is an environment that enhances their capacities to organize, mobilize resources, and invest in public facilities, local public entrepreneurs can develop a wide variety of efficiency-enhancing solutions to local collective-action problems. In some cases, donors can encourage national governments to reduce restrictions on the ability of individuals to form local associations, to establish a common treasury, and to undertake a wide variety of local community projects. Encouraging such groups to form associations of associations enhances their ability to learn from each other about what works, and to monitor their own members.

Investing in short-term projects to enhance citizen participation has, however, frequently failed in the past. Solving collective-action problems is a costly and time-consuming process. If it is to succeed, it requires a parallel effort to create solid and functional institutions at the national level. Many of the so-called participation programs initiated by donors, NGOs and national governments involve little more than calling meetings, with little extension of real responsibility. Just attending meetings is boring and costly and not worth it.

PA: It seems that your research has two distinctive implications for policy. On the one hand, an upbeat one: people can overcome collective action problems in very creative ways without needing a Leviathan. On the other hand, a cautious one: self-governance is not an easy process and there is no guaranteed universal blueprint for achieving it.

EO: It is now obvious that the search for rules that will improve institutions and government is not as straightforward as many scholars—some of them not at all utopians or naivete—were once inclined to believe. For instance, there is an incredibly large combination of rules that could be adopted to overcome the commons dilemmas in different ecological and social settings. Because multiple rules affect each of the many components of a particular setting, conducting such a complete analysis would involve more time and resources than many policy analysts have assumed in the past. Instead of assuming that designing effective governance systems is a relatively simple analytical task that can be undertaken by a team of objective analysts sitting in the national capital, or at an international headquarters, it is important that we understand policy design to require experimentation with combinations of large numbers of component parts.

When we change policy—when we add a rule, change a rule, or adopt some new set of rules—we are in effect running an experiment based on more or less informed expectations about the likely outcome. It is important to recognize that the complexity of the ever-changing biological and socio-economic environment, combined with the complexity of institutional rules, makes it fairly likely that any proposed change of rules will fail.

The need to experiment and the chance that we're going to make mistakes alerts us to the positive side of redundancy and multiple, parallel jurisdictions. In any design process that involves a substantial probability of error, using redundant teams of designers has been shown as one way of reducing the costs of big mistakes. If there are multiple jurisdictions with considerable autonomy at the local level, policy makers can experiment more or less simultaneously within their separate jurisdictions. It is potentially feasible for a central government to undertake pilot programs in order to experiment with various options. However, when central governments do this, they usually intend to identify the set of rules that works best for a single, large, diverse jurisdiction, which misses the point.

PA: This discussion of experiments within social units or decision arenas is an excellent way to introduce two other key notions of the Bloomington research program: "polycentricity" and "complex adaptive systems."

EO: Many scholars consider the very concept of organization to be closely tied to the presence of a central director who designed a system to operate in a particular way. Consequently, many self-organized governance systems are invisible to them. In contrast to forms of organization that result from central direction, most self-organized groups are better viewed as complex adaptive systems. Complex adaptive systems are composed of a large number of active elements whose rich patterns of interaction produce emergent properties that are not easy to predict by analyzing the separate parts of a system. One can see them as consisting of rules and interacting agents that adapt by changing the rules dynamically on the basis of experience. Complex adaptive systems differ from the kind of simple non-adaptive physical systems that have been the focus of much scientific effort. Unfortunately, the relatively straightforward physical sciences have been the model for many aspects of contemporary social science, even though contemporary physics and biology are starting to address similar problems of complex systems. Thus, social scientists have yet to develop many of the concepts needed to understand the adaptability of systems. No general theory of complex adaptive systems yet exists to provide a coherent explanation for processes shared by all such systems.

Many of the capabilities of complex adaptive systems are retained in a polycentric public enterprise system. By "polycentric" I mean a system where citizens are able to organize not just one but multiple governing authorities, as well as private arrangements, at different scales. Each unit may exercise considerable independence to make and enforce rules within a circumscribed scope of authority for a specified geographical area. In a polycentric system, some units are general-purpose governments, whereas others may be highly specialized. Self-organized resource governance

systems, in such a system, may be special districts, private associations, or parts of a local government. These are nested in several levels of general-purpose governments that also provide civil equity as well as criminal courts.

Polycentric systems are themselves complex adaptive systems without one dominating central authority. Thus, no guarantee exists that such systems will find combinations of rules at diverse levels that are optimal for any particular environment. In fact, one should expect that all governance systems would be operating at less than optimal levels, given the immense difficulty of fine-tuning any complex, multi-tiered system. But because polycentric systems have overlapping units, information about what has worked well in one setting can be transmitted to other units. And when small systems fail, there are larger systems to call upon—and vice versa.

PA: A concern with "failure," "error," and "vulnerability" appears to play a major role in the approach developed by the Bloomington School. Vincent Ostrom wrote an entire book on the vulnerability of democratic societies, while your own work has given special attention to the vulnerability of "social-biophysical systems."

EO: Given the complexity of rule systems, and the complexity of the biophysical world that we are trying to regulate, all efforts to devise effective governance systems face a nontrivial probability of error. When you have a system that is vulnerable to disruption by external shocks—for example, a hurricane, or a military invasion—the probability of error increases substantially. Polycentric governance systems are frequently criticized for being too complex, redundant, and lacking a central direction when viewed from a static, simple-systems perspective. They have considerable strengths when viewed from a dynamic, complex-systems perspective, particularly one that is concerned with the vulnerability of governance systems to external shocks.

The strength of polycentric governance systems is each of the subunits has considerable autonomy to experiment with diverse rules for a particular type of resource system and with different response capabilities to external shock. In experimenting with rule combinations within the smaller-scale units of a polycentric system, citizens and officials have access to local knowledge, obtain rapid feedback from their own policy changes, and can learn from the experience of other parallel units. Instead of being a major detriment to system performance, redundancy builds in considerable capabilities.

If only one government exists for a large geographic area, failure of that unit to respond adequately to external threats may mean a major disaster for the entire system. If there are multiple governance units, organized at different levels for the same geographic region, a failure of one or more of these units to respond to external threats may lead to small-scale disasters. But these may be offset by the successful reaction of other units in the system. Policy analysts can learn a lot from the important role that redundancy plays in the design of robust physical systems as well as by a serious study of the human immune system and its capacity to cope with external threats by the presence of a large number of seemingly redundant systems that are ready to combine and recombine in order to fight off the threat of various types of infections. Redundancy is a means of keeping systems running in the presence of external shocks or internal malfunctions.

In an earlier era, policy analysts simply criticized polycentric systems as being grossly inefficient due to excessive levels of redundancy. These criticisms were made on the basis of static theories of optimal management and not on the basis of empirical research. Simply listing the number of governments in a region was seen by some scholars as sufficient proof of inefficient governance. In both the United States and Western Europe, massive consolidation campaigns were waged during the past century to eliminate so-called "overlapping, redundant units of government," which were, however, vigorously defended by the populations they served.

Serious empirical research has now shown that polycentric systems tend to generate higher levels of output at similar or lower costs than monocentric systems governing similar ecological, urban, and social systems. Empirical studies of the vulnerability of differently linked social-biophysical systems are highly likely to demonstrate that governance systems composed of multiple units at multiple scales of organizations are less vulnerable to many types of

external shocks than centralized systems. Studying the vulnerability of governance systems thus provides an important opportunity to build a better theory of governance based on the recognition that no social-biophysical system is a static system, and that in order to cope with external shocks one needs robust systems that possess considerable redundancy in their capacities to respond and learn from one another.

PA: Considering the analytical challenges posed by the study of polycentricity and complex adaptive systems, it seems that an interdisciplinary approach is not just one option among other, but unavoidable. In your own work, it looks like your interdisciplinary efforts went well beyond the social sciences:

EO: In a sense, your observation is correct. For instance, in the case of the CPR work published in *Governing the Commons*, I combined the strategy used by many scholars associated with the "new institutionalism" with the strategy used by biologists for conducting empirical work. The institutionalist strategy is based on the assumption that individuals try to solve problems as effectively as they can and also try to ascertain what factors help or hinder them in these efforts. When the problems observed involve a lack of predictability, information, or trust, as well as high levels of complexity and transactional difficulties, then the efforts to explain must take these problems overtly into account rather than assuming them away.

The biologists' scientific strategy involves identifying for the simplest possible organism in which the process under investigation occurs in a clarified, or even exaggerated, form. The organism is not chosen because it is representative of all organisms. Rather, the organism is chosen because particular processes can be studied more effectively using this organism than using another. These cases are in no sense a "random" sample of cases. Rather, these are cases that provide clear information about the processes involved.

My "organism" for much of my work has been a particular type of human situation — the common-pool resource situation. Colleagues and I have studied this situation using game theory and agent-based models, in the experimental laboratory, in single case studies, in small-N, comparative studies, and in large-N statistical studies. We have deployed multiple methodologies in order to develop a series of reasoned conjectures about how it is possible that some individuals organize themselves to govern and manage common-pool resources while others do not. We hope that these conjectures contribute to the development of an empirically valid general theory of self-organization and self-governance.

However this discussion about interdisciplinary and general theory shouldn't be misleading. In my view, there are important specific differences between social sciences and the natural sciences. Complex adaptive systems involve learning. The role of knowledge, conditional action, and anticipation are fundamental. In this respect I might say that the work that we have done at the Workshop is deeply rooted in the central tradition of human and social studies. There is no better testimony for that than the questions that structure our work: How can fallible human beings achieve and sustain self-governing entities and self-governing ways of life? How can individuals influence the rules that structure their lives? Similar questions were asked by Aristotle and other foundational social and political philosophers. These were the concerns of Madison, Hamilton and de Tocqueville. Today these central questions unite political scientists, economists, geographers, sociologists, psychologists, anthropologists, and historians who study the effect of diverse rules on human behavior in various institutional contexts, countries or at different geographic scales.

Moreover one of our greatest priorities at the Workshop has been to ensure that our research contributes to the education of future citizens, entrepreneurs in the public and private spheres, and officials at all levels of government. We have a distinct obligation to participate in this educational process as well as to engage in the research enterprise so that we build a cumulative knowledge base that may be used to sustain democratic life. Self-governing, democratic systems are always fragile enterprises. Future citizens need to understand that they participate in the constitution and reconstitution of rule-governed polities. And they need to learn the "art and science of association." If we fail in this, all our investigations and theoretical efforts are useless.

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