Elinor Ostrom and the Bloomington School of Political Economy

Volume 4, Policy Applications and Extensions

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Introduction to Volume 4

Scaling Up and Extending Bloomington-School Analysis

This, the final volume of *Elinor Ostrom and the Bloomington School of Political Economy*, may come as something of a shock to scholars who think of Lin mainly as someone who traveled to remote regions of the world to study local common-pool resource (CPR) problems. In this volume, we explore the later stage of Lin's career, when she turned her attention, and her analytical frameworks, from local CPR problems to large-scale problems of the global commons—climate change and sustainability—and from natural to "artifactual" commons, including information and the "knowledge commons." These extensions were fully consistent with Lin's systematic approach to institutional analysis and polycentric governance, since the analytical frameworks she developed (in collaboration with Workshop colleagues)—the IAD and SES frameworks—were designed to be applicable to all problems of collective choice. As Lin stated in her Nobel Prize address (Ostrom 2010a, 646; original emphasis): "The IAD *framework* is intended to contain the most general set of variables that an institutional analyst may want to use to examine a diversity of institutional settings including human interactions within markets, private firms, families, community organizations, legislatures, and government agencies." Similarly, Vincent Ostrom's conception of polycentric governance was never meant to be limited to local (metropolitan) governments (V. Ostrom, Tiebout, and Warren 1961). Both he and Lin applied this same concept to federal governance systems, and suggested its relevance for global or regional problems requiring international negotiation and cooperation (V. Ostrom 1969; E. Ostrom 2010b).

This volume includes several examples of research topics that Workshoppers have been investigating since the deaths of Vincent and Elinor

Ostrom in 2012. Some are continuations of projects on which Ostrom was working; others take her work as a starting point and advance it. Some are methodologically or theoretically oriented; others carry on Lin's tradition of empirical work, closely examining local common-pool resources. What they all share in common is continued reliance on Bloomington School ideas, methods, techniques, and approaches to institutional analysis. They represent the beginning of the future of the Ostrom Workshop, without the Ostroms, but very much in their spirit and in dedication to empirically informed theory as the touchstone of good social science.

Part I: Climate Change and Sustainability

Before exploring these recent and future directions of research, this book returns to the time when the Bloomington School had not yet been born. Chapter 1 is a paper written by Vincent Ostrom in 1968, but which was not published until 2011. It concerns the use, development, and management of the atmosphere, which he described then as a "common-pool, flow resource." To this day, most social scientists refer to the atmosphere inaccurately as a "public good." Apparently, Vincent already had in mind a distinction between public goods and CPRs that he would elucidate nearly a decade later in a paper with Elinor ("Public Goods and Public Choices," Ostrom and Ostrom 1997), which was reprinted as the first chapter in volume 2 of this series. Vincent also presciently analyzed the atmosphere as a combined social-ecological system, though not in so many words: "Any consideration of the human use of the atmosphere involves an analysis of interaction between two systems—the atmosphere as a resource system and the organization of human endeavor and of human action as a social system concerned with the utilization and exploitation of the resource system" (p. 5). The conclusion of his paper foreshadows arguments explored in subsequent papers in Part I: "In the long run, national arrangements will not suffice. International arrangements will be required to deal with the continental and global dimensions of atmospheric phenomena" (p. 20).

Chapter 2 is a relatively early indication that Lin intended not just to focus on problems of small-scale local commons. Published in *Science* in 1999 with several coauthors, this paper begins to apply lessons learned from studying local and regional CPRs to "challenges of the global commons." It tackles, in brief, all of the major issues involved in scaling-up institutional analysis of CPRs, including homogeneity (e.g., cultural diversity), complications associated with interlinked CPRs, the unanimity rule

for collective-choice decisions in international governance, and the lack of multiple planets with which we might experiment and from which we could learn by trial and error. Even before this paper, Lin had sketched out many of the relevant ideas and problems in the introduction of a book she coedited with Robert Keohane, *Local Commons and Global Interdependence: Heterogeneity and Cooperation in Two Domains* (Keohane and Ostrom 1995).

When she began writing about the global commons, Lin's initial topic was not climate change but sustainability, as demonstrated in chapter 3, another coauthored piece. The paper is a "call to action," intended to mobilize the scientific community to focus research on sustainable development in the context of global environmental change. More specifically, the paper lists five "grand challenges" that require global coordination: (1) "Improve the usefulness of forecasts of future environmental conditions and their consequences for people"; (2) "Develop, enhance, and integrate observation systems to manage global and regional environmental change"; (3) "Determine how to anticipate, avoid, and manage disruptive global environmental change"; (4) "Determine institutional, economic, and behavioral changes to enable effective steps toward global sustainability"; and (5) "Encourage innovation (and mechanisms for evaluation) in technological, policy, and social responses to achieve global sustainability." It was a "call to action" Ostrom would reiterate throughout the remainder of her career, particularly as her attention shifted to the uniquely challenging problem of climate change. She believed strongly that Bloomington School approaches to institutional analysis and its normative commitment to polycentricity could be usefully applied to the largest-scale social-ecological dilemma humans have ever confronted.

Chapter 4 reprints Lin's first paper specifically directed to the topic of climate change, which she produced for the World Bank in the same year she received the Nobel Memorial Prize. In it, and in subsequent publications (Ostrom 2010b, 2010d, 2014), she urged a polycentric approach to that immense collective-action problem, explaining that national governments, state governments, local governments, private enterprises, and individuals did not have to wait for a workable global agreement before taking valuable steps to reduce their greenhouse gas emissions. It was a pathbreaking work that spawned a veritable cottage industry among scholars and policymakers seeking alternatives to the uniform, and generally unsuccessful, United Nations-based approach under the Kyoto Protocol. Other scholars began recommending various kinds of polycentric approaches (see Cole 2011, 2015, 311–12), whether labeled as "bottom-

up" (Leal-Arcas 2011), "building-blocks" (Stewart, Oppenheimer, and Rudyk 2013a, 2013b), or "regime complexes" (Keohane and Victor 2011) for climate change.

The final chapter in Part I, authored by one of this series' coeditors, reinforces Ostrom's arguments favoring a more polycentric approach to climate governance by explaining how cooperation in the international arena, as in local communities, depends on mutual trust between the parties. Among heterogeneous populations, mutual trust is difficult to generate and takes time to build. It is more easily developed if successful interactions between parties are more numerous and diverse (including activities unrelated to the chief issue of concern). Polycentric approaches to policy provide for more numerous and diverse interaction. This same point was highlighted in Lin's 1994 book with Roy Gardner and James Walker on *Rules, Games, and Common-Pool Resources*—one of her most important but often overlooked works—which combined field studies and laboratory experiments to explore questions of trust and reciprocity in common-pool resource settings. As Cole explains in chapter 5, the bilateral US–China Climate Change Working Group had a pronounced effect on international negotiations leading up to the 2015 Paris Agreement, exemplifying how (quieter) interactions at lower levels—in this case, bilateral negotiations held in private, outside the intense media glare of the global UN meetings—can increase mutual trust between important players, thereby creating positive feedback to global negotiations. By the same token, cessation of such interactions, such as the Trump administration's decision to shut down the working group with China, can generate mutual distrust, destroying earlier gains from increased cooperation and greatly reducing prospects for future cooperation.

Part II: The Artifactual Commons: Information, Infrastructure, and Public Health

In work initiated with her Workshop colleague Charlotte Hess, Elinor Ostrom also provided foundational contributions to a fast-growing body of work on the "knowledge commons" (see chapter 6 in this volume; Hess and Ostrom 2006, 2007; Ostrom 2010c). Lin's conceptualizations gave impetus to several active, connected areas of research, a few examples of which are included in this volume. Indeed, this may turn out to become the richest "vein" of new research applying Bloomington School ideas and techniques.

In chapter 6, a paper that was originally published four years before their landmark book, *Understanding Knowledge as a Commons* (2007), Charlotte Hess and Elinor Ostrom provide a primer for intellectual property scholars and others interested in the "knowledge" or "information" commons, including lessons from more than 25 years of international studies of natural common-pool resources. They correct confusions and conflations frequently found in writings about the "knowledge commons," including the common conflation of common-pool resources with property systems instituted to manage those resources. Phrases like "common-property resource" are rife in the literature, but they conflate the natural or artifactual resource with the institutional (e.g., property) system humans use to manage it. Pastures, new inventions, and paintings are all resources or "goods." By themselves, they imply nothing about the institutions humans devise to manage them, such as property rights.

Each of the three coauthors of chapter 7 have made signal contributions to the literature on artifactual commons, including Brett Frischmann's brilliant book on *Infrastructure* (2012); Strandburg, Frischmann, and Cui's (2017) work on rare disease networks; and Madison's (2000) work on copyright law. This same team has edited two very important books on knowledge commons generally and the medical knowledge commons in particular (Frischman, Madison, and Strandburg 2014; Strandburg, Frischmann, and Madison, 2017). In chapter 7 of this volume, they establish an analytical framework, based on the Bloomington School's IAD framework, for "constructing" commons in the cultural environment. The term "constructing" is an important recognition that, unlike natural CPRs, in an artifactual world dominated by trade secrets and intellectual property, cultural commons may be deliberately created to solve certain problems. That said, in the "natural intellectual environment," otherwise known as the "public domain" or, more recently, the "creative commons," intellectual property rights do not exist, and a "vast pool of intellectual resources" is available to be shared by all. Some constructed cultural commons may create other problems by remaining too exclusive, which obstructs potentially life-saving and other socially valuable efforts to build on prior knowledge.

The theme of differences between problems in the natural commons and problems in the artifactual commons is picked up by Dan Cole in chapter 8, which originated when he and Lin Ostrom traveled together to a conference at NYU Law School that was organized around a book project (Frischmann, Madison, and Strandburg 2014). Ostrom was originally assigned to write a paper on this topic, but after her death, Cole attempted,

as best he could, to write the kind of paper he imagines Ostrom might have written as a caution to scholars working on issues of the knowledge commons. The chief caution relates to the overwhelmingly normative nature of writings on the knowledge and cultural commons, with authors typically advocating for a greater (or lesser) "public domain" of information. However, very little of what Ostrom wrote suggested normative answers to policy problems. Instead, she focused on improving techniques for accurately *analyzing* and *understanding* problems, in all their complexity, which is a necessary precondition to useful policy advice. She and Vincent certainly shared certain normative commitments to methodological individualism, the promise of self-governance, and polycentrism; but Lin (more so than Vincent) was reluctant to promote particular policy options. Though she is sometimes portrayed as an *advocate* for local self-governance, her actual commitment, based on a great deal of empirical and experimental evidence, was to the *idea* that local self-governing systems can sometimes be successful. She never believed in local self-governance as a panacea solution. "There are no panaceas," she would say. So, what value does her work actually have for scholars of artifactual commons? Ostrom's clear conceptual, analytical, and methodological techniques have a great deal to offer scholars who are not only interested in policy outcomes but in *understanding*, *analyzing, and evaluating* problems in the artifactual commons. The IAD framework, in particular, has great utility for their work.

In chapter 9, Rolf Künneke and Matthias Finger focus on a specific type of artifactual commons that differs significantly from the "knowledge commons." Infrastructure, such as networks of roads (including bridges), electric power grids and transmission lines, oil pipelines, and flight routes for airlines, shares many features with natural commons. Both are congestible and degradable common-pool resources with (relatively) high exclusion costs but rivalrous consumption. Indeed, the kinds of irrigation systems that Lin Ostrom studied for many years as local CPRs could be described as either natural commons or systems of infrastructure, which create collective-action problems relating to maintenance, among others. Especially given the decrepit state of physical infrastructure in the United States (and presumably other places) today, due mainly to a lack of funding for proper maintenance (see, e.g., McBride 2017), the treatment of infrastructure as a CPR makes a great deal of sense, and may generate some insights for better management in the future.

Chapters 10 and 11 offer alternative viewpoints on a very different kind of infrastructure, namely, the scientific, technological, and policy foundations for public health and health care in the United States. In the first,

Robert Cook-Deegan addresses the importance of a "science commons" for continuing innovation in medicine and pharmacology. Genomics, in particular, has been the focus of contestation between intellectual property advocates and those who would keep genomic data in the science commons. As a field that emerged quite recently (the 1980s), it presented new issues that the legal system and the courts had never before confronted. But the conflict raises the traditional issue in intellectual property of balancing the need to provide incentives for innovators, which patents and copyright provide, against the broad public values that "free" scientific information serves by facilitating continued research to update prior knowledge. Where to strike that balance is hotly disputed by economists, the intellectual property bar, and policy wonks. Applying Bloomington tools and techniques, although unlikely to determine the most normatively desired answer, can assist in better framing the question and understanding how various solutions might differentially affect the various private and social interests at stake.

Michael McGinnis, in chapter 11, demonstrates how Bloomington-School analysis might help us better understand and evaluate options for allocating scarce common resources to address complex issues relating to health care, health insurance, and public health. McGinnis's paper, written expressly for this volume, applies Ostrom's "design principles" (from *Governing the Commons* [1990], on which see chapters 8–9 of volume 2 of this series) to certain health care resources that appear to be CPRs, including public access to emergency services, the time physicians allocate to patients, fixed budgets for social insurance programs, and the number of available hospital beds. One major complicating factor of this project is that, in the US health care system, all different types of goods—private, public, club, and CPRs—are interwoven and nearly impossible to disentangle. McGinnis reviews research that suggests that medical professionals and community leaders can effectively manage these common resources, by regularly communicating with one another and building higher levels of mutual trust and cooperation (along the same lines suggested by Cole in chapter 5). McGinnis concludes by imagining what a fully polycentric system of health care might look like, not as a guide to policy so much as a thought experiment of what such a system would require.

Part III: Continuing Projects

Even while breaking new ground, Lin Ostrom never stopped seeking to improve her analytical frameworks—the IAD and SES frameworks—

either in light of new empirical findings or as a result of ongoing discussions with other social and ecological scientists. From the time she published the initial version of the IAD framework in 1982 (Kiser and Ostrom 1982), it was subjected to almost continual improvement. Ostrom published at least ten distinct versions of the IAD framework between 1982 and 2011. Since her death, scholars have continued to apply and revise Ostrom's frameworks as they confront new problems and continue efforts to resolve old ones.

For example, in 2009, Ostrom and Michael McGinnis started a new "Program in Institutional Analysis of Social-Ecological Systems" (see McGinnis and Ostrom 2010). Its purpose was to more clearly combine the IAD and SES frameworks, but, unfortunately, many participants instead treated these frameworks as alternatives. McGinnis continues to pursue this same goal, via a different approach, along with Daniel Cole and Graham Epstein. (See chapter 14 in this volume for an application, by other scholars, of one version of their ongoing efforts to combine the IAD and SES into a common framework.)

Chapter 12 demonstrates how the Bloomington School's analytical frameworks can be used and sometimes misused, and suggests a means for reassessing and correcting previous misunderstandings. After rehearsing the basics of the SES framework, Cole, Epstein, and McGinnis observe that one of Ostrom's initial applications of the framework—to Garrett Hardin's "Tragedy of the Commons" (1968)—participates in a basic mistake Hardin (and most scholars following him) have made about the institutional structure of the common pasture in his allegory. The "Governance Systems" box in Ostrom's SES application was empty, suggesting the complete absence of any institutions. But in other settings, Ostrom expresses her fervent belief that humans, as social animals, could never have been completey preinstitutional. The authors conclude that the absence of institutions in both Hardin's account and Ostrom's illustration was inconstant with the "tragic" outcome so central to the power of Hardin's allegory. They show that the tragedy could not have resulted from open access to the pasture alone. It also required the efforts of ranchers responding to a level of demand for food beyond subsistence levels, the existence of private ownership of the cattle, and markets in which cattle are bought and sold (which in turn required enforceable contracts). Hardin's allegory is replete with assumed and unexplained institutions without which the tragedy of the commons could simply not have occurred. The authors provide a revised SES application to Hardin's pasture that more accurately characterizes the surprisingly complex set of maladjusted (to each other)

institutions required to lead to Hardin's "inexorable" tragedy. The chapter also shows that institutional "fit" is not just about how rules align with ecological circumstances but also about how various rules interact with one another.

In chapter 13, Ulrich Frey and Michael Cox take two of Lin Ostrom's basic tenets—the need to take complexity seriously and consequent need to recognize that no panacea solutions exist—and suggest how the use of ontologies—formal frameworks for representing knowledge based on clear, explicit specifications of conceptualized entities populating the world or some domain of knowledge—can help scholars who study social-ecological systems to move beyond diagnosing specific dilemmas to developing more general theories of the interactions of important variables within social-ecological systems. This effort is similar to, but not the same as, earlier attempts by Elinor Ostrom and Sue Crawford to develop an "institutional grammar" (Crawford and Ostrom 1995). It is also consistent with Ostrom's use of analytical frameworks to study social-ecological systems using consistent concepts, and the development of databases, such as the International Forestry Resources and Institutions database, original created at the Ostrom Workshop but now housed at the University of Michigan (see www.ifriresearch.net). But what Frey and Cox suggest is an even more formal approach than either the IAD or SES framework. In fact, they attempt to convert the SES framework into an ontology, mainly by establishing clear relationships between its various tier 1 categories, recognizing that some primary categories are components or attributes of the SES, while others are related by interactions (such as related ecosystems). They similarly subdivide second-tier variables based on various relationships between them. The extent to which Frey and Cox's SES ontology succeeds will depend on applications and refinements over time.

Chapter 14 presents what may appear to be a standard Bloomington School-style case study of a local CPR: irrigation water in Kenyan villages. But this is the first paper to apply a combined IAD-SES framework, as yet unpublished, and still being developed by Dan Cole, Graham Epstein, and Michael McGinnis. In the early version of the combined framework as used here, the primary SES variables simply take the place of the "exogenous variables" or "preexisting conditions" of the original IAD framework (see Figure 14.1(c)). The same or enhanced second-tier SES variables then populate those boxes.

In chapter 14, Paul McCord, Jampel Dell'Angelo, Elizabeth Baldwin, and Tom Evans apply the combined framework to a case involving the social and ecological consequences of Kenya's 2002 Water Law. The

authors discuss how reforms under the 2002 law facilitated the rise of a more polycentric system of irrigation water governance. The authors use the combined IAD-SES framework because it provides a clear feedback mechanism that better facilitates multiple observations over time, so that as institutions change, the effects of those changes can more easily be tracked not just as outcomes but also as part of the "preexisting conditions" for future action situations that might lead to other institutional changes. In other words, the combined IAD-SES framework facilitates comparative static or punctuated equilibrium studies of institutions and their social-ecological effects.

As with the ontological approach in chapter 13, it remains to be seen whether the new combined IAD-SES framework will be widely adopted and applied. In any event, the McCord et al. paper stands as a compelling example of Bloomington-School analysis at work, since this case study shows how polycentric governance systems can be institutionally facilitated within nested national, regional, and local governance structures.

Part IV: Persisting Challenges

We had hoped to squeeze in another wide-ranging theoretical essay by Vincent Ostrom (1990), but space constraints would not allow it. For each of the four volumes of this compendium, we had to make very difficult choices about what to leave out. For some parts, we had twice as many papers as we could possibly include. Our guiding principle was to select papers that clearly represent both the diversity and the consistency of the thinking of the Ostroms and the ideas associated with the Bloomington School.

It is only fitting that Lin Ostrom should have the last word on the Bloomington School of Political Economy and the ongoing challenges faced by all social scientists seeking to understand human behavior, both individually and in groups, and for those engaged in policy analysis. Both chapters 15 and 16 address Lin Ostrom's career-long concern about the need for more and better interdisciplinary research and analysis, as well as the structural impediments that need to be overcome to accomplish those goals. This was the central theme of one of Lin's later books, *Working Together* (2010), coauthored with Amy Poteete and Marco Janssen.

As first named by Mitchell (1988), the Bloomington School epitomizes one way of approaching the study of public choice, the others being identified with the University of Virginia and the University of Roches-

ter (see Aligica and Boettke 2009). All developed from an initial 1963 conference that included, among others, James Buchanan, Gordon Tullock, William Riker, Mancur Olson, and Vincent Ostrom. One of the most significant aspects of the Public Choice Society was its interdisciplinary makeup, including from the outset economists, political scientists, legal scholars, and sociologists. Both Ostroms subsequently served as presidents of the Public Choice Society. When the Ostroms created their Workshop in Political Theory and Policy Analysis at Indiana University in 1973, their goal was to establish a place where scholars, from whatever discipline, who shared interests in political theory and/or policy analysis could meet, exchange ideas, develop common research projects, and help to develop a shared vocabulary for conceptualizing and analyzing problems such that scholars from diverse disciplines could more fully understand each other's research studies. Ever since, the quest to facilitate interdisciplinary cooperation and research, in conditions of Tocquevillian voluntary association, has been at the core of the Ostrom Workshop's mission. Nonetheless, impediments remain.

In chapter 15, Lin compares the important contributions made by the New Institutional Economics, Behavioral Economics, Political Science, Political Economy, Sociology, and both Cognitive and Social Psychology to our understanding of individual and group behavior with respect to resources (especially CPRs), under institutionally generated incentives. But in chapter 16, she strikes a less optimistic note, observing that "overcoming disciplinary limits" remains a "great need" (p. 414). She quotes one cynic: "The world has problems, but universities have departments" (p. 414). Cynical or not, that quote is not far from describing Lin's attitude about the negative effects of departmental "silos" on grappling with real-world problems.

As legal scholar Robert Ellickson (1987) explains, in order to develop useful theories of social and social-ecological dilemmas, "a theorist . . . needs a command of psychology, economics, sociology, organization theory, and political science" (quoted on pp. 415–16 of this volume). Of course, no ordinary scholar can hope to gain sufficient expertise in all of these fields (notable exceptions may include the likes of John Stuart Mill, Max Weber, Herbert Simon, and Elinor Ostrom herself). Which is why the ability to work together with other scholars is so fundamentally important to understanding and ultimately resolving complex problems in the world. Any single disciplinary approach may provide, at best, a necessary part of a comprehensive solution. At worst, they offer simple or simplistic policy solutions that cannot possibly explain, let alone resolve, complex

problems. As Lin writes, "we need to think about how to overcome the disciplinary walls that have been erected in the contemporary university . . ." (p. 421). One chief purpose of the Ostrom Workshop and associated organizations, such as the Center for the Study of Institutions, Population, and Environmental Change" (CIPEC), has been to "'cross-train'" students, learning not only the basic theories of anthropology, economics, or political science, but also "a healthy dose of ecology, the analysis of spatial metrics, the use of geographic information systems, and the analysis of remotely sensed data" (p. 421). In short, Workshoppers are trained to "analyze complex systems" (p. 421).

There are precious few places where cross-disciplinary theoretical and multi-methodological training and wide-ranging applications to empirical research projects have been so effectively integrated. Arguably, such spaces are needed now more than ever in a world and time of increasingly complex and interrelated problems. In a 2011 publication, Lin noted that "The research program facing IAD scholars, as they explore new questions, new research methods, and new modes of analysis, is immense!" (p. 24). Indeed, it is. But Lin gave us analytical tools and techniques that we can use to continue her important work. And, as she was known to quip, "What could be more fun than work?"

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