

THE DRAMA OF THE COMMONS

Committee on the Human Dimensions of Global Change

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2 Common Resources and Institutional Sustainability

Arun Agrawal

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ANALYSES OF SUSTAINABLE MANAGEMENT OF COMMON-POOL RESOURCES

Of the significant number of comparative studies on the commons, I have chosen the book-length studies by Wade ([1988] 1994), Ostrom (1990), and Baland and Platteau (1996). Two of them, by Wade and Ostrom, appeared more than a decade ago, and can be seen as the advance guard of a veritable flood of new writings on the commons that have put an end to the notion that common property is a historical curiosity. The main positive lessons I derive by comparing these authors are how they show that under some combinations of frequently occurring conditions, members of small groups can design institutional arrangements that help sustainable management of resources. They go further and identify the specific conditions that are most likely to promote local self-management of resources. Not only that, they use theoretical insights to defend and explain the empirical regularities they find.

It would be fair to say that each of the three books is a careful and rigorous conversation between theory and empirical investigation because of their attention to theoretical developments at the time of writing, their effort to relate theory to the cases they examine, and their contributions to common property theory.

They all use a large body of empirical materials to test the validity of the theoretical insights they garner. Although the three books embody very different approaches to empirical comparative research, and rely on very different kinds of data, their concern for being empirically relevant and holding theory accountable to data is evident. For this paper, one of the most appealing aspects of their argument is that after wide-ranging discussion and consideration of many factors, each author arrives at a summary set of conditions and conclusions he or she believes to be critical to sustainability of commons institutions. Together, their conclusions form a viable starting point for the analysis of the ensemble of factors that account for sustainable institutional arrangements to manage the commons. But a discussion of their conclusions and some of the implications of their work also demonstrates that their propositions about sustainability on the commons need to be supplemented.

Because there is no single widely accepted theory of what makes common property institutions sustainable, it is important to point out that differences of method are significant among these three authors. Wade relies primarily on data he collected from South Indian villages in a single district. His sample is not representative of irrigation institutions in the region, but at least we can presume that the data collection in each case is consistent. To test her theory, Ostrom uses detailed case studies that other scholars generated. The independent production of the research she samples means that all her cases may not have consistently collected data. But she examines each case using the same set of independent and dependent variables. Baland and Platteau are more relaxed in the methodological constraints they impose on themselves. To motivate their empirical analysis, they use a wide-ranging review

of the economic literature on property rights and the inability of this literature to generate unambiguous conclusions about whether private property is superior to regulated common property. But to examine the validity of their conclusions, they use information from different sets of cases. In an important sense, the “model specification” is incomplete in each test (King et al., 1994).

Wade’s (1994) important work on commonly managed irrigation systems in South India uses data on 31 villages to examine when it is that corporate institutions arise in these villages and what accounts for their success in resolving commons dilemmas.¹⁶ His arguments about the origins of commons institutions point, in brief, toward environmental risks as being a crucial factor. But he also provides a highly nuanced and thoughtful set of reasons about successful management of commons. According to Wade, effective rules of restraint on access and use are unlikely to last when there are many users, when the boundaries of the common-pool resource are unclear, when users live in groups scattered over a large area, when detection of rule breakers is difficult, and so on (Wade, 1988:215).¹⁷ Wade specifies his conclusions in greater detail by classifying different variables under the headings of resources, technology, user group, noticeability,

relationship between resources and user group, and relationship between users and the state (1988:215-216).¹⁸ The full set of conditions that Wade considers important for sustainable governance are listed in [Box 2-1](#).

In all, Wade finds 14 conditions to be important in facilitating successful management of the commons he investigates.¹⁹ Most of his conditions are general statements about the local context, user groups, and the resource system, but some of them are about the relationship between users and resources. Only one of his conditions pertains to external relationships of the group or of other local factors.

BOX 2-1

BOX 2-1 Facilitating Conditions Identified by Wade

1. Resource system characteristics
 - i. Small size
 - ii. Well-defined boundaries

2. Group characteristics
 - i. Small size
 - ii. Clearly defined boundaries
 - iii. Past successful experiences—social capital
 - iv. Interdependence among group members

(1 and 2) Relationship between resource system characteristics and group characteristics

- i. Overlap between user group residential location and resource location

- ii. High levels of dependence by group members on resource system

- 3. Institutional arrangements

- i. Locally devised access and management rules
- ii. Ease in enforcement of rules
- iii. Graduated sanctions

(1 and 3) Relationship between resource system and institutional arrangements

- i. Match restrictions on harvests to regeneration of resources

- 4. External environment

- i. Technology: Low-cost exclusion technology
- ii. State:

- a. Central governments should not undermine local authority

SOURCE: Wade (1988).

Studies appearing since Wade's work on irrigation institutions have added to his list of factors that facilitate institutional success, but some factors have received mention regularly. Among these are small group size, well-defined bounds on resources and user group membership, ease in monitoring and enforcement, and closeness between the location of users and the resource. Consider, for example, the eight design principles that Ostrom (1990) lists in her defining work on community-level governance of resources. She crafts these principles on the basis of lessons from a sample of 14 cases where users attempted, with varying degrees of success, to create, adapt, and sustain institutions to manage the commons. A design principle for Ostrom is "an essential element or condition that helps to account for the success of these institutions in sustaining the [common-pool resources] and gaining the compliance of generation after generation of appropriators to the rules in use" (1990:90). She emphasizes that these principles do not provide a blueprint to be imposed on resource management regimes. Seven of the principles are present in a significant manner in all the robust commons institutions she analyzes. The eighth covers more complexly organized cases such as federated systems.

Although Ostrom lists eight principles, on closer examination the number of conditions turns out to be larger. For example, her first design principle refers to clearly defined boundaries of the common-pool resource and of membership in a group, and is in fact listed as two separate conditions by Wade. Her second principle, similarly, is an amalgam of two elements: a match between levels of restrictions and local conditions, and between appropriation and provision rules. Ostrom thus should

be seen as considering 10, not 8, general principles as facilitating better performance of commons institutions over time (see [Box 2-2](#)).

A second aspect of the design principles, again something that parallels Wade's facilitating conditions, is that most of them are expressed as general features of long-lived, successful commons management rather than as relationships between characteristics of the constituent analytical units or as factors that depend for their efficacy on the presence (or absence) of other variables. Thus, principle seven suggests that users are more likely to manage their commons sustainably when their rights to devise institutions are not challenged by external government authorities. This is a general principle that is supposed to characterize all commons situations. The principle says that whenever external governments do not interfere, users are more likely to manage sustainably. In contrast, principle two suggests that restrictions on harvests of resource units should be related to local conditions (rather than saying that the lower [or higher] the level of withdrawal, the more [or less] likely would be success in management). Thus, it is possible to imagine certain resource and user group characteristics for which withdrawal levels should be high, and where setting them at a low level may lead to difficulties in management. For example, when supplements to resource stock are regular and high, and user group members depend on resources significantly, setting low harvesting levels will likely lead to unnecessary rule infractions. Thus

BOX 2-2 Ostrom's Design Principles

1. Resource system characteristics

- i. Well-defined boundaries

2. Group characteristics

- i. Clearly defined boundaries

(1 and 2) Relationship between resource system characteristics and group characteristics

None presented as important

3. Institutional arrangements

- i. Locally devised access and management rules
- ii. Ease in enforcement of rules
- iii. Graduated sanctions
- iv. Availability of low-cost adjudication
- v. Accountability of monitors and other officials to users

(1 and 3) Relationship between resource system and institutional arrangements

- i. Match restrictions on harvests to regeneration of resources
- 4. External environment
 - i. Technology: None presented as important
 - ii. State:
 - a. Central governments should not undermine local authority
 - b. Nested levels of appropriation, provision, enforcement, governance

SOURCE: Ostrom (1990).

principle two covers a wider range of variations across cases, but at the cost of some ambiguity. In contrast, principle seven is more definite, but it is easy to imagine situations where it is likely not to hold.

Finally, most of Ostrom's principles focus primarily on local institutions, or on relationships within this context. Only two of them, about legal recognition of institutions by higher level authorities and about nested institutions, can be seen to express the relationship of a given group with other groups or authorities.

Baland and Platteau (1996), in their comprehensive and synthetic review of a large number of studies on the commons, follow a similar strategy as does Ostrom (1990). Beginning with an examination of competing theoretical claims by scholars of different types of property regimes, they suggest that the core argument in favor of privatization "rests on the comparison between an idealized fully efficient private property system and the anarchical situations created by open access" (Baland and Platteau, 1996:175). Echoing earlier scholarship on the com-

mons, they emphasize the distinction between open access and common property arrangements and suggest that when private property regimes are compared with regulated common property systems (and when information is perfect and there are no transaction costs), then "*regulated common property and private property are equivalent from the standpoint of the efficiency of resource use*" (Baland and Platteau, 1996:175, emphasis in original).²⁰ Furthermore, they argue, the privatization of common-pool resources or their appropriation and regulation by central authorities tends to eliminate the implicit entitlements and personalized relationships that are characteristic of common property arrangements. These steps, therefore, are likely to impair efficiency, and even more likely to disadvantage traditional users whose rights of use seldom get recognized under privatization or expropriation by the state.²¹

Their review of the existing literature from property rights and economic theory leads them to assert that "none of the property rights regimes appears intrinsically efficient" and that the reasons for which common property arrangements are criticized for their inefficiency can also haunt privatization measures. Where agents are not fully aware of ecological processes, or are unable to protect their resources against intruders, or their opportunity costs of degrading the environment are low,²² state intervention may be needed to support both private *and* common property

(Baland and Platteau, 1996:178). In the absence of clear theoretical predictions regarding the superiority of one property regime over another, they argue in favor of attention to specific histories of concrete societies, and explicit incorporation of cultural and political factors²³ into analysis. Only then might it be possible to know when people cooperate, and when inveterate opportunists dominate and make collective action impossible.

After a wide-ranging review of empirical studies of common-pool resource management, and focusing on several variables that existing research has suggested as crucial to community-level institutions, Baland and Platteau arrive at conclusions that significantly overlap with those of Wade and Ostrom. Small size of a user group, a location close to the resource, homogeneity among group members, effective enforcement mechanisms, and past experiences of cooperation are some of the themes they emphasize as significant to achieve cooperation (Baland and Platteau, 1996:343-345). In addition, they highlight the importance of external aid and strong leadership.²⁴

As is true for Ostrom, several of the factors they list are actually a joining together of multiple conditions. For example, their third point incorporates what Wade and Ostrom would count as four different conditions: the relationship between the location of the users and the resources on which they rely, the ability of users to create their own rules, the ease with which rules are understood by members of the user group and are enforced, and whether rules of allocation are considered fair. Some of their other conditions also signify more than one variable. Therefore, instead of 8 conditions, Baland and Platteau should be seen as identifying 12 conditions (see [Box 2-3](#)).

BOX 2-3 Conclusions Presented by Baland and Platteau as Facilitating Successful Governance of the Commons

1. Resource system characteristics

None presented as important

2. Group characteristics

- i. Small size
- ii. Shared norms
- iii. Past successful experiences—social capital
- iv. Appropriate leadership—young, familiar with changing external environments, connected to local traditional elite
- v. Interdependence among group members
- vi. Heterogeneity of endowments, homogeneity of identities and interests

(1 and 2) Relationship between resource system characteristics and group characteristics

- i. Overlap between user group residential location and resource location
- ii. Fairness in allocation of benefits from common resources

3. Institutional arrangements
 1. Rules are simple and easy to understand
 2. Locally devised access and management rules
 3. Ease in enforcement of rules
 4. Accountability of monitors and other officials to users

(1 and 3) Relationship between resource system and institutional arrangements

None presented as important

4. External environment
 - i. Technology: None presented as important
 - ii. State:
 - a. Supportive external sanctioning institutions
 - b. Appropriate levels of external aid to compensate local users for conservation activities

SOURCE: Baland and Platteau (1996).

The conclusions that Baland and Platteau reach typically are stated as general statements about users, resources, and institutions rather than about relationships between characteristics of these constituent analytical units. Only one of their conclusions is relational: contiguous residential location of group members and of the resource system. Finally, in comparison to Wade and Ostrom, Baland and Platteau pay somewhat greater attention to external forces, such as in their discussions of external aid, enforcement, and leadership with broad experience.

[Box 2-4](#) summarizes the different conditions that Wade, Ostrom, and Baland and Platteau have identified as important in promoting sustainable use of common-pool resources. Even a quick examination of the conditions listed in [Box 2-4](#) makes evident some of the patterns in the conclusions of these three landmark studies.²⁵ The examples they consider have ample variation on the causal and dependent variables, and they use this variation to identify a set of conditions that facilitate greater success on the commons. Whereas Ostrom focuses primarily on the specifics of institutional arrangements in accounting for successful governance of the commons, Wade and Baland and Platteau cast a wider net, and incorporate noninstitutional variables in their conclusions. The regularities in successful management that they discover pertain to one of four sets of variables: (1) characteristics of resources, (2) nature of groups that depend on resources, (3) particulars of institutional regimes through which resources are managed, and (4) the nature of the relationship between a group and external forces and authorities such as markets, states, and technology.²⁶

Characteristics of resources can include, for example, features such as well-defined boundaries of the resource, riskiness and unpredictability of resource flows, and mobility of the resource. Characteristics of groups, among other aspects, relate to size, levels of wealth and income, different types of heterogeneity, power relations among subgroups, and experience. Particulars of institutional regimes have an

enormous range of possibilities, but some of the critical identified aspects of institutional arrangements concern monitoring and sanctions, adjudication, and accountability. Finally, a number of characteristics pertain to the relationships of the locally situated groups, resource systems, and institutional arrangements with the external environment in the form of demographic changes, technology, markets, and the state.

The analysis of the information in [Box 2-4](#) reveals several significant obstacles to the identification of a universal set of factors that are critical to successful governance of common-pool resources. Of these, three relate to substantive issues and two stem from conundrums of method. The missing substantive concerns of these three scholars are examined at greater length in the next section, which widens the net I cast to examine additional important research on common property institutions. Unfortunately, attempts to redress substantive issues tend to exacerbate problems of method that I explain later in the chapter. We have to contend with the possibility that attempts to create lists of critical enabling conditions that apply universally founder at an epistemological level. Lists of factors can be only a starting point in the search for a compelling theorization of how these factors are related to each other and to outcomes. Instead of focusing on lists of factors that apply to all commons institutions, it is likely more fruitful to focus on configurations of conditions that contribute to sustainability. The identification of such configurations requires sharp analytical insights. Such insights

BOX 2-4 Synthesis of Facilitating Conditions Identified by Wade, Ostrom, and Baland and Platteau

1. Resource system characteristics
 - i. Small size (RW)
 - ii. Well-defined boundaries (RW, EO)

2. Group Characteristics
 - i. Small size (RW, B&P)
 - ii. Clearly defined boundaries (RW, EO)
 - iii. Shared norms (B&P)
 - iv. Past successful experiences—social capital (RW, B&P)
 - v. Appropriate leadership—young, familiar with changing external environments, connected to local traditional elite (B&P)
 - vi. Interdependence among group members (RW, B&P)
 - vii. Heterogeneity of endowments, homogeneity of identities and interests (B&P)

(1 and 2) Relationship between resource system characteristics and group characteristics

- i. Overlap between user group residential location and resource location (RW, B&P)
- ii. High levels of dependence by group members on resource system (RW)

are most likely to follow from comparative research that is either based on carefully selected cases, or uses statistical techniques to analyze data from multiple cases after ensuring that the selection of cases conforms to theoretical specification of causal connections.

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PART II

PRIVATIZATION AND ITS LIMITATIONS

If it is feasible to establish a market to implement a policy, no policy-maker can afford to do without one. Unless I am very much mistaken, markets *can* be used to implement any anti-pollution policy that you or I can dream up.

(Dales, 1968:100, italics in original)

The two chapters by Tietenberg and Rose challenge an influential body of literature that suggests privatization as a solution for commons dilemmas (Gordon, 1954; Dales, 1968; Hardin, 1968; Crocker, 1966; Montgomery, 1972). In theory, for private goods, markets efficiently determine what, how much, how, and for whom to produce in the current period and over time. Tietenberg and Rose argue that it is difficult to privatize common-pool resources in the real and messy world when property rights are not easily defined and enforced, a prerequisite for efficient market functioning. Tietenberg recommends how and when institutions for privatizing common-pool resources, specifically tradable permits, can be developed. Rose, on the other hand, identifies conditions under which common-pool resources are managed more effectively as common property regimes than by tradable permits.

[Chapter 6](#), by Tietenberg, provides lessons on how and why the optimism about the use of tradable permits in the 1980s changed to a more realistic approach to studying the conditions under which they may bring about a given level of environmental protection at the lowest cost. The chapter examines two aspects of "result efficiency" of this policy instrument: environmental effectiveness and economic effectiveness. However, it also points out the importance of "implementation feasibility." Tradable permits are considered to perform better for common-pool resources with limited negative externalities, a finding echoed by Rose in [Chapter 7](#).

[Chapter 7](#) examines hypotheses regarding the relative performance of common property regimes and tradable environmental allowances, operationalized in terms of their adaptability to (1) changes in resource demand and (2) variability of the resource. The institutional performance is hypothesized to depend on the following factors: (1) size and complexity of the common-pool resource (2) its use (extractive versus additive); and (3) characteristics of resource users and their interactions.

If the problem of common-pool resource overuse lies in ill-defined property rights, then defining property rights would solve the problem. Questions then arise as to what bundle of rights (specifically the right to manage and alienate the common-pool resource) provides the necessary incentives for owners to invest resources to prevent common-pool resource overuse, and who can define property rights and allocate them among individuals. Tradable permits and common property regimes differ across these dimensions.

The level of detail of the right definition and the ability of the regime to vary rates of resource use over time differ significantly between these regimes. Rights can be more detailed and flexible in common property regimes than in tradable permit regimes because they are not traded in the market. In fact, in resources that are

complex (exhibit important interactions among various aspects of resource use) and vary over time, Rose points out that common property regimes outperform tradable permits, especially when the users belong to a close-knit, high-trust community.

Tradable permit regimes, on the other hand, develop uniform rules that offer security in market exchange, even allowing for trades among strangers. Therefore, they perform better for large-scale, but noncomplex common-pool resources. However, for complex common-pool resources, Tietenberg points out how rules can be designed to ensure effective working of tradable permits and prevention of resource overuse. He also deals with another criticism of tradable permit regimes: that they sacrifice equity and environmental effectiveness. He suggests that if a society wishes to prevent a concentration of permits in the hands of some resource users, it may limit transferability of the quotas, of course at the cost of lowering economic effectiveness.

Tietenberg examines cases in which a local, state, or national government assigns property rights and allocates them among common-pool resource users. The users are not allocated the complete bundle of rights, but usually only the right to withdraw from the resource (or deposit pollutants into the resource) and the right to sell their allocations to others. Because users do not influence total allocations, the total level of common-pool resource use—and therefore deterioration—depends on governmental decisions. In the case of common property regimes, users usually do not have the right to sell their individual allocations. They can, however, jointly decide the aggregate level of common-pool resource use.

Having said this, it is important to realize that identifying the maximum sustainable use of the resource—a function undertaken by a government in tradable permit regimes and by the user community in common property regimes—is both scientifically difficult (see Wilson, this volume: [Chapter 10](#)) and politically sensitive (see McCay, this volume: [Chapter 11](#)).

Tietenberg's and Rose's chapters agree on several issues. First, tradable permits perform better for managing simple common-pool resources with few negative externalities. Second, the allocation of rights is a difficult political process that has to be solved in any environmental regime. The allocation process, therefore, deserves special attention in the analysis of "implementation feasibility." Third, both chapters point out the crucial importance of monitoring and enforcement for any institutional arrangement governing common property resources. However, given that tradable permits offer important financial rewards when sold in market, their institutional design must provide for additional monitoring of not only resource use, but also the number of permits and their transfers. This increases the monitoring costs.

In sum, these chapters make a significant contribution to the understanding of under what conditions common-pool resources are better managed through alternative institutional mechanisms. Specifically, they carefully examine the strengths and weaknesses of tradable permit regimes and common property regimes in managing common-pool resources.

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