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Elinor Ostrom's legacy: governing the commons, and the rational choice controversy

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Elinor Ostrom’s Legacy: Governing the Commons, and the Rational Choice Controversy

Tim Forsyth and Craig Johnson

INTRODUCTION

Elinor Ostrom had a profound impact on development studies through her work on public choice, institutionalism and the commons. In 2009, she became the first — and so far, only — woman to win a Nobel Prize for Economics (a prize shared with Oliver Williamson). Moreover, she won this award as a political scientist, which caused controversy among some economists. She committed her professional life to expanding traditional economic thinking beyond questions of individualistic rational behaviour towards a greater understanding of self-regulating cooperative action within public policy. In particular, she organized the University of Indiana’s Workshop in Political Theory and Policy Analysis with her husband, Vincent Ostrom, and the International Association for the Study of the Commons (IASC). She also earned the reputation of a loyal and caring colleague and mentor. She donated much money to the University of Indiana, including her Nobel Prize money.

The purpose of this article is to identify and discuss Elinor Ostrom’s legacy in international development. Rather than being a simple obituary, this article also seeks to review the tensions arising from her work, especially concerning the debate about institutions and the commons, and particularly Ostrom’s own focus on rational choice theory and methodological individualism as a means of understanding cooperative behavior.

First unnumbered footnote

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Ostrom's work here has defined a field of research, and radically changed understandings. It also inspired work on the governance of public economics (Ostrom et al., 1993), and later writings on the institutions of development aid (Gibson et al., 2005). By so doing, we argue that Ostrom's main legacy within development studies has been her development and communication of rational choice approaches to institutional thinking. In turn, this work has influenced policy debates about natural-resource management, and recent approaches to multi-level governance and polycentrism within environment and development. Yet, this approach has also produced tensions within development studies, which remain largely unresolved (Bardhan and Ray, 2008a). We argue that Ostrom's work reflected wider transitions in social science and international development over a period of decades, but also indicates some of the key dilemmas faced by development studies in integrating political science and economics as useful and respected forms of analysis.

Early Career

Elinor Ostrom was born Elinor Claire Awan in Los Angeles, California in 1933, the daughter of an unemployed Hollywood set designer father, and a musician mother. She studied at University of California, Los Angeles (UCLA), where she married a classmate. This first marriage, however, did not prosper. 'I was thinking of doing a Ph.D.' Elinor later explained, 'and he was not too enthusiastic' (Woo, 2012). They divorced, and she returned to UCLA to do this PhD. In 1963, she married Vincent Ostrom, one of her professors. In 1965, she took up a job at the University of Indiana, where Vincent was already employed. They remained together and at Indiana for the rest of their careers. Vincent died three weeks after Elinor's own death from pancreatic cancer in 2012.

In 1973, Vincent and Elinor founded their Workshop in Political Theory and Policy Analysis at the University of Indiana. This workshop focused especially on political and economic governance through polycentric systems, where, according to Vincent Ostrom, 'polycentric connotes many centers of decision making that are formally independent of each other' (V. Ostrom et al., 1961: 831). This initial analysis focused most upon questions of federal governance of public infrastructure such as water

projects in the USA. But within this work lay the foundations of later writings on institutions and the regulation of the commons.

Like many political scientists of the era, the Ostroms had been influenced by the paper written in *Science* by Garrett Hardin (1968), *The Tragedy of the Commons*, which argued that unrestricted access to communal resources would inevitably lead to over-exploitation. Elinor and Vincent Ostrom were clearly concerned about this challenge in their own lives. In 2011, Elinor wrote a letter to the Sierra Club of Canada explaining how she and her husband had bought land on the southern shore of Manitoulin Island in Lake Huron in 1967, also building a log cabin. Over the years, they noted the decline in the levels of the lake, and how ‘investments in increased conveyance, dredging channels, and other public works have hardened the shoreline, led to losses of wetland habitats, and reduced fish habitat regions’ (Ostrom, 2011). Here were clear parallels between a concern for protecting communal natural resources and the public-policy challenge of regulating economic actors.

Elinor and Vincent, however, began to develop an alternative vision to Hardin (1968) by showing how different means of access changed the nature of goods to be governed. For example, in 1977, the Ostroms developed an early categorization of economic goods based on the difficulty of excluding actors wishing to appropriate them. In this classification, private goods exist where private consumption reduces their availability for other consumers, but where it is possible to exclude other users. Common pool resources refer to goods that are decreased through consumption, but where exclusion is more difficult. Toll goods occur when consumption has minimal effect on the resource, and where it is easier to exclude consumers. And public goods are those that are reduced by consumption, but where exclusion is not possible (Ostrom and Ostrom, 1977).

According to one later appreciation of their work, this early period demonstrated that Vincent and Elinor Ostrom were highly influenced by the major reorientation in social science in the USA after World War II along the lines of science during the 1950s and 1960s, where the objective was to ‘usefully deploy and expand the economic way of thinking beyond its traditional boundaries while avoiding most of the criticisms of economic imperialism’ (Boettke and Coyne, 2005: 145). At its root,

this trend had a philosophical emphasis on methodological individualism — the analysis of social phenomena through seeing the motivations and actions of individual agents, following the influence of economic philosophers such as Frank Knight, Ludwig von Mises, and Friedrich Hayek.

This early period also marked a further distinction of Elinor Ostrom’s career — of being an innovative female scholar when women’s opportunities within academia were limited. According to one later interview, ‘there was no encouragement to think about anything other than teaching in high school or being pregnant and barefoot in the kitchen’ (Zehr and Carson, 2009 in Ostrom, 2012: 26). She often remarked that she was hired partly because she was willing to teach a class on American government at the unpopular hour of 7:30 am (Woo, 2012). The department did not even have female bathrooms at the time, requiring women to use the men’s room and to put a sign on the door when they were inside (*Solutions*, 2010).

Institutionalism and the Commons

Elinor Ostrom’s work advanced and applied the rational choice model of political science in various ways. Her most significant legacy lay in applying methodological individualism to understand cooperative behavior and institutions. This work was used to advance Hardin’s (1968) thesis on the Tragedy of the Commons, and in theorizing pathways to collective action despite rational choice individualism.

In 1982, Ostrom wrote, ‘we are coming to an end of an era in political science, a slow, whimpering end’ (Ostrom, 1982: 11). She was referring to the universal laws of positivism as a means of explanation within political science. Instead, Ostrom sought a middle ground where social responses to economic problems can be theorized as a result of rational behavior — but where ‘the cumulation we do achieve will be limited in scope to specific types of theoretically defined situations rather than sweeping theories of society as a whole’ (Ostrom, 1982: 26). These outcomes became part of Ostrom’s contribution to theories of institutions, or occasions of shared behavior within society.

Ostrom identified three different worlds of social behavior relating to action (where individuals act); collective choice (based on the decisions of representatives); and constitutional choices (which change how decisions or actions are taken). Institutions are defined as the shared decisions and behaviours that regulate otherwise rational, but egoistical, actions of individuals who seek to maximize their own benefits. She wrote: ‘if we limit the way we model individuals and situations to those models that have been successful in explaining market behavior, we may continually fail to show how *different* institutional arrangements help fallible and less than fully informed persons to achieve relatively satisfactory outcomes’ (Kiser and Ostrom, 1982: 218, emphasis in original).

These principles were then applied to Ostrom’s most famous work on natural resources and the commons. Her 1990 book, *Governing the Commons: The Evolution of Institutions for Collective Action* (Ostrom, 1990) solidified research and debates that proposed ‘that neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems’; and that ‘communities of individuals have relied on institutions resembling neither the state nor the market to govern some resource systems with reasonable degrees of success over long periods of time’ (Ostrom, 1990: 1). This book took the well-known Tragedy of the Commons model of Garrett Hardin (1968), plus the existing analytical logics of collective action and the prisoner’s dilemma, to argue that institutions — or shared behaviour, and regulation of egoistical individualists — was not only possible, but empirically proven.

This work also reflected broader changes in the analysis of institutions and political theory at the time. *Governing the Commons* was part of a highly influential series that was published by Cambridge University Press on the ‘Political Economy of Institutions and Decisions’. The series was co-edited by James Alt and Douglass North, whose work on the institutional foundations of economic and political life had at the time become highly influential in the American social sciences. At the heart of their framework was an assumption that institutions can be usefully defined as rules, norms and other ‘humanly devised constraints that structure political, social and economic interaction’ (North, 1991: 97). In the words of the editors, the focus of the series was ‘positive, rather than normative’, exploring the conditions under which

‘institutions evolve in response to individual incentives, strategies, and choices’, as well as the ways in which ‘institutions affect the performance of economic and political systems’ (Ostrom, 1990: xi).

Ostrom’s particular focus on institutions and the commons also reflected an important constellation of publishers, researchers and scientific bodies, whose work was becoming increasingly interested in the institutional foundations of social and environmental change. In her preface to *Governing the Commons*, she writes that her ‘awareness of the possibility of using detailed case studies written by other authors to obtain a sufficiently rich empirical base came about as a result of joining the National Academy of Sciences’ “Panel on Common Property Resource Management” in 1985,’ (Ostrom, 1990: xiv). According to Ostrom, all of the panelists were ‘asked to write their papers using a framework prepared by Ronald Oakerson’, whose conceptualization of institutions and resources emphasized ‘not only the physical properties of the resource systems but also what types of rules were used to regulate entry and use of these systems, what types of interactions resulted, and what types of outcomes were obtained’ (Ostrom, 1990: xiv).

Governing the Commons was therefore part of a wider trend in American social science that emphasized the study of institutions (defined as rules), thereby eschewing the limitations of ‘value-laden’ theory and embracing a positivist social science rooted in formal modeling and empirical analysis. Yet, more important than the historical and professional factors affecting Ostrom’s decision to work in this particular paradigm was the influence of the new institutionalism on her conceptualization of collective action and the commons. Starting from the position that information (about the state of the resource and intentions of resource users) is costly, Ostrom argued that *rules matter* because they reduce the uncertainty that stems from the unpredictable behaviour of others and resource systems:

In all cases in which individuals have organized themselves to solve CPR problems, rules have been established by the appropriators that have severely constrained the authorized actions available to them. Such rules specify, for example, how many resource units an individual can appropriate, when, where, and how they can be appropriated, and the amounts of labour, materials, or money that must be contributed to various provisioning activities.

If everyone, or almost everyone, follows these rules, resource units will be allocated more predictably and efficiently, conflict levels will be reduced, and the resource system itself will be maintained over time. (1990: 43; emphasis added)

This approach to institutions also advanced the debate about the Tragedy of the Commons in several significant ways. First, she argued that Hardin's earlier pessimism about individualistic exploitation of the commons referred only to open-access resources or public goods that open to appropriation because of the lack of a sufficient governance or common-property regimes that transformed open-access resources into common-pool resources. Second, she therefore argued that Hardin's stark choices between ecological collapse, state-led dictats, or privatization could be replaced by a more flexible, inclusive, and locally governed institutions for regulating excessive appropriation of resources. In addition to these important conceptual themes, *Governing the Commons* also presented field-work based research to demonstrate the nature and success of self-organizing institutions from diverse locations such as Switzerland, Japan, Spain, the Philippines and Turkey.

Ostrom's main point was that individuals will be more likely to create and conserve the commons when they have credible and reliable information about the costs and benefits of resource decisions and (crucially) when they have an opportunity to decide the rules of the game. Drawing upon her empirical case material, she identified eight 'design principles' that would improve the effectiveness and sustainability of common property regimes: clear resource boundaries (i.e. knowing physical and ecological properties of the resource), clear rules of membership (knowing who is entitled to use the resource), congruence between rules of provision/appropriation and local conditions, arenas for 'collective choice,' mutual monitoring, 'graduated' sanctions, mechanisms for conflict resolution (i.e. ensuring that resource users are able to monitor and sanction other resource users) and, finally, a state that is willing to recognize (or at least not challenge) local rights of organization (Ostrom, 1990: 90).

Grounded within a choice theoretic, the implication was that different property rights regimes (e.g. common, private, or a combination of the two) are the result of a selection process, in which 'resource users' craft institutions that best meet the needs

of resource users and the resource base. Whether resources fall prey to the Tragedy of the Commons is therefore not a foregone conclusion, as Hardin (1968) would lead us to believe, but rather an empirical outcome dependent on the existence of institutions governing access, utilization, management, exclusion, ownership and transfer of ownership.

Furthermore, this form of analysis resonated with two further trends. First for many environmental analysts, the findings of Ostrom's research offered the prospect of a solution to long-standing fears of Malthusian collapse or ecological ruin resulting from unregulated economic exploitation. Indeed, Ostrom (1990: 58) argued 'the institutions discussed... have survived droughts, floods, wars, pestilence, and major economic and political change'. And secondly, in a period when individualistic economic thinking was popular, Ostrom offered a vision of cooperative behaviour that did not rely upon reverting to a centralized state. Indeed, for donors and NGOs, Ostrom's design principles offered a model of decentralization and local resource governance that could be replicated in multiple field settings, and which used empowering local and incentive-based governance mechanisms.

Ostrom's work on the commons inspired further research projects and immense international interest in questions relating to the commons. *Governing the Commons*, and later books such as *The Drama of the Commons* (Dietz et al., 2002), expanded on common-property regime theory by exploring and empirically testing institutional design principles for self-organizing institutions. In fundamental terms, Ostrom and her colleagues argued that the three root conditions were: that the resource must be salient enough to encourage users to invest time to make rules; users must have autonomy to devise and change rules; and at least a subset of users must be able to engage in direct communication in order to bargain and negotiate (Stern et al., 2002: 456). But these principles were also augmented by more operational factors such as clearly defined boundaries between resources and users; low cost of rule enforcement; monitoring resource use and rule compliance; reconciling conflicting values and interests; and so on (Ostrom, 1990: 182–92; Stern et al., 2002: 462–66). The identification and classification of institutional design principles has indeed become a debate of its own (Agrawal, 2008). These studies also sought to establish empirical evidence for success and failure, with most apparent success found at the small and

medium-scale enterprise such as involving monitoring of shared fisheries. Research has also questioned whether heterogeneity, or the size of groups of resource users can influence institutional success (Poteete and Ostrom, 2004).

Ostrom was also the founder of the International Association for the Study of the Commons (IASC), a multi-disciplinary body ‘devoted to understanding and improving institutions for the management of resources that are (or could be) held or used collectively by communities in developing or developed countries’.¹ The IASC’s Digital Library of the Commons and bi-annual conferences now provide an important forum for the discussion and dissemination of academic and applied research on a wide range of environmental and resource governance issues. According to the IASC website, the Digital Library of the Commons contains more than 60,000 citations and 25,000 abstracts. It also supports a peer-reviewed journal, the *International Journal of the Commons*, and a compendium of training materials aimed at understanding and supporting local efforts to conserve the commons.

That the IASC continues to attract the interest and support of a truly international network of scholars and practitioners speaks to Ostrom’s abilities as a leader, a fundraiser and a visionary. It also helps to illustrate the very healthy extent to which Ostrom and the IASC have fostered an open and academic dialogue about the terms on which researchers now study and interpret the commons. Indeed, some of the critical perspectives on which we draw below can be found on the Digital Library’s database.

Challenges to Ostrom’s Work

Elinor Ostrom’s approach to the study of institutions and institutional change was rooted in her application of rational choice theory and methodological individualism. At the heart of this model was an assumption that social outcomes can be explained in terms of the calculations that individuals make about the perceived costs and benefits of future actions. In her words (Ostrom, 1991: 243), the assumption is that

¹ <http://www.iasc-commons.org>

‘individuals compare expected benefits and costs of actions prior to adopting strategies for action’. By incorporating game theory and rational choice into policy analysis, her research also offered a systematic approach to the study and evaluation of public policy. She said, ‘our main goal has been to show... that the techniques of rules and games works and puts policy analysis on a sound logical footing’ (Ostrom et al., 1994: 96–97).

But the approach also raised debates within development studies about the nature and origins of institutions, and the value of using rational choice theory to understand processes of environmental change. One persistent theme that has long featured in this debate is a methodological tension between the apparent reductionism of rational choice theory and the interpretivism of anthropological and historical research. For many critics, the focus on theory building and methodological individualism produced a body of research that was at times too far removed from the important aspects of context, culture and meaning that have bearing on the ways in which people use and manage common property regimes. In a critical volume on the commons, Prakash (1998: 168) for instance warned that the policy analyst’s ‘abstraction from the complexities of field settings’ may lead to ‘a reification of concepts, models and strategies’ (Prakash, 1998: 168). Similarly, and in more detail, the anthropologist David Mosse (1997: 486) argued that,

. . . an institutional analysis of indigenous resources systems is unlikely to be useful unless it has first correctly characterized the social relations and categories of meaning and value in a particular resource system. In the first place this means resisting the tendency to impose a narrow definition of economic interest, utility and value . . . (Mosse, 1997: 472)

And more critically, Michael Goldman (1998: 21) argued that Ostrom’s approach belied:

. . . a fundamental tension between knowledge production and historical consciousness, a tension between casting a blind eye towards the destructive forces of capitalist expansion onto the commons and a broad smile that beams at the ‘underskilled’ local commoner who defies all odds by protecting the commons.

Criticisms such as these illustrate the strong normative and ideological terms on which many scholars reacted to the work of Ostrom and rational choice scholars more generally. At the heart of these differences were well-documented tensions between different methodological styles, where, stereotypically, ‘economists are often in error, but seldom in doubt, whereas economists believe anthropologists spend too much time in the field without testable hypotheses’ (Bardhan and Ray, 2008b: 1) — or what Boettke and Coyne (2005: 152) somewhat dismissively call ‘compiling facts upon facts without a theoretical language to sort through them’. But the matters raised by this debate go beyond simply whether analysts should use contextual or nomothetic analysis. Rather, these themes question the appropriateness of Ostrom’s hypothetic-deductive model of rational choice for the underlying problems she was trying to solve.

First, concerning resources, various analysts have argued that common property regime analysis has tended to define resources and scarcity too essentially. Ostrom acknowledged that the physical characteristics of a resource are fundamental to the appropriateness of common property regimes. Two important factors are the *stationarity* of a resource (how resources are spatially confined prior to harvest), and *storage* (which refers to the ability of a resource to collect and hold resource units, such as in a reservoir) (Ostrom et al., 1994: 308). Accordingly, Ostrom herself has acknowledged that common property regimes work best in cases where the resources and resource users have clear boundaries, and where all actors agree on the rules of the game, such as in cases of reservoirs, or clearly defined pastureland where users have similar objectives.

The risk of Ostrom’s new-institutionalist approach, therefore, is that resources, and the problems of resource scarcity, are identified in *a priori* terms, with the result that common property regime analysis misses the point of how resources and scarcity are meaningful to people. Mosse’s (1997) analysis of irrigation tanks in Tamil Nadu, for example, observed that tank users were not restricted to those who only saw tanks as repositories of water for irrigation, but that the main significance of these tanks as common pool resources lay in their multifarious social roles such as locations of social standing, caste, and cultural interaction. Accordingly the so-called self-organized institutions for common property management were not developed entirely

to avoid the degradation or exhaustion of a scarce physical resource, but also to mediate social roles.

A second and related concern is whether Ostrom's analysis presupposes a cause and effect of ecological crisis that might be universal. Ostrom wrote, 'human interventions cannot change fundamental physical regularities, such as the laws of physics and biology' (Ostrom et al., 1994: 75). But one of the common features of Ostrom's work is the implication that certain social outcomes such as violence, the Tragedy of the Commons, or other Malthusian scenarios would occur without the existence of institutions. For example, Ostrom gave one case study of illegal fishing and piracy off western Malaysia in the 1970s. She wrote: 'unless the fishers themselves accept legislation as effective rules, however, they continue to play the fishing game as if the legislation did not exist. The possibility of violence is ever present' (Ostrom et al., 1994: 79–80).

The underlying question here is whether phenomena such as the Tragedy, or violence, and other scenarios are as inevitable and uniform as this. It is worth remembering that Hardin's (1968) original paper on the Tragedy was not an empirical analysis, but written more as a hypothetical parable that assumed human societies would act in certain ways. Other writers have argued that the Tragedy constitutes a classic 'development narrative' that 'tell scenarios not so much about what should happen as about what will happen according to their tellers — if the events or positions are carried out as described' (Roe, 1991: 288). These arguments do not suggest that resource exhaustion does not occur, or should not be avoided. But instead they suggest that it is too simplistic to represent these problems as simply the inevitable result of rational human behaviour; or that failing to engage with so-called rational behavior will result in these projected outcomes.

It also implies there are tensions in Ostrom's attempts to marry an historical, inductive approach to case study material with her hypothetic-deductive model of rational choice because fieldwork and the selection of case studies are undertaken under an *a priori* framework determined through the Tragedy of the Commons. For example, Ostrom and her co-writers refer to various old anthropological analyses of land use as examples of responses to the Tragedy, when many of these studies

focused simply on local experiences and resource use in general, rather than being case studies of individualistic competition over resources as suggested by the Tragedy (e.g. Dietz et al., 2002: 13; Leach, 1954 in Ostrom, 1990: 239). Indeed, two critics suggested that ‘common property theory not only does not account for the ethnographic findings in... societies, but instead distorts data when applied to ethnographic cases’ (Lieber and Rynkiewich, 2007: 90).

More generally, others have questioned whether searching for ‘success stories’ of institutions for collective action is itself flawed if it is based on *a priori* assumptions of what one is looking for. Indeed, de Sardan (2013: 287–88) questioned the very legitimacy of the fieldwork used in *Governing the Commons* because:

New-institutional economists do, of course, carry out empirical analyses, but these are very much focused on the quantitative approach and remain essentially centered on what they consider to be the solid ground of firms and economic transactions . . . All in all, the typologies and conceptualizations advanced by new-institutional economics . . . are basically abstract and formal, deductive rather than inductive, in a sense just like the theoretical propositions of rational-choice economics. Their very generality consequently makes them immune to any attempt at empirical verification.

Consequently, a third concern has been whether Ostrom’s approach to common property regime tended to adopt a ‘cookie-cutter’ style of prescribing both the nature of the problem and solution. This tendency to universalize institution building has been considered problematic because it diminishes the diversity in which localities can achieve institutional responses, but also the diversity by which resource scarcity is meaningful (Johnson, 2004). These criticisms are, of course, ironic given that Ostrom’s analysis has been considered by many to champion decentralization and local autonomy. Indeed, does Ostrom tend to conflate collective action with the formation of rules by states, development interventionists, or by discursive means, which might pre-shape how communities are expected to respond to problems?

A related question here is whether, in order to analyse institutional responses to scarcity, Ostrom’s vision of common property regimes tended to assume common and uniform identities for individuals participating in rules. Agrawal (2005), for example,

argued that ‘environmental subjects’ (or participating individuals) can be shaped over time through careful government strategies such as engaging in forms of consultation, which can transform previously uncooperative exploiters to people willing to accept rules. Similarly, we, in another paper, have argued that ‘rights’-based approaches to development cannot assume that communities create rules autonomously without acknowledging how states (often in alliance with other actors) create the goalposts for what rights aim to achieve (Johnson and Forsyth, 2002). And more generally, Cleaver (2002) has proposed the term, ‘institutional bricolage’, to refer to a more malleable and contextually specific form of making institutions based on using pre-existing, and more legally pluralist rights and access. She commented:

The evolution of collective decision-making institutions may not be the process of conscious selection of mechanisms fit for the collective action task as in Ostrom’s model but rather a messier process of piecing together shaped by individuals acting within the bounds of circumstantial constraint. (Cleaver, 2002: 17)

Ostrom responded to her various critics by engaging in debate about institutional and methodological diversity, and the crucial role of knowledge in informing and structuring responses (Poteete et al., 2010; Hess and Ostrom, 2007). She wrote: ‘contextual variables are essential for understanding the initial growth and sustainability of collective action as well as the challenges that long-surviving self-organized regimes must try to overcome. Simply saying that ‘context matters’ is not, however, a satisfactory theoretical approach’ (Ostrom, 2005: 287). Moreover, one of the key design principles for institutions is reconciling conflicting values and interests, and that ‘success means different things to different people’ (Stern et al., 2002: 457).

In a book published late in her career, Ostrom and her colleagues, Marco Janssen and Amy Poteete (Poteete et al., 2010) acknowledged the disagreements about large ‘n’ studies versus case studies, and aligned these as sources of evidence alongside meta-analysis (such as synthesis), experiments and agent-based models as multi-faceted (and co-strengthening) sources of information about self-organizing institutions. In direct response to critics, they wrote: ‘We only wish that suspicion of nonethnographic research has not resulted in a misplaced attack on something called “common

property theory” (Poteete et al., 2010: 268). Optimistically (and perhaps opaquely?) they also noted, ‘promotion of methodological pluralism favors a theoretical eclecticism that should decrease concerns about existential threats to particular approaches, and should thus decrease the intensity of methodological debates’ (Poteete et al., 2010: 11).

These statements, however, imply that Ostrom considered the challenges to her position to be epistemological — or referring to the means by which knowledge is generated. Instead, it seems clear that many criticisms of Ostrom’s approach to institutions are also ontological — in the sense of identifying which problem is being addressed. For Ostrom, her main objective was to demonstrate that rational responses to scarce resources need not result only in stark choices between ecological collapse (the Tragedy), state-led dictats, or individual (private) property rights alone. For other analysts, the objective is a more inclusive and meaningful form of governance that does not insist upon a predefined vision of the nature of the problem, and hence solution, which arises from an *a priori* belief in the Tragedy as an accurate and transferable summary of human behaviour.

From Common Property Regimes to Multi-level Governance

In later years, Elinor Ostrom also sought to apply her work on self-organizing institutions to wider spatial scales. Here, she drew on her earlier research and collaborations with her husband Vincent about the concept of polycentricism. The purpose of this work was to extend the logic of incentive-led and locally autonomous institutions towards policies that can be ‘scaled up’ to regions, national policies, or international frameworks. But these approaches did not imply universal institutions, or that polycentric systems were a panacea for problems.

She wrote, ‘polycentric systems are characterized by multiple governing authorities at differing scales rather than a monocentric unit’ (Ostrom, 2010: 552). But different units within the system can make norms and rules within their own specific domain (ranging from families, firms, governments or networks). An important aspect of polycentric analysis is its ability to incorporate a wide variety of formal/informal and

state/non-state actors whose power to decide different resource governance outcomes varies in relation to different modes of governance (Ostrom, 2010). It also captures the important idea that different resources (e.g. land, water, air, etc.) have different governance dynamics, implying that resource attributes, social dynamics and institutional arrangements (defined as rules and norms) will have important bearing on resource sharing, conservation and distribution. Finally, the emphasis on networks and non-state actors highlights the role of leaders and 'shadow networks' in creating the conditions for collective action in polycentric resource governance regimes

By so doing, polycentric systems can also become sites of learning and innovation, and where aspects of social capital and cooperation can be enhanced. Ostrom's work therefore began to contribute more directly to international regime formation (Keohane and Ostrom, 1995), the role of knowledge and epistemic communities within environmental policy (Hess and Ostrom, 2007), and the integration of diverse actors and institutions within systems (Ostrom, 2007b; Ostrom, 2007a). Indeed, Ostrom applied this framework to global climate change policy. She wrote: 'Climate change is a global collective-action problem... while many of the effects of climate change are global, the causes of climate change are the actions taken by actors at smaller scales' (Ostrom, 2010: 550–51).

Yet, Ostrom's writings about climate change also indicated the same controversies relating to her earlier work. In a paper written for the World Bank, Ostrom (2009:1) used the term 'adaptive governance' to refer to 'the potential for building a more effective way of reducing greenhouse gas emissions at multiple levels'. In this sense, Ostrom was re-using her rational-choice framework in order to identify how to change (or adapt) individualistic consumption of greenhouse gases in order to reduce degradation of communal resources (the atmosphere). But at the same time, this approach frames climate change policy in terms of regulating individual contributions to atmospheric greenhouse gas concentrations. Various other scholars, however, have argued that this framework avoids questions of equitable distributions of emissions, or the extent to which atmospheric changes are indeed experienced communally. For example, many developing-world analysts have argued that greenhouse gas emissions should not be regulated according to current consumption, but should also acknowledge historic emissions, and the purposes for which emissions are made.

Indeed, some emissions might allow poorer countries to become less vulnerable to climate change (Agarwal and Narain, 1991).

Similarly, other scholars have questioned how far increasing greenhouse gas concentrations pose a shared and communal risk because the impacts of climate change are also influenced by variations in social vulnerability. Hence, Ostrom's emphasis on 'adaptive governance' seeks to build communal benefits by achieving climate change mitigation among multiple actors at different spatial scales. But this emphasis stands in contrast to 'adaptation' to climate change, which instead focuses on the means of reducing vulnerability, and where it is acknowledged that 'climate change is a global risk, yet vulnerability is locally experienced' (Ayers, 2011: 62). Consequently, it is difficult to identify common risks posed by climate change without acknowledging social vulnerability — and efforts to mitigate climate change without acknowledging the need for adaptation might overlook the local and contextual factors that make climate change a risk.

Ostrom's work on global environmental governance formed part of a larger paradigm since the mid-1990s of using market-based instruments to regulate carbon use. At face value, there seem many similarities between Ostrom's framework of rational choice and polycentricism and the current adoption of carbon trading schemes such as Reduced Emissions from Deforestation and forest Degradation (REDD+) or the European Union Emissions Trading Scheme. These policy schemes resemble Ostrom's frameworks because they involve clearly defined boundaries about resources and procedures; and with a multi-tier structure that can include citizens, companies, industries, nation states, and blocs of nation states. Yet, Ostrom's specific writings on climate change were relatively few (Ostrom, 2009, 2010; Solutions, 2010), and analyses of the genealogy of carbon markets have cited economists and theorists of cap-and-trade rather than political scientists or institutionalists such as Ostrom (Calel, 2013).

Perhaps this distance between Ostrom's new institutionalism and economic models of climate change policies reflects the somewhat muted response of some economists to Ostrom winning the 2009 Nobel Prize for Economics. The economist Steven Levitt of the University of Chicago commented:

If you had done a poll of academic economists yesterday and asked who Elinor Ostrom was, or what she worked on, I doubt that more than one in five economists could have given you an answer. I personally would have failed the test. I had to look her up on Wikipedia, and even after reading the entry, I have no recollection of ever seeing or hearing her name mentioned by an economist. She is a political scientist, both by training and her career (in Izzo, 2009).

Similarly, Paul Krugman of Princeton University, and himself the 2008 Nobel Prize winner, said:

The way to think about this prize is that it's an award for institutional economics, or maybe more specifically New Institutional Economics... I wasn't familiar with Ostrom's work, but even a quick scan shows why she shared the prize: if the goal is to understand the creation of economic institutions, it's crucial to be aware that there is more variety in institutions, a wider range of strategies that work, than simply the binary divide between individuals and firms (in Izzo, 2009).

Quotations such as these — made in the wake of the 2008 financial crisis — suggest that Ostrom's work has had problems being accepted by economists, as well as causing debate within non-rational choice approaches to development studies.

Conclusion

Elinor Ostrom contributed significantly to development studies by arguing that individuals — well informed and with minimum rights of autonomy and monitoring — could undertake collective action to protect communal resources without causing irreparable degradation, or requiring the intervention of the state or private property rights. Ostrom's work offered a more optimistic and focused approach to development interventions than previous discussions about the Tragedy of the Commons, and it identified roles for interventionists and citizens to undertake action. Ostrom also applied this insight to thinking about development aid and public governance in general (Gibson et al., 2005; Ostrom 1991, 2007a).

In this sense, Ostrom's work provided both a criticism, and a reflection, of trends in political science and development studies since the 1980s. Her work challenged many extreme neo-liberal concerns by emphasizing cooperative behavior and the possibility for solutions not involving private property. Yet, fairly or unfairly, her work was also associated with the intellectual and ideological environment of the 1980s and 1990s because of her emphasis on rational choice and methodological individualism, and because her proposed solutions to resource scarcity implied bypassing the state.

The criticisms of Ostrom's research approach can be those applied to rational choice decision making and methodological individualism in general. There is little doubt that building institutions to regulate exploitative behaviour or to empower localized policy making are welcome steps, especially in the context of environmental degradation. But critics argue that the analysis of self-organizing institutions for collective action typified by Ostrom too frequently predefine the problem that institutions were seeking to resolve, or put too much faith into a specific type of political bargaining processes to achieve outcomes. The problem caused by these generalizations is that they reduce the objectives of what institutions are for, and hence avoid important local variations and meanings. For example, common property regimes provide incentives and rules to encourage actors at various spatial scales to regulate individualistic resource exploitation. There is little space here for more diverse understandings of what resource exploitation is for, or for alternative conceptions of rationality. Instead, critics have urged more attention to the continuing role of the state or other actors in influencing the nature and objectives of institutions — or of the excluding impact of Ostrom's own approach on how development problems and solutions are defined.

Some analysts have argued that Ostrom's work cannot be criticized for 'economic imperialism' (Boettke and Coyne, 2005: 145). But it is also clear that the hypothetic-deductive model of rational choice as a response to an assumed shared problem of a Tragedy of the Commons carries some assumptions about how different people and societies address environmental scarcity. Indeed, many analysts have argued that these assumptions get in the way of building effective and meaningful environmental policy.

Looking forward, it appears that development studies is now witnessing a gradual transition from such a hypothetic-deductive, but overly nomothetic, model of explanation towards more deliberative and diverse approaches to global policy. As Ostrom noted in 1982, linear positivism is ‘coming to... a slow, whimpering end’ (Ostrom, 1982: 11). But moving on from positivistic generalizations entails not just explaining and demonstrating institutional and collective action in-between the state and market, but also rethinking the universality of how problems and policy objectives are identified and addressed (Sen, 2009). A movement to institutions needs to be matched by a more deliberative and participatory approach to defining problems and potential political processes.

In retrospect, Elinor Ostrom will be remembered for the seminal contribution she made to the study of institutions, rational choice theory and her applied work on environmental policy and governance. Through her work with the IASC and with other networks of scholars and practitioners, she clearly influenced the ways in which donors, NGOs and development practitioners now understand and address environmental problems, providing the empirical and theoretical basis for moving beyond the unhelpful dichotomy between market and state. She also provided a powerful argument in favour of working and experimenting with local solutions and human ingenuity.

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