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# The Danger of Self-Evident Truths\*

by  
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Self-evident truths are frequently invoked when scholars and policymakers propose political reforms. We often hear: "It is obvious that X is true, therefore we need to do Y." The implication of this assertion is that common sense dictates our understanding of the problem and the solution. But is it

really the case that X is true? And is Y really the best response? The fact that something is widely believed does not make it correct. Several recent political and academic debates illustrate the overreliance on self-

evident truths in public policy making.

The presumption that large numbers of small governmental units serving a metropolitan area produce inadequate, inefficient, and inequitable services has been widespread throughout this century. Its converse--that big, centralized governments are more professional and offer economies of scale in the production of public goods and services--has been considered to be similarly obvious. But are these assumptions correct? For much of this century, few questioned this common-sense wisdom. Consequently, lacking systematic empirical evidence to substantiate this belief, local governments throughout the U.S. and West Europe adopted proposals to reform their structure by consolidating local governments. In general, these reforms have failed to generate predicted benefits.

A second example illustrates the way in which self-evident truths can be multilayered. In earlier times, local natural resources such as forests, grazing areas, fisheries, and water were accessible and abundant, allowing individuals to cut, pasture, gather, and drink whatever they needed. Common sense suggested that these resources were not only plentiful but also renewable, and each person was free to take whatever was needed. But growing populations strained these freely available resources. New self-evident truths emerged. Users were perceived to be trapped in a "tragedy of the commons," unable to extract themselves from perverse incentives leading to overuse. Thus, it was thought, national governments needed to impose

new institutions on those trapped in a race to use up resources. Based on this common prescription, officials in many countries nationalized the ownership of these resources in an effort to save them from destruction, only to find that the reforms exacerbated overuse rather than reducing it.

Both of these examples suggest a general principle underlying recent governmental reforms. Individuals tend to believe that highly decentralized or polycentric systems are by their very nature disorderly and ineffective. Order is presumed to result from central direction. This common-sense assumption, however, leads to proposals to improve the operation of political systems that have had the opposite effect. By consistently taking the power to make decisions about the ways to innovate, adapt, and coordinate efforts away from those who are directly affected, policymakers have created institutions that are less able to respond to the problems they were created to address.

In this article I intend to discuss how two long-term research programs with which I have been associated have shown that "self-evident truths" provide poor foundations for policy reforms. The first research program focused on the study of polycentric public economies serving metropolitan areas. The second research program focused on the study of common-pool resources and their governance. In the concluding section, I will briefly discuss the general relevance of these research programs for the study and practice of public policy.

## **Studying Public Economies in Metropolitan Areas**

The sheer complexity of the government service delivery arrangements existing in American metropolitan areas has long perplexed many observers. Many articles, books, monographs, and reports have recommended the elimination of smaller jurisdictions and the creation of a few, large, general-purpose governments to provide all local services in any given metropolitan area. Amos Hawley and Basil G. Zimmer summarized the dominant academic view of the 1970s.

A diagnosis of the metropolitan malady is comparatively easy and its logic is too compelling to admit disagreement. Given the diagnosis the treatment seems just as apparent: consolidate the many political units under a single, overarching municipal government. With one stroke the many conflicting jurisdictions could be eliminated and a fragmented tax base could be combined into an adequate source of revenue for an entire community. Nothing, it would seem, could be more obvious or more rational. For that reason governmental consolidation has had numerous advocates. It has also had numerous opponents. Indeed, opposition to such a proposal has been monumental. (1970, 3)

This view has been reiterated continuously.<sup>1</sup> In the May 1997 issue of *The New Leader*, for example, Michael Lind echoes the same theme in an article on “A Horde of Lilliputian Governments.” Lind vigorously complains about the “multiplication of little electorates like coral polyps, which pile together in reefs that lack any ordering principle other than propinquity” (1997, 7).

### *A Monocentric Theory*

Observers have focused so much on the incomprehensibility and irrationality of metropolitan systems that they have not asked why these systems have evolved the way they have.<sup>2</sup> Scientific progress is difficult when the phenomena of interest is perceived as incomprehensible. Implicit in the proposals for widespread reform is a theory of monocentric order. The basic assumptions of this theory are

1. Urban public goods and services are relatively homogeneous and similarly affect all neighborhoods within a metropolitan area.
2. Urban voters share relatively similar preferences for urban goods and services.
3. Voters can effectively articulate their preferences for urban goods and services through one electoral mechanism.
4. Elected officials can effectively translate citizen preferences into policy objectives assigned to public bureaus and determine tax rates for producing the revenue needed to achieve these objectives.
5. Heads of public bureaus have effective command over street-level bureaucrats, who produce the highest level of public goods and services given the budget they receive.
6. Street-level bureaucrats deliver goods and services to passive clients.

Each of these assumptions is open to serious challenge. Regarding the first assumption, urban public goods and services vary substantially from one another. Freeways and mass transportation systems are capital-intensive and affect residents living and working throughout a metropolitan area. Services like primary education and police patrol, on the other hand, are not capital-intensive and directly benefit smaller sets of families. Physical goods and services involve quite different production processes because they can be produced independently of the inputs of those who eventually consume them. However, the production of

all services involves some active input--or “coproduction”--by the consumers being served (Parks et al. 1981; E. Ostrom 1996). If students, for example, do not participate actively in their own education, input resources devoted to education have little effect on results achieved. In regard to safety in a community, citizens provide the “public eyes” that may prevent criminal activities or alert the police to problems.

Contrary to the second assumption, citizens do not share similar preferences for these urban goods and services. The preferences of citizens living in relatively poorer neighborhoods differ substantially from those living in wealthier neighborhoods. In regard to recreational services, for example, residents living in neighborhoods where private living space is crowded have strong preferences for the use of public spaces--urban streets as well as parks--to be used as safe gathering places and for sports. Citizens living in wealthier neighborhoods, on the other hand, have a strong preference for quiet public spaces; they use private space for recreation.

When trying to finance public goods or services, designing mechanisms that honestly reflect beneficiaries’ preferences and their willingness to pay is difficult and complex, regardless of whether the providing unit is public or private. Thus, the third assumption is seriously open to question. In very small groups, those affected are usually able to discuss their preferences and constraints face-to-face and to reach a rough consensus. In larger groups, decisions about provision are made through voting mechanisms and the delegation of authority to public officials. The extensive literature on voting systems demonstrates how difficult it is to translate individual preferences into collective choices that adequately reflect individual views (Arrow 1951; Shepsle 1979). The problem of preference aggregation is intensified when individuals with radically differing preferences must reach decisions within a single voting unit.

Even assuming that elected officials for large and diverse jurisdictions could obtain good information about the preferences of citizens, they would find it extremely difficult to convey these to public agencies that do not face competitive pressure to perform, which calls into question the fourth assumption. The heads of large public bureaus also face substantial problems supervising large and dispersed staffs which are protected from disciplinary actions by various forms of legislation. The smooth operation of centralized public bureaus--assumption five--is not guaranteed (Miller 1992). And, if assumption six proves true, and street-level bureaucrats simply deliver services to passive citizens who are not actively engaged in coproduction, the level and quality of these services will be seriously reduced.

### *A Polycentric Theory*

Instead of prejudging the performance of complex organizations in metropolitan areas, Vincent Ostrom, Charles Tiebout, and Robert Warren challenged scholars

to think about the multiplicity of local jurisdictions in a metropolitan area as a “polycentric political system.”

“Polycentric” connotes many centers of decisionmaking which are formally independent of each other. . . . To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior. To the extent that this is so, they may be said to function as a system. (1961, 831)

This insight stimulated several decades of sustained empirical research on metropolitan governance. The research demonstrated that order and high performance were most likely to be achieved in local public economies in which large, medium, and small governmental and nongovernmental enterprises engage in competitive as well as cooperative relationships.<sup>3</sup> Local public economies are not markets. Individuals are not able to engage in a wide diversity of independent *quid pro quo* relationships with any producer they choose. Decisions are made by collective consumption units—including both neighborhood associations and local governments—who are then required to pay for the provision of public goods and services through a combination of taxes and user fees. Thus, local public economies are not hierarchies either. Entities in a local public economy engage in repeated horizontal as well as vertical interrelationships. The structure and performance of a local public economy must be examined at an interorganizational level of analysis rather than just at the level of a single unit.

The basic assumptions of a polycentric theory are

1. Urban public goods and services differ substantially in regard to their production functions and their scale of effects.
2. Individuals with relatively similar preferences for public goods and services tend to cluster in neighborhoods. Preferences will tend to be more homogeneous within neighborhoods than across an entire metropolitan area.
3. Citizens who live in multiple jurisdictions learn more about the performance of any one jurisdiction by seeing or hearing about how problems are handled in other jurisdictions.
4. Multiple jurisdictions with different scopes and scales of organization allow citizens to better make effective choices when selecting packages of services most important to them, to better articulate their preferences and concerns, and, if necessary, to move to other jurisdictions.
5. The presence of large numbers of potential producers of urban goods and services in a metropolitan area allows elected officials to make more effective selections when choosing producers.
6. Producers who must compete for contracts are more likely to search for innovative technologies, to operate at close to optimal scales of production, and to encourage effective team production, as well as coproduction, so as to enhance their own performance.

This modified form of competition is viewed as a method for reducing opportunistic behavior even though no institutional arrangement can totally elimi-

nate opportunism with respect to the provision and production of collective goods. Allowing citizens to form neighborhood-level collective consumption units encourages some face-to-face discussion and the achievement of common understanding. Creating larger collective consumption units reduces the strategic behavior of the wealthy, such as trying to escape into tax havens where they can free-ride on the tax contributions of citizens in other jurisdictions. Larger consumption units also can more effectively bear the costs of those urban goods and services that do have large-scale effects.

### *Studying Police in Metropolitan Areas*

During the late 1960s and early 1970s, in response to concerns about police effectiveness in the face of increasing crime rates, proposals to slash the number of police departments serving urban and rural areas were placed on the national agenda. Underlying these proposals was the assumption that “bigger would be better”—more professional, more responsive, and, most important, more effective. Some proposals recommended moving from the over 40,000 police departments that then existed to under 500 police departments across the country.<sup>4</sup> No systematic empirical evidence supported these reform proposals. I and colleagues associated with the Workshop in Political Theory and Policy Analysis began what became a 15-year intensive research program on urban policing with a relatively simple most-similar systems study in the Indianapolis metropolitan area and eventually conducted a comparative study of agencies in 80 metropolitan areas throughout the U.S.<sup>5</sup>

### *Alternative Predictions about Police Performance in Metropolitan Areas*

From an analysis of the nature of producing and consuming police services, we derived an alternative set of predictions about the performance of differently structured police public economies than those presumed to be true by the proponents of consolidation. First, we found we had to distinguish between direct police services, such as patrol and immediate response service, and indirect police services, such as crime laboratories and jails (that are basically provided to direct service producers rather than directly to citizens). Due to the labor-intensive nature of direct police services, the essential role of citizen as coproducer, and the problem of measuring output, we assumed that small- to medium-sized direct-service producers would be more effective and efficient than large direct-service producers under similar service conditions. Thus, for direct police services, we predicted that small governmental units that arrange for the supply of direct services by small- to medium-scale producers will perform better than larger jurisdictions.

Given that indirect police services tend to be capital-intensive and are easier to measure than direct services, large production agencies should be more effective and

efficient than smaller agencies in producing indirect services. If local police departments face pressures to become more efficient, they should search out larger police departments or other producers to supply most indirect services. To the extent that institutional arrangements facilitate contracting or other intergovernmental arrangements, we predicted we would find that (1) substantially fewer indirect-service producers exist in metropolitan areas than direct-service producers, (2) most indirect producers are large, and (3) small direct-service producers obtain most indirect services from large producers.

A third set of counterintuitive predictions was that the performance of direct-service producers of police services would be enhanced in metropolitan areas containing a large number of producers at multiple scales of organization. In these areas, the larger producers can efficiently and effectively produce crime laboratory services, training, and communications while smaller agencies produce immediate response services. It is the potential for complementarity that leads to this prediction. Substantial empirical support exists for all three predictions, which I can only briefly review here.

#### *Small and Medium-Sized Police Agencies Are More Effective in Producing Direct Services*

When conducting studies in the Indianapolis, Chicago, St. Louis, Rochester, and Tampa-St. Petersburg metropolitan areas, we solved the severe problem of measuring police performance by collecting performance data from interviews with a random sample of households served by small and large departments. Information was obtained about victimization, willingness to call the police, speed of police response, amount of police follow-up, satisfaction levels with police contacts, and general evaluations of the quality of policing in a neighborhood (McIver and Parks 1983). By studying matched neighborhoods with similar service conditions, we controlled for many of the other factors that can be expected to affect performance.

The consistent finding from this series of studies is that small and medium-sized police departments perform more effectively than large police departments serving similar neighborhoods, and frequently at lower costs (E. Ostrom and Parks 1973; E. Ostrom, Parks, and Whitaker 1973; E. Ostrom and Whitaker 1974).<sup>6</sup> Victimization rates tend to be lower, police response tends to be faster, citizens tend to be more willing to call on police, citizens tend to more positively evaluate specific contacts with the police, and citizens tend to rate police higher across a series of other evaluative questions. Further, citizens living in small communities tend to be more informed about how to change local policies, tend to know more policemen serving their neighborhoods, and call the police more frequently to obtain general information than do citizens living in large cities. Citizens served by small departments tend to receive better services at lower costs than their neighbors living in the center city. Instead of being a "problem" for the metropolitan area, small departments

frequently contribute to the improvement of police services in the area. And, recent research demonstrates, the relationships found in Indianapolis in the 1970s are still valid almost thirty years later (Parks 1995).<sup>7</sup>

#### *Small Police Agencies Can Arrange for Indirect Services from Large Police Agencies*

In our major study of police organization in 80 Standard Metropolitan Statistical Areas (SMSAs) (see

**The structure and performance of a local public economy must be examined at an interorganizational level of analysis rather than just at the level of a single unit.**

E. Ostrom, Parks, and Whitaker 1978), a total of 1,159 direct-service producers was found to serve residents in these 80 metropolitan areas. Most of these agencies produced

general area patrol, traffic patrol, accident investigation, and burglary investigation services. About 70% of these agencies conducted homicide investigations, while citizens served by the other 30% of the direct-service producers received homicide investigation services from a large agency in the area--usually an overlapping sheriff's office or a metropolitanwide homicide unit.

With regard to indirect services, we found 70% of the direct-service producers also produced their own radio communications, but only a small proportion of any of the direct-service producers produced the other indirect services. In all 80 SMSAs, indirect services were made available to all direct-service producers. In most SMSAs, direct-service producers had a choice between at least two large-scale, indirect producers. Where agencies can work out interjurisdictional contracts, set up regional facilities, and exchange services with one another, small agencies are able to obtain highly professional, indirect services at low costs without becoming fully integrated departments.

#### *Police Performance Is Enhanced in Metropolitan Areas with Larger Numbers of Police Agencies*

To examine the effect of interorganizational arrangements on police performance, we relied on measures of performance such as the allocation of police personnel to on-the-street assignments and the relative efficiency of agencies in producing response capacity and solving crime. For each of the 80 SMSAs, we calculated the number of producers of each type of service (multiplicity) and the proportion of the population being served by the largest producer of each type of service (dominance). Metropolitan areas with low multiplicity and high dominance scores come closest to approximating

the “consolidated” model. Metropolitan areas with high multiplicity scores and low dominance scores come closest to approximating the “fragmented” metropolitan area criticized by some police performance advocates.

Parks (1985) found a distinct difference in the availability of sworn officers to conduct patrols in the metropolitan areas depending upon the structure of interorganizational arrangements. While there are more officers per capita in the most consolidated areas, a lower percentage of these officers is actually assigned to patrol divisions in these SMSAs. The ratio of full-time sworn officers employed in an area to actual officers on the street at 10:00 p.m. is highest in the most consolidated areas. One-third more officers are required in the most consolidated SMSAs to place the same number of officers on patrol as compared to the least consolidated SMSAs. Citizens living in the most fragmented metropolitan areas receive more police presence on the streets for their tax expenditures than do citizens living in the most consolidated areas.

Parks and Ostrom (1981) estimated production possibility frontiers in metropolitan areas that varied with respect to multiplicity. These production possibility frontiers show the maximum combinations of clearances by arrest and cars on patrol (both standardized by the number of sworn officers to control for agency size) that were obtained by departments in metropolitan areas with differing amounts of multiplicity. The frontiers show a significant upward shift in output possibilities as the number of patrol producers in a metropolitan area increases. The most efficient producers supply more output for given inputs in high multiplicity SMSAs than do the most efficient producers in lower multiplicity areas. Thus, the presence of many other producers for comparison enhances the efficiency of direct-service producers.

### **There is No “One Best System” for All Local Public Economies**

As with police, scholars have found empirical evidence that challenges the presumptions that larger public school districts achieve higher performance (Coleman, Hoffer, and Kilgore 1982; Hanushek 1986; Kiesling 1967; Niskanen and Levy 1974; Solomon 1999; Teske et al. 1993) and that fragmentation of governments leads to higher costs (Dilorenzo 1983; Schneider 1986; Wagner and Weber 1975). Empirical studies of public entrepreneurship (Schneider and Teske 1995) and on the way local governments are constituted (Oakerson and Parks 1989) have added to the theoretical foundations and led to a more general acceptance of polycentric public economies (Stephens and Wikstrom 2000). As a result of extensive empirical and theoretical research, the presumed self-evident truth that constructing one government for each metropolitan area is the best way to achieve efficiency and equity has slowly been replaced with a recognition that judging “structure directly on the single criterion of uniformity contributes little to the advancement of research or

reform” (Oakerson 1999, 117). Instead of directing informed and interested citizens and public officials to identify and enact a single best design that would have to cope with the wide variety of problems faced in different localities, a polycentric theory encourages them to articulate core principles that can be used to design effective local institutions well-matched to local circumstances (122-24).

### **Studying Common-Pool Resources**

The second long-term research program involving “self-evident truths” with which I have been associated is the study of institutions for governing and managing common-pool resources such as forests, irrigation systems, and the atmosphere. Common-pool resources (CPRs) are natural or human-made facilities or stocks that generate flows of resource units over time. Forests and grazing lands are typical natural CPRs. The Internet and irrigation systems are examples of human-constructed CPRs. CPRs share two characteristics: (1) it is costly to develop institutions to exclude potential beneficiaries from them; (2) the resource units (e.g., fish, water, and kilobits) that are appropriated (harvested or used) by one individual are not available to others (E. Ostrom, Gardner, and Walker 1994). The first characteristic is shared with those goods and services referred to as “public goods” and leads to the potential problem of free riding. The second characteristic is shared with those goods and services referred to as “private goods” and leads to the potential problems of congestion, overharvesting, and destruction of the resource itself.

It is self-evident that a CPR generating highly valuable resource units from which anyone can appropriate will be overused. It has also been thought to be self-evident that those who appropriate resource units from a CPR are incapable of designing and enforcing effective rules to limit their appropriation to sustainable levels. Following from this second self-evident truth, it is presumed that solutions to the problems of overappropriation must be imposed by external authorities. Some resources have indeed been destroyed by those who have appropriated from them, but it is also the case that for millennia people have self-organized to manage CPRs and have devised long-term, sustainable institutions for governing these resources.

### *The Conventional Theory of Open-Access Common-Pool Resources*

Since the important early studies of open-access fisheries by Gordon (1954) and Scott (1955), most theoretical studies have analyzed simple common-pool resource systems using relatively similar assumptions.<sup>8</sup> In such systems, it is assumed, the resource generates a highly predictable, finite supply of one type of resource unit (one species, for example) in each relevant time period. Appropriators are assumed to be homogeneous in terms of their assets, skills, discount rates, and cultural views. They are also assumed to be short-term,

profit-maximizing actors who possess complete information. In this theory, anyone can access the resource and take resource units. Appropriators only gain property rights to what they harvest, which they can then sell in an open competitive market. The open-access condition is a theoretical given. Given these assumptions, a logical conclusion is that CPRs will be overused and eventually exhausted.

Many textbooks on environmental policy present this conventional theory of an open-access common-pool resource as the only theory needed for understanding CPRs more generally (cf., Baland and Platteau 1996). Massive deforestation in tropical countries and the collapse of multiple ocean fisheries have been taken as sufficient evidence by many policy analysts and public officials to confirm the general validity of the theory. Garrett Hardin's dramatic 1968 article in *Science* convinced others that the conventional theory captures the core of the problem. The metaphor of resource users helplessly trapped in a relentless tragedy has been used by scholars and policymakers to rationalize central government control of forests, inshore fisheries, and many other CPRs. Beyond metaphor, the presumption that users are helpless is also based on well-accepted theories of collective action drawing on the seminal work of Mancur Olson (1965), as well as on the foundation of noncooperative game theory. While not accepted by all social scientists, these theories are fully developed and have received empirical support in some settings. Thus, reform proposals that stressed the essential role of the state as the source of rules and their enforcement have seemed to have a very firm academic foundation.

Implicitly, theorists have assumed that public officials--as contrasted to appropriators--act in the public interest, understand how ecological systems work, and know how to change institutions so as to induce socially optimal behavior (Feeny, Hanna, and McEvoy 1996, 195). The possibility that the appropriators themselves would find ways to organize themselves has not seriously been considered until recently. Organizing for the purpose of creating rules that specify the rights and duties of participants creates a public good for those involved. All appropriators benefit from this public good, whether they contribute or not. Thus, getting "out of the trap" is itself a second-level dilemma. Further, monitoring and sanctioning others with the intention of increasing rule conformance also generates a public good. Thus, deciding whether to monitor and sanction is a third-level dilemma. Since much of the initial problem exists because the individuals are in a dilemma setting where they generate negative externalities on one another, it is not consistent with the conventional theory that the interested individual solve a second- and third-level dilemma in order to address the first-level dilemma under analysis.

### *Empirical Anomalies from Field and Experimental Research*

Contrary to this well-accepted theory, however, a large number of studies have demonstrated that not only

have those facing these multiple social dilemmas crafted institutions to govern their own resources, they have in many instances sustained these regimes for very long periods of time.<sup>9</sup> The design principles that characterize robust, long-lasting institutional arrangements for the governance of CPRs have been identified (Ostrom 1990) and supported by further testing (Girrot, Weitzner, and Fonseca 1998; Merrey 1995; Morrow and Hull 1996; Pomeroy, Katon, and Harkes 1998). Still other in-depth case analyses have documented the accelerated overharvesting of forests that occurred after national governments declared themselves to be the owner of forested land (Arnold 1992; Ascher 1995).

In addition to the extensive case study literature, quantitative studies have shown that local-scale CPRs, such as irrigation systems, grazing systems, and inshore fisheries tend to be effectively and sustainably organized by appropriators (Lansing and Kremer 1993; Schlager and Ostrom 1993; Tang 1992). Agrawal (1999) shows how migrating shepherds devise decision-making arrangements to cope with the difficult problems facing individuals whose assets are in the form of animals rather than land. Lam (1998) has examined the performance of over 100 irrigation systems in Nepal that are either self-organized by the farmers or constructed and operated by the national government. Using a multiple regression analysis controlling for the size of the system and several physical variables, Lam showed that the farmer-managed systems out-perform the government-managed systems in terms of a composite score based on productivity and water distribution. The difference in performance is particularly striking since the farmer-managed systems tend to be constructed using primitive techniques, including brush, stone, and mud diversion works, while government systems have largely been constructed with donor assistance using modern engineering designs. Several well-crafted empirical studies have now also begun to identify variables that are associated with a higher probability of successful organization or failure (Bardhan 1999; Dayton-Johnson and Bardhan 1998; Kukuchi et al. 1998).

The structure of a finitely repeated CPR game has also been examined in experimental laboratory studies. In this setting, it has been shown that when appropriators from a CPR are in a minimal institutional setting without any capacity to communicate, signal, know who each other are, or otherwise build community or institutions, outcomes approach the predicted outcome of the conventional theory. On the other hand, as soon as subjects are allowed to communicate (which noncooperative game theory predicts will make no difference in finitely repeated dilemma situations since oral promises are not binding), subjects are able to achieve far better outcomes than predicted by the conventional theory. Once communication is allowed, subjects spend time and effort assessing each other's trustworthiness and reaching agreements about the strategies they should jointly take to achieve this best outcome. Further, individuals in a laboratory setting are willing to monitor each other and invest in costly sanctions in order to punish those who overappropriate as well as in

devising specific rules that they themselves enforce on each other (see E. Ostrom, Gardner, and Walker 1994). In other words, in a controlled setting, individuals solve all three social dilemmas and achieve substantially greater payoffs than predicted once communication is allowed.

Evidence from field and experimental research thus challenges the generalizability of the conventional theory. While it is generally successful in predicting outcomes in settings where appropriators are alienated from one another or cannot communicate effectively, the conventional theory does not provide an explanation for settings where appropriators are able to create and sustain agreements to avoid serious problems of over-harvesting. A fully articulated, formal theory encompassing the conventional theory as a special case does not yet exist. On the other hand, the work of many scholars is contributing to an evolving theory of institutional change that begins to explain both successful and unsuccessful processes of self-organization.<sup>10</sup>

### *A Theory of Institutional Change*

Within the evolving theory of institutional change, resource systems vary in regard to their size, predictability, and the reliability of indicators of system performance. The appropriators from a CPR are boundedly rational and vary with respect to their assets, dependence on the resource, time horizons, trustworthiness, common understanding, and other attributes. Changes in these key variables--to be discussed below--account for when groups do self-organize or when they fail to achieve collective action. When boundedly rational appropriators contemplate changing their rules, they undertake a rough benefit-cost analysis based on their expectations concerning the benefits and costs that are likely to flow to them from a future set of rules.

Each appropriator compares the expected net benefits of continuing to harvest under a situation with no rules (or, if contemplating a reform within the structures of existing rules) with the benefits he or she expects to achieve under a new set of rules.<sup>11</sup> An appropriator has an initial incentive to change if expected benefits from new rules are significantly greater than continuing under the status quo. If no appropriator has a positive incentive to change, the status quo remains in effect. If appropriators have an initial incentive to change, they then need to estimate three types of costs:

1. The up-front costs of time and effort spent devising and agreeing upon new rules;
2. The short-term costs of adopting new appropriation strategies; and
3. The long-term costs of monitoring and maintaining a self-governed system over time.

If the sum of these expected costs for each appropriator exceeds the incentive to change, no appropriator will invest the time and resources needed to create new institutions, and the status quo remains in effect.

In field settings, everyone is not likely to expect the same costs and benefits from a proposed change. Some may perceive positive benefits after all costs have been taken into account, while others perceive net losses. Consequently, the collective-choice rules used to change the day-to-day operational rules related to appropriation from a CPR affect whether an institutional change favored by some and opposed by others will be made. The collective-choice rules used to change operational rules range from reliance on the decisions made by one or a few leaders, to a formal reliance on majority or supermajority vote, to reliance on consensus or close to unanimity. For any collective-choice rule, there is a minimum coalition of appropriators that must agree prior to the adoption of new rules. If the members of this minimum winning coalition at the collective-choice level view the sum of the three types of costs as greater than the expected net benefits of a change, no new rules will be adopted.

We can only expect a change in operational rules when there is a minimum winning coalition--given the collective-choice rule in force--whose individuals expect to receive more benefits than the costs of a change in rules. If there are several such coalitions, the question of which coalition will form, and thus which rules will result, is a difficult theoretical question to answer, even in settings that are much simpler than the settings discussed here. If there are substantial differences in the perceived benefits and costs for different appropriators, it is possible that a subset of appropriators will impose a new set of rules on others that strongly favors those in the winning coalition and imposes losses or lower benefits on those in the losing coalition (Thompson, Mannix, and Bazerman 1988). If expected benefits from a change in institutional arrangements are not greater than expected costs for a substantial proportion of the appropriators, however, the costs of enforcing a change in rules will be much higher for the winning coalition than when most participants expect to benefit from a change in rules over time. When the enforcement costs are fully borne by the members of a winning coalition, operational rules that benefit other appropriators lower the long-term costs of monitoring and sanctioning for a governing coalition, and, thus, rules benefiting a larger proportion of the group are more likely to emerge. Where external authorities are the only enforcers of rules, the distribution of costs and benefits is more likely to benefit the winning coalition and may impose costs on those who did not agree to the rules (see Walker et al. forthcoming). Thus, the particular collective-choice rules used by a group for making institutional changes affect not only the likelihood of change, but the distribution of costs and benefits.

It is rarely easy to measure the perceived benefits and costs of an institutional change in field settings. To further refine the evolving theory of institutional change, it is necessary to posit observable variables that are likely to affect either the benefits or the costs of institutional change--and, thus, whether appropriators will be likely to move away from a status quo position. A growing consensus exists that the variables listed below are associated with greater benefits (or lower costs) of changing the

rules specifying who can appropriate from a resource and the conditions imposed on appropriation.

The attributes of a resource that are associated with an increased likelihood of self-organization are:

- R1. Feasible improvement: Resource conditions are not at a point of deterioration such that it is useless to organize or so underutilized that little advantage results from organizing.
- R2. Indicators: Reliable and valid indicators of the condition of the resource system are frequently available at a relatively low cost.
- R3. Predictability: The flow of resource units is relatively predictable.
- R4. Spatial extent: The resource system is sufficiently small, given the transportation and communication technology in use, that appropriators can develop accurate knowledge of external boundaries and internal microenvironments.

The attributes of appropriators that are associated with an increased likelihood of self-organization are:

- A1. Saliency: Appropriators are dependent on the resource system for a major portion of their livelihood or other important activity.
- A2. Common understanding: Appropriators have a shared image of how the resource system operates (attributes R1, 2, 3, and 4 above) and how their actions affect each other and the resource system.
- A3. Low discount rate: Appropriators use a sufficiently low discount rate in relation to future benefits to be achieved from the resource.
- A4. Trust and reciprocity: Appropriators trust one another to keep promises and relate to one another with reciprocity.
- A5. Autonomy: Appropriators are able to determine access and harvesting rules without external authorities countermanding them.
- A6. Prior organizational experience and local leadership: Appropriators have learned at least minimal skills of organization and leadership through participation in other local associations or studying ways that neighboring groups have organized.

Many of these variables are in turn affected by the type of larger regime in which users are embedded. Larger regimes can facilitate local self-organization by providing accurate information about natural resource systems, providing arenas in which participants can engage in discovery and conflict-resolution processes, and providing mechanisms to back up local monitoring and sanctioning efforts. The probability of participants adopting more effective rules in macroregimes that facilitate their efforts over time is higher than in regimes that ignore resource problems entirely or, at the other extreme, presume that all decisions about governance and management need to be made by central authorities.

The attributes of a resource and of appropriators affect both the benefits and costs of institutional change directly and indirectly. It is not possible, given space constraints, to discuss how all of the attributes affect the benefit-cost analysis of participants (see E. Ostrom forthcoming), but I will focus on one attribute of a

resource and several attributes of the appropriators as an illustration of the type of relationships posited.

Let us turn first to the resource. If resource units are relatively abundant (R1), there are few reasons for appropriators to invest costly time and effort in organizing. If the resource is already substantially destroyed, the high costs of organizing may not generate substantial benefits. Thus, self-organization is likely to occur only after appropriators observe scarcity, but only if they still see the possibilities for improvement (Bardhan 1999; Wade 1994). The danger here, however, is that exogenous shocks leading to a change in relative abundance of the resource units occur rapidly and appropriators may not adapt quickly enough to new circumstances.

Regarding the attributes of the appropriators, if the CPR is not highly salient for the appropriators (A1), the high costs of organizing and maintaining a self-governing system may not be worth their effort (Gibson forthcoming). If appropriators do not share a common understanding of how complex resource systems operate (A2), they will find it extremely difficult to agree on future joint strategies. Asymmetric private information about heterogeneous assets adversely affects the willingness of participants to agree to a reduction in their use patterns before considerable damage is done to a resource (Libecap and Wiggins 1985). Given the complexity of many common-pool resources--especially multispecies or multiproduct resources--understanding how these systems work may be counterintuitive even for those who make daily contacts with the resource.<sup>12</sup> Appropriators with many other viable and attractive options, who thus discount the importance of future income from a particular resource (A3), may prefer to "mine" one resource without spending resources to regulate it, since they can simply move on to other resources or other activities once the first resource is depleted.

Appropriators who trust one another (A4) to keep agreements and practice reciprocity in their relationships with one another face lower expected costs involved in monitoring and sanctioning one another over time. Appropriators who lack trust at the beginning of a process of organizing may be able to build social capital (Coleman 1988; E. Ostrom 1992a) if they initially adopt small changes that most appropriators can agree to before trying to make major changes. Autonomy (A5) tends to lower the costs of organizing. A group that has little autonomy may find that those who disagree with locally developed rules seek contacts with higher-level officials to undo the efforts of appropriators to achieve regulation. With the legal autonomy to make their own rules, appropriators face substantially lower costs in defending their own rules against other authorities. Prior experience with other forms of local organization (A6) greatly enhances the repertoire of rules and strategies known by local participants as potentially useful to achieve various forms of regulation. Further, appropriators are more likely to agree upon rules whose operation they understand from prior experience than upon rules that are introduced by external actors and which are new to their experience.

## Contested Variables

Despite their growing consensus concerning the variables most likely to enhance self-organization, scholars seeking to explain institutional change still face many unresolved theoretical questions relating to the effect of the size of a group and its heterogeneity.

### Size

The effect of the number of participants on the likelihood of creating and sustaining a self-governing enterprise is unclear. Drawing on the early work of Mancur Olson (1965), many theorists argue that group size is negatively related to solving collective-action problems in general. Many results from game theoretical analysis of repeated games conclude that cooperative strategies are more likely to emerge and be sustained in smaller rather than larger groups. Scholars who have studied many self-organized irrigation and forestry institutions in the field have concluded that success will be most likely in smaller groups (see, e.g., Barker et al. 1984; Cernea 1989), but this is not uniformly supported (see Agrawal forthcoming; Lam 1998; Tang 1992).

One of the problems with focusing on group size as a key determining factor is that many other variables change as group size increases (R. Hardin 1982). If the costs of providing a public good related to the use of a common-pool resource, say a sanctioning system, remain relatively constant as group size increases, then increasing the number of participants brings additional resources that could be drawn upon to provide the benefit enjoyed by all (see Isaac, Walker, and Williams 1994). On the other hand, if one is analyzing the conflict levels over a subtractable good and the transaction costs of arriving at acceptable allocation formulas, group size may well exacerbate the problems of self-governing systems.

### Heterogeneity

Many scholars have concluded that only very small groups can organize themselves effectively because they presume that size is related to the homogeneity of a group and that homogeneity is needed to initiate and sustain self-governance. Heterogeneity is also a highly contested variable. For one thing, groups can differ along a diver-

sity of dimensions, including their cultural backgrounds, interests, and endowments. Each may operate differently.

When the interests of appropriators differ, achieving a self-governing solution to common-pool resource problems is particularly challenging. Appropriators who possess more substantial economic and political assets may have similar interests to those with fewer assets or they may have different interests. When the more powerful have similar interests, they may greatly enhance the probability of successful organization if they invest their resources in organizing a group and devising rules to govern that group. Those with substantial economic and political assets are more likely to be members of the winning coalition and thus have a bigger impact on decisions about institutional changes. Mancur Olson (1965) long ago recognized the possibility of members of a privileged group being sufficiently affected to bear a disproportionate share of the costs of organizing to provide public goods (such as the organization of a collectivity). On the other hand, if those with more assets also have low discount rates (A3) related to a particular resource and lower salience (A1), they may simply be unwilling to expend inputs or actually impede organizational efforts that might lead to their having to cut back on their productive activities. This problem characterizes some fisheries where local subsistence fishermen have strong interests in the sustenance of an inshore fishery, while industrial fishing firms have many other options and may be more interested in the profitability of fishing in a particular location than its sustained yield. The conflict between absentee livestock owners versus local pastoralists has also proved difficult to resolve in many parts of the world.

Even in a group whose members differ considerably, if at least a minimally winning subset of appropriators harvesting a scarce and valuable resource are dependant on it (A1), share a common understanding of their situations (A2), have a low discount rate (A3), trust one another (A4), and have autonomy to make their own rules (A5), it is more likely that they will estimate the expected benefits of governing their resource to be greater than the expected costs. Whether the rules agreed upon distribute benefits and costs fairly depends both on the collective-choice rule used and the type of heterogeneity existing in the community. Thus, neither size nor heterogeneity are variables with a uniform effect on the likelihood of organizing and sustaining self-governing enterprises. The impact of these variables depends on how they are related to the other attributes of a resource and of the appropriators, and therefore how they are linked to expected benefits and costs of institutional change.

Given the complexity of many field settings, appropriators face a difficult task when evaluating how diverse variables affect expected benefits and costs over a long time horizon. In many cases, it is just as difficult, if not more so, for scientists to make a valid and reliable estimate of total benefits and costs and their distribution. Appropriators in the field rarely face a setting that generates clear-cut benefit-cost ratios and

appropriators may have considerable doubt that a change in rules will genuinely bring them net benefits. Further, the collective-choice rules in some settings give a small elite substantial power to block suggested changes that may generate overall positive gains, but losses for those in power.

Consequently, evolving theory does *not* lead to a conclusion that most appropriators using common-pool resources will self-organize to govern a CPR. Many settings exist where the theoretical expectation should be the opposite: Appropriators will overuse the resource unless efforts are made to change one or more of the variables affecting perceived benefits or costs or to change the collective-choice rule in effect. Given the number of variables that affect these costs and benefits, many points of external intervention can enhance or reduce the probability of appropriators' agreeing upon and following rules that generate higher social returns. Both social scientists and policymakers have a lot to learn about how these variables operate interactively in field settings and even how to measure them so as to increase the empirical warrantability of the growing theoretical consensus.

## Lessons from Metropolitan and CPR Research Programs

From my participation in these two extended research programs, I have learned to be skeptical whenever I

hear the phrase "it is self-evident" that some empirical regularity occurs in a sociopolitical setting. Patterns of relationships among individuals and groups tend to be relatively complex and rarely lend themselves to simple explanations. Reforms based on overly simplified views of the world have led to counterintuitive and counterintentional results in both urban and CPR environments. Further, I have gained an ever greater respect for polycentric systems and the direct involvement of citizens in governance.<sup>13</sup> While all institutions are subject to takeover by opportunistic individuals and to the potential for perverse dynamics, a political system that has multiple centers of power at differing scales provides more opportunity for citizens and their officials to innovate and to intervene so as to correct maldistributions of authority and outcomes (McGinnis 1999a, forthcoming; V. Ostrom 1997). Thus, polycentric systems are more likely than monocentric systems to provide incentives leading to self-organized, self-corrective institutional change. Trying to understand how complex multicentered, multilevel political systems operate is difficult. Thus, theoretically driven empirical research is an essential element of improving the operation of a democratic system. Empirically supported theories are important tools for the effective conduct of policy analysis and the successful reform of political systems.

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## Notes

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1. According to Stephens and Wikstrom, "The reform perspective concerning governmental structure in metropolitan areas early on gained the allegiance of practically all scholars of urban affairs and held a virtual intellectual monopoly well into the 1960s" (2000, 15).

2. This section draws on E. Ostrom (1998).

3. For a parallel research program, see Frey and Eichenberger (1996) and Frey (1997).

4. For example, Bernard L. Garmire, then chief of police for Miami, Florida, stated:

There are approximately 40,000 police agencies ranging in size from one man to 30,000 men. *It is not necessary to elaborate on the disadvantages of such a fractured system: they are too well known.* Perhaps only cities of 50,000 or more should be allowed their own police agencies; the state should police the smaller cities and the rural areas. In the metropolitan areas there should be consolidation of the smaller police agencies. If this were done, the number of police agencies could be reduced from 40,000 agencies to roughly 400-plus agencies--with clear gains in terms of effectiveness and efficiency. (1972, 9; emphasis in original)

5. For an overview, see McGinnis (1999b).

6. These studies were replicated in Nashville, Tennessee (Rogers and

Lipsey 1974) and Grand Rapids, Michigan (IsHak 1972).

7. Recent research also demonstrates that the "new panacea" for urban policing, "community policing," while generally producing increased citizen satisfaction, is also more difficult to implement in those neighborhoods where it is most needed due to a past history of distrust among citizens and between citizens and the police (Parks and Reisig 1998).

8. This section draws on E. Ostrom (forthcoming).

9. See Berkes (1989), Berkes and Folke (1998), Blomquist (1992), Bromley et al. (1992), Fortmann and Bruce (1988), Lam (1998), McCay and Acheson (1987), Netting (1993), E. Ostrom (1990; 1992a), V. Ostrom, Feeny, and Picht (1993), Pinkerton (1989), Sengupta (1991), Tang (1992), Thomson (1992), and Wade (1988). Hess (1999) contains an extensive bibliography on CPRs.

10. See Baland and Platteau (1996), Bardhan (1995), E. Ostrom (1992b; forthcoming), E. Ostrom and Gardner (1993), Kikuchi et al. (1998), McKean (1992; forthcoming), and Wade (1994).

11. See E. Ostrom (forthcoming) for a more formal treatment of this process.

12. For resources whose supply is highly variable (R3), it may be particularly difficult to understand and to sort out those outcomes stemming from exogenous factors and those resulting from the actions of appropriators. And, as Brander and Taylor (1998) have argued, when the resource base itself grows very slowly, population growth may exceed the carrying capacity before participants have achieved a common understanding of the problem they face. Of course, this problem confronts officials as well as appropriators.

13. The research program of Bruno Frey and colleagues at the University of Zurich has also provided substantial parallel findings. Frey and Stutzer (1999), for example, have shown that citizens are happier and governments perform better when citizens are directly involved.

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