COMMONS

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The "tragedy of the commons" has been a famous metaphor for problems related to common-pool resources ever since Garrett Hardin (1968) wrote his evocative article in Science. Common-pool resources (CPRs) are natural or human-made resources that share two attributes: (I) substantial difficulty (but not impossibility) of devising ways to exclude individuals from benefiting from these resources and (2) the subtractability of benefits consumed by one individual from those available to others (Ostrom, Gardner, and Walker, 1994: 6). CPRs share the first attribute with public goods and the second attribute with private goods.

Natural CPRs can range in size from global phenomena, such as the ocean's fisheries and migratory wildlife, to very small-scale local commons such as irrigation systems, small lakes, grazing lands, or inshore fisheries. Human-made CPRS may also range in size from the global (e.g., the Internet) to the local (a mainframe computerised by multiple researchers). A key distinction that needs to be made in understanding problems of governing and managing commons is between the resource system itself and the resource units such a system generates. The resource units of a CPR are finite and can thus be overused leading to many externalities including congestion, higher costs of production, and a change in the attributes of the resource units themselves. For a groundwater basin, the resource system is the physical aquifer that has the potential of storing up to a maximum amount of water. The resource units from a groundwater basin are the quantities of water that are withdrawn for household, agricultural, or industrial uses. Resource systems have their own characteristics as do the resource units. Resource systems vary in size, regularity, location, ease of access, and ease of monitoring. Resource units vary in quality, mobility, and predictability—and, of course, value.

Because CPRs face problems related to exclusion, potential beneficiaries from their construction, management, improvement, or conservation will be strongly tempted to free-ride on the efforts of others if they can. When a group of fishers agree to abide by a plan to share a conservatively estimated safe yield from a fishery, all of them benefit. They benefit from the preservation of their fishery over time, from the lowered cost of fishing, and from the increased quality of their catch. They all pay a short-term cost as well. The short-term cost is the immediate income foregone by following the agreed-upon conservative strategy in their fishing efforts. A fishing boat that did not agree to the limit, however, can benefit even more by harvesting at the same level they had in the past or even by increasing their harvest rate while others decreased their rates. Unless the fishers who agreed to the management plan find a way of excluding those who did not agree to the plan (as well as monitoring the efforts of those who agreed), the individuals who pay a short-term cost in order to receive long-term benefits may not be "suckered" into paying short-term costs and not receiving the long-term benefits. Thus, while solving the problems of exclusion is difficult, they are essential if any highly valued commons will be governed and managed effectively over the long-term.

Because CPRs face problems related to subtractability, users always face potential problems of congestion, higher production costs, and even destruction. These are the obvious problems that fishers who negotiate a management plan try to avoid. It is a much discussed problem for contemporary users of the Internet. Users at key times of the day find that they cannot get information rapidly because so many other users are also accessing the Internet and it has become very congested. Various plans to increase the capacity of the Internet, as well as regulating the amount of use through pricing or rationing, are under discussion.

In order to effectively govern and manage a CPR, some form of property-rights system must be developed. Property-rights systems can be thought of as a bundle of rights related to who can access the CPR, whether they can withdraw resource units and how much, who can invest in and manage the CPR, who has the right to exclude users, and what type of rights can be transferred to others under what circumstances (Schlager and Ostrom, 1992). When all of these rights are given to a private individual or private corporation, one has a private-property system. When all of these rights are held by a local, regional, or national government, one has a public property-rights system. A common-property or communal-property system is involved when a private association of individuals or firms holds at least access, management, and exclusion rights even though they may not be able to alienate these rights to others. In many common-property systems, however, participants may sell their rights if other members of the association approve of the sale. Many CPRs exist without well-defined property-rights systems having been designed. The most severe problems of the commons exist for these "open access" regimes due both to problems of extreme free-riding and overuse.

Much contemporary policy analysis has presumed that either State ownership or private ownership are the only two alternative modes of effectively managing CPRs. Since a major study by a National Academy of Science Panel was conducted in the mid-1980s, however, common-property regimes of diverse kinds have been found to be as effective if not more than some State or private-property systems (Bromley et al., 1992; Feeny et. al, 1990). Careful studies of a large number of farmer-managed irrigation systems in Nepal, for example, have found that farmers are able to gain higher yields, use their irrigation systems for three seasons of the year, and have more equitable water distribution systems than government-owned systems

(Lam, forthcoming). For global commons that cross national boundaries, state ownership is not even an option. Thus, various kinds of international regimes are essential ingredients of any effort to govern and manage a global commons (Keohane and Ostrom, 1995). Many regimes of all kinds, however, do fail to control access and regulate use so that severe problems of overuse and destruction have occurred.

In an effort to determine the attributes of successful CPR regimes, Ostrom (1990) identified eight design principles. Most successful, robust, long-lasting CPR regimes can be characterized by six or more of these principles. Failed and fragile CPR regimes do not use more than a few of them (Schweik, Adhikari, and Pandit, 1997; Morrow and Hull, 1996; Blomqvist, 1996). The particular rules used in effectively managed systems vary substantially. Consequently, it is not possible to develop a set of blueprints that can be used to guarantee successful management. The design principles are:

Design Principle 1—rules that clearly define who has rights to use a resource and the boundaries of that resource—ensures that users can clearly identify anyone who does not have rights and take action against them as well as identify the geographic span of the resource itself.

Design Principle 2 involves two parts. The first is a congruence between the rules that assign benefits and the rules that assign costs so that participants consider the rules to be fair. The second part of this design principle is that both types of rules be well-matched to local conditions such as soils, slope, number of diversions, crops being grown, etc.

Design Principle 3 is concerned with the collective-choice arrangements used to modify the operational rules used to manage a resource. If most users are involved in modifying these rules over time, the information about the benefits and costs as perceived by different participants is

more fully taken into account in these efforts to adapt to new conditions and information over time. And, if technological change brings new conditions, participants are able to adjust their rules so as to keep up with new opportunities or new threats.

No matter how high the level of agreement to an initial agreement is, there are always conditions that tempt some individuals to cheat (even when they perceive the overall benefits of the system to be higher than the costs). Without effective monitoring of rule conformance—Design Principle 4—few systems are able to function well at all.

Design Principle 5 focuses on the use of graduated sanctions. The important thing about a sanction for a user who has succumbed to temptation is that their action is noticed and that a punishment is meted out. This tells everyone that cheating on rules is noticed and punished without making all rule infractions into major criminal events. If someone breaks the rules repeatedly and is noticed doing so, the rule breaker eventually faces a severe penalty or expulsion from the set of authorized users.

While rules are always assumed to be clear and unambiguous in theoretical work, this is rarely the case in field settings. Design Principle 6 is the provision of fair, low-cost conflict resolution arenas so that the natural conflicts that occur can be resolved rapidly and in a manner that is considered legitimate.

Design Principle 7 relates to the rights of a group to devise their own institutions being recognized by international, national, regional, and local governments. When this is the case, the legitimacy of the rules crafted by users will be less frequently challenged in courts, administrative and legislative settings.

In larger resources with many participants, Design Principle 8 stresses the need for nested enterprises that range in size from small to large that enable participants to solve diverse problems involving different scale economies. By utilizing base institutions that are quite small, face-to-face communication can be utilized for solving many of the day-to-day problems in smaller groups. By nesting each level of organization in a larger level, externalities from one group to others can be addressed in larger organizational settings that have a legitimate role to play in relationship to the smaller entities. The last principle is particularly important for governing global commons.

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Bibliography

Blomqvist, A. Food and Fashion. Water Management and Collective Action among Irrigation Farmers and Textile Industrialists in South India. Linkoping, Sweden: The Institute of Tenia Research, Department of Water and Environmental Studies, 1996.

Bromley, D. W., D. Feeny, M. McKean, P. Peters, J. Gilles, R. Oakerson, C. F. Runge, and J. Thomson, eds. Making the Commons Work: Theory. Practice, and Policy. San Francisco: Institute for Contemporary Studies Press, 1992.

Feeny, D., F. Berkes, B. J. McCay, and J. M. Acheson. "The Tragedy of the Commons: Twenty-Two Years Later." Human Ecology 18 (1990): 1-19.

Hardin, G. "The Tragedy of the Commons." Science 162 (1968): 1243-1248.

Keohane, R. O., and E. Ostrom, eds. Local Commons and Global Interdependence: Heterogeneity and Cooperation in Two Domains. London: Sage, 1995.

Lam, W. F. Institutions. Engineering Infrastructure, and Performance in the Governance and Management of Irrigation Systems: The Case of Nepal. San Francisco: Institute for Contemporary Studies Press, forthcoming.

Morrow, C. E., and R. W. Hull. "Donor-Initiated Common Pool Resource Institutions: The Case of the Yanesha Forestry Cooperative." World Development 24 (1996): 1641-1657.

Ostrom, E. Governing the Commons: The Evolution of Institutions for Collective Action. New York: Cambridge University Press, 1990.

Ostrom, E., R. Gardner, and J. Walker. Rules. Games, and Common-Pool Resources. Ann Arbor: University of Michigan Press, 1994.

Schlager, E., and E. Ostrom. "Property-Rights Regimes and Natural Resources: A Conceptual Analysis." Land Economics 68 (August 1992): 249-262.

Schweik, C, K. Adhikari, and K. N. Pandit. "Land-Cover Change and Forest Institutions: A Comparison of Two Sub-Basins in the Southern Siwalik Hills of Nepal." Mountain Research and Development 17 (1997): 99-116.