

Foundations of the Ostrom workshop: institutional analysis, polycentricity, and self-governance of the commons

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Abstract This paper highlights important lessons gained from the research program of Elinor Ostrom, and demonstrates the close connection between public choice and the work on collective management of the commons for which Lin was honored by the Nobel Prize committee. Although our primary focus is on Lin's research on self-governance and the "commons," an overarching goal is to capture the intellectual journey of participants in the Ostrom Workshop, who continue to be guided by the inspiring examples set by Lin and Vincent Ostrom.

Keywords Ostrom · Commons · Self-governance

Elinor (Lin) Ostrom won the 2009 Nobel Prize in Economic Sciences "for her analysis of economic governance, especially the commons" (http://nobelprize.org/nobel_prizes/lists/2009.html). Lin would be the first to admit that her prize recognizes the products of research programs that have been truly collaborative in nature, involving an ever-expanding network of scholars and students associated with Indiana University's Workshop in Political Theory and Policy Analysis (hereafter the Ostrom Workshop), which Lin and her spouse and long-time collaborator Vincent Ostrom first established in 1973. Former and current faculty, students, and visiting scholars have all contributed to this effort to document the ability of self-governing communities to effectively manage common-pool resources in many contexts throughout the world. The Ostrom Workshop approach to institutional analysis has a long and evolving history, only parts of which we can adequately cover in this essay. (See Jagger et al. (2009) for a more extensive informal discussion of the history of the Workshop.)

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Anyone approaching Lin's work on groundwater, irrigation systems, or forestry resource management for the first time might be forgiven for presuming that her work has few if any connections to the large body of research on "public choice," but that presumption would be sorely mistaken. Throughout her career, Lin has been deeply influenced by Vincent Ostrom, and Vincent was present at the creation of public choice. Specifically, Vincent was among those attending the "No-Name" conference in 1963 that soon developed into the Public Choice Society (see Ostrom and Ostrom 1971). Vincent later served as president of Public Choice in 1967–69, and Lin did the same in 1982–84.

The goal of this paper is to highlight some critically important lessons of Lin's research and to demonstrate the close connection between public choice and the work on collective management of the commons for which Lin was honored by the Nobel Prize committee. Although our primary focus is on Lin's research on self-governance and the "commons," we hope that it also captures part of the complexity of the intellectual journey of participants in the Ostrom Workshop, who continue to be guided by the inspiring examples set by Lin and Vincent.

1 From natural resource management to urban policing and back again

The Ostrom Workshop is very much a product of the passion and intellectual drive that lies at the core of the research programs of Lin and Vincent Ostrom. To understand Lin's approach to issues of self-governance, one must understand the intellectual common ground on which Lin and Vincent began building in the 1960s.

A useful starting point is the seminal paper by Ostrom et al. (1961), which introduced the concept of a "polycentric political system," now more frequently referred to as polycentricity (McGinnis 2000). The basic idea is that any group of individuals facing collective problems should be able to address that problem in whatever way they best see fit. To do so, they might work through the existing system of public authorities, or they might establish a new governance unit that would impose taxes on members of that group in order to achieve some common purpose, including monitoring and sanctioning of individual contributions. Either way, groups should first try to solve their problems themselves, rather than immediately turning to some government unit for an authoritative (and perhaps coercive) decision.

The well-being of any human community is critically dependent on continued access to natural and man-made resources. Decades before sustainability became a popular slogan, the Ostroms began to investigate the conditions under which natural resources can be managed in a sustainable manner. The origins of the Workshop approach can be traced back at least as far as "State Administration of Natural Resources in the West," in which Vincent Ostrom (1953) examines the legal underpinnings of the role of American states in natural resource management. In the opening paragraphs, he directs the reader's attention to the imperatives imposed by the physical nature of the good; that is, the characteristics of the physical and climatic environment of the American West. He argues that state jurisdictions bear little relationship to natural water management zones, and specifically asserts that "the major problems of resource administration require regional solutions that transcend state boundaries" (Ostrom 1953: 492).

This concern for matching institutions to the physical environment (and to the characteristics of the community) lies at the heart of the Institutional Analysis and Development (IAD) framework later developed at the Ostrom Workshop. These issues were of more than passing, theoretical interest. In subsequent years, Vincent helped craft the natural resource article of the Alaskan state constitution.

In her PhD dissertation on the role of public entrepreneurs in devising groundwater management in California, Elinor Ostrom (1965) concluded that the use of equity proceedings in state courts facilitated the negotiation of complex patterns of interagency arrangements to prevent saltwater erosion from the ocean and to assure the replenishment of groundwater supplies. Through in-depth interviews, archival research, and nonparticipant observation, Elinor Ostrom determined that one factor crucial to this success was the existence of institutional arrangements at the state level that authorized local associations, special districts, and public and private agencies to deal with these problems. Also, effective conflict mechanisms were made available to reach consensual arrangements that secured clear property rights.

Despite their initial (and subsequent) research on natural resource management, the first large-scale empirical research program of the Ostrom Workshop dealt with police services in urban America (McGinnis 1999). Upon their arrival in Bloomington, the Ostroms were intrigued by a long-standing political debate over metropolitan organization that had just come to a head. In 1969, city and county governments in the Indianapolis metropolitan area were consolidated into a single government, called “Unigov.” However, this consolidation was incomplete, in the sense that a few suburban municipalities elected to remain outside this new arrangement. Thus, these social scientists had a unique opportunity to compare the production of public goods and services by large and small agencies serving consolidated and nonconsolidated communities that were virtually identical in all other ways.

In a series of related research projects, the Ostroms and their colleagues demonstrated that citizens were more satisfied with the performance of smaller- or intermediate-sized police forces (McGinnis 1999). However, larger-scale operations remained an important aspect of this success, especially for training and crime lab facilities. This early Workshop research on police services delivery demonstrated that the “nature” of the good or service is a crucial intervening variable in the relationship between scale of production and citizen evaluation of agency performance. Goods or services that are most efficiently produced at small scales would be hurt by consolidation, whereas larger-scale goods might still be efficiently produced if small jurisdictions were allowed to enter into contracts with larger-scale producers. For example, a small police force might produce better service in terms of patrolling or responding to reports of crimes than a large police force, but both might rely on the same crime lab or training facilities or emergency dispatch (see articles collected in McGinnis 1999).

This empirical demonstration that public services can be most efficiently provided under a system of multiple and overlapping jurisdictions reinforced the wisdom behind the founders of the American constitutional order, who were guided by a political theory articulated by Vincent Ostrom (2008). When they returned to the study of the management of natural resources, the Ostroms brought with them a renewed appreciation of the myriad advantages of empowering communities to address their own collective problems. Their later research on resource and development demonstrated that polycentric governance is equally effective for empirical settings that could not be further removed from metropolitan centers in the United States, namely, some of the poorest regions of the developing world.

Perhaps the most fundamental lesson drawn from this early research lies in the recognition of the critical importance of *local solutions* to complex policy problems. This lesson did not comport well with the prevailing inclination towards large-scale governmental intervention throughout society and in nearly all sectors of the economy. The relevant policymaking communities are now more open to a wider range of alternative approaches, partially as a response to the disappointing record of national policy initiatives.

2 The commons

The literature on the commons, or what is more technically defined as common-pool resources (CPRs), should be viewed initially from its place in the larger literature on dilemmas of collective action. Since the foundational work of H. Scott Gordon (1954) on the commons, and Mancur Olson (1965) on collective action more broadly, the behavioral dilemmas associated with collective action have gained prominence across all of the social sciences. Olson argued that “unless the number of individuals is quite small, or unless there is coercion or other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interests*” (1965: 2; emphasis in original). In the last thirty years, however, this behavioral hypothesis has received considerable challenge from both field researchers and experimentalists.

A hugely influential article by Garrett Hardin (1968) highlighted two standard responses to the “tragedy of the commons”: when open-access resources are overexploited, the “answer” was to either privatize the resource (in order to realize the advantages of efficient market exchange of private property) or to centralize its management (by governmental officials guided by a long-term understanding of the public interest). By exogenously imposing new institutions that either centralized all rights in a single owner (or regulator) or established a market to allocate fully specified rights, it was presumed that overexploitation could be avoided. The evidence from field studies, however, demonstrated that these policy responses were far from universally successful. Most importantly, one central theme in this literature was that regulation by an external authority often ignored important local information readily available to users directly affected by this resource. Nor could all common-pool resources be effectively disaggregated into distinct units of private property.

Slowly, a growing number of field researchers documented the geographical and historical prevalence of successful systems of management through which communities of user groups effectively limited access to a resource and thereby avoided the supposedly inevitable tragedy of the commons (e.g., Bromley et al. 1992; Berkes et al. 1989; Feeny et al. 1990; Netting 1981; Sengupta 1991; Wade 1988; Ostrom 1990). These researchers documented the development of self-governance institutions in communities as diverse as small-scale fishing and horticultural societies, as well as those embedded in large-scale industrial societies.

Numerous studies provide considerable evidence that resource users confronted with CPR dilemmas may establish self-governing organizations that enable them to resolve some of these dilemmas. This work was documented, integrated, and developed along several new dimensions in what has become the classic work in this literature, Lin Ostrom’s *Governing the Commons* (1990).

The approach found in Ostrom’s seminal work, as well as the theoretical, field, and experimental literature that followed, has revolved around a few key questions. To what degree are the predictions about behavior and outcomes derived from formal theory, including non-cooperative game theory, supported by empirical evidence? In CPR dilemmas where behavior and outcomes are substantially different from those predicted, are there behavioral regularities that can be drawn upon to develop improved theories and policy analysis? What types of institutional and physical variables determine the evolution and success of internal provision of institutions that facilitate cooperation? To what extent does sustainability of endogenous institutional solutions depend on external circumstances, such as market conditions and/or overlapping political events?

From among the important findings from field studies on CPRs and laboratory experiments, the following conclusions have been drawn. First, overuse, conflict, or destruction of the resource is most likely to occur when users harvest independently or

are incapable of making credible commitments (Christy and Scott 1965; Anderson 1977; Libecap and Wiggins 1984; Blomquist 1992; Libecap 1995). Similarly, the experimental research investigating decision-making behavior in CPR settings, focusing on the level of rent dissipation, led to the conclusion that even in minimally enhanced institutional settings, rent dissipation is greater than that predicted in equilibrium (Ostrom et al. 1994). Second, systems of norms, rules, and property rights that are developed internally, but not recognized by external authorities, are more fragile (Cordell and McKean 1992; Davis 1984). Finally, regulation by central authorities, ignoring internal rules and norms, is often ineffective and potentially destructive (Feeny 1988; Thomson 1977).

When viewed as a problem of collective action, the theoretical prediction turns to an expectation that individuals in a CPR dilemma are unlikely to solve the second-order public goods provision problem of how to solve the free-rider problem of providing and sustaining the institutional structure necessary to create appropriate incentives and cooperative behavior. The core of the problem for this research has been to identify those conditions in which the second-order public goods problems have been successfully overcome. Along these lines, the literature from field studies, in particular the literature associated with Ostrom, her students, and colleagues, identify several commonalities as existing in self-organized CPRs (see Ostrom 1990). Here, we briefly examine three of these common aspects: the presence of boundary rules, authority rules related to allocation, and active forms of monitoring and sanctioning.

1. *Presence of Boundary Rules*: Boundary rules specify who appropriates. A wide diversity of appropriator characteristics, including residence, land ownership, organizational membership, share ownership, form the basis for boundary rules. These rules vary in their official status. Some are fully recognized and backed by formal, governmental authority. Some are recognized as legitimate by participants but not by formal, governmental authorities.
2. *Presence of Authority Rules Related to Allocation*: Authority rules define acceptable levels of harvesting from the CPR and/or the access to the resource through the allocation of space, time, and technological capabilities. Authority rules enhance efficiency through their impact on overall harvesting or coordination of technologies to reduce negative externalities that exist when users employ technologies that are incompatible.
3. *Active Forms of Monitoring and Sanctioning*: Self-organized communities develop ways to monitor and enforce their rules. When appropriators monitor and enforce boundary and authority rules they consider to be legitimate and effective, they tend to improve performance in the CPR.

While legitimate and effective rules can come from external sources, many studies suggest that a more effective source is the appropriators themselves. Importantly, the rules used in a self-organized CPR are often tailored to the specific characteristics of the CPR. Rules imposed by external authorities may fail to draw on knowledge of the time and place characteristics of a specific CPR. In fact, such rules may be less effective, or even counterproductive, compared to those designed locally.

No resource system exists in total isolation from the rest of the environment, nor can any human community cut itself off from all contact with outsiders. Thus, the broader institutional context within which any particular resource is managed must also be considered. Part of the problem in understanding the evolution of the provision of collective-action institutions is that too many proposed reforms or adopted policies are founded on an inadequate understanding of complex relationships across hierarchical levels of institutional change, between institutional arrangements within a setting, and how newly created incentives impact human decisions and the resource-related outcomes.

Dilemmas of collective action manifest themselves at all levels of aggregation. For example, McGinnis and Ostrom (2008) investigate the extent to which similar principles of institutional design are relevant for the management of global commons. Gibson et al. (2005) examine international aid from the perspective of information economics, paying particular attention to principal-agent models and moral hazard. They conclude that development organizations must craft their own internal structures and implement policies so as to not create perverse incentives that undermine collective action on the part of their intended recipients. Finally, Agrawal (2002) emphasizes that sustainability requires the establishment of governance processes at the national level that complement and build on community-based organizations, as well as local governments that are responsive to resource users, enabling users to develop internal systems that create workable and efficiency-enhancing appropriation and provision rules.

3 Further reflections on Lin Ostrom

The literature on CPR dilemmas remains a work in progress. As in most problems of social dynamics, the realities are extremely complex. Lin's most important contributions to this literature come in the form of an evolving framework that attempts to tackle the realities of these complex situations.

Over the last three decades, Lin has coordinated efforts to develop an overarching framework for institutional analysis, namely, the IAD framework (most recently elaborated in Ostrom 2005, 2007b). This framework helps organize the task confronting a scholar or policy analyst approaching a policy issue by directing their attention to the rules-in-use, rather than the rules on paper, and to the underlying biophysical nature of the good under consideration as well as the most relevant attributes of the community directly affected by that resource issue. In her current work, she is extending this framework to encompass more of the biophysical aspects of coupled social-ecological systems (Ostrom 2007a, 2009).

The action situation that lies at the heart of this framework is of particular interest to scholars of public choice, since the rules that define an action situation are generalizations of the set of rules traditionally used to define a game. For Lin, and for other Workshop scholars, it is essential to keep in mind the extent to which game players' preferences, as well as the choice options available to them, are determined by the institutional arrangements that define their position or that shape their perceptions and options. Lin first explicated the nature of these rules in her Public Choice presidential address (Ostrom 1986), and she elaborates upon these same themes in her recent work (Ostrom 2005).

In her initial work on groundwater in Southern California, Lin's focus was not on governance of the commons (since this vocabulary had not yet been created), but instead on governance institutions in polycentric settings. What is now clear, however, is how essential this early work was to lay the foundation for her pathbreaking work on the commons.

Community self-governance can be sustained only within a broader context of a polycentric system of governance. In addition, self-governance requires that individuals be willing to expend considerable amounts of time and energy in seeking out a commonly acceptable solution and participating, in an active fashion, in its implementation. People are unlikely to be willing to put forth that level of sustained effort unless there is some compelling reason. Lin's choice to focus on local communities of resource user groups was a work of genius, since such groups are uniquely dependent on the continued availability of that resource into the indefinite future.

Thanks to Lin's research, analysts of public policy have learned to draw important lessons from the actions of resource user groups. These lessons have broader significance because

effective management of commonly held resources requires political skill. Efforts to coordinate use and/or exclude others from appropriation can be very costly in terms of the time and effort required to establish rules, monitor compliance, and sanction rule violators. Thus, any CPR user group faces two interrelated dilemmas of collective action: how can the common goal of sustaining secure access to a critical resource be realized despite individual incentives to (1) overexploit common resources for private gain and (2) free-ride on the efforts of others to devise and implement restrictions on use? These dilemmas are intrinsically political, no matter how narrow the scope of that resource or how small the community affected by it.

Polycentric governance can nurture and sustain the self-governing capabilities of local communities, but even in the best of circumstances, some collective efforts to manage common-pool resources will fail. Instances of overuse and destruction of common-pool resources have been well documented, but the tragedy of the commons is by no means inevitable. Lin's work on CPRs is most appropriately envisioned as an extended process of investigation into the conditions and arrangements under which users of limited-access CPRs develop, through self-governance, the institutional arrangements that allow for significant (but not perfect) levels of cooperation.

The methodological legacy of the research programs that underlie Lin's success includes three key characteristics: insistence on both scientific rigor and policy relevance, openness to multiple techniques of empirical and formal analysis, and sensitivity to nested levels of analysis. An enduring legacy of her work is that the research literature on CPR situations now routinely encompasses field studies, experimental methods, mathematical modeling, statistical analyses, and agent-based simulations, each of which brings unique insights to this common object of study (Ostrom et al. 1994; Poteete et al. 2010).

Lin has taken the lead in redirecting the focus of the research and policy analysis conducted in this area, away from a perspective of a "one-dimensional" approach, to one that acknowledges the fact that there are multiple avenues by which more efficient solutions can be found to CPR governance, utilization, and sustainment. In her recent book (Ostrom 2005), she defends the critical importance of "institutional diversity" as a supplement to biodiversity and as a resilient foundation for sustainable development.

Finally, Lin Ostrom stands as an exemplar of the "scholar entrepreneur." Throughout her career, Lin has been pathbreaking in her willingness to embrace academic advances across disciplines and methodologies. She has authored or coauthored hundreds of scientific papers that incorporate cutting-edge methods across all of the social sciences, as well as the natural sciences (Poteete et al. 2010). In addition to her early focus on police institutions and field studies, her work with collaborators includes some of the earliest analyses of CPR issues in game theory and experimental methods, as well as more recent use of agent-based modeling techniques and geographic information systems. She adeptly uses all of these diverse tools and approaches to explore one central theme: how individuals, groups, and communities have used their capacity for self-governance to craft institutional arrangements that enable them to effectively cope with perverse economic and social incentives that threaten to undermine their ability to survive.

As noted by 2002 Nobel Prize winner Vernon Smith, "Ostrom brings a distinct style in applying her skill in different methodologies. She blends field and laboratory empirical methods, economic and game theory, the really important ingredient of scientific common sense, and she constantly challenges her own understanding by looking at new potentially contrary evidence and designing new experiments to challenge her understanding of the emergent historical rules and the theory used to explicate them" (Smith 2009).

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