

The benefits of the commons

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Conventional wisdom holds that resources held in common will invariably be overexploited — the “tragedy of the commons”. A number of examples show that this is not necessarily so.

It has become a truism that resources held in common are vulnerable to over-exploitation. Twenty-one years ago, Hardin popularized this dilemma — calling it the “tragedy of the commons” — by the use of a metaphorical village common in which each herdsman “is locked into a system that compels him to increase his herd without limit”¹. Hardin argued that such problems have no technical solutions, and emphasized the need for government controls to limit “freedom in the commons [which] brings ruin to all”¹. Hardin and others² have subsequently pointed to privatization of common resources as another solution consistent with the analysis of many resource economists³.

It is usual to assume that resource degradation is inevitable unless common property is converted into private property or government regulations are instituted. The prevalence of this view is reflected by an article in *The Economist* of 10 December 1988 about fisheries, typically viewed as a common-property resource: “...it is possible to manage fisheries successfully”, the author asserts, “provided three facts are kept in mind”. Two of these are relevant here: “left to their own devices, fishermen will over-exploit stocks” and “to avoid disaster, managers must have effective hegemony over them”.

Nevertheless, research carried out in the 21 years since Hardin’s article often leads to conclusions that challenge this conventional wisdom. Such results are of interest to resource managers, applied natural and social scientists, policy-makers and development planners. Many case studies, including our own, show that success can be achieved in ways other than privatization or government control⁴⁻⁷. Communities dependent on common-property resources have adopted various institutional arrangements to manage those resources, with varying degrees of success in achieving sustainable use. We use ecological sustainability⁸ as a rough index of management success without necessarily implying resource use that is ecologically or economically optimal.

As a first step in the analysis, it is necessary to define the kind of resources under consideration. Common-property (or common-pool⁹) resources share two key characteristics. First, these are resources for which exclusion (or control of access) of potential users is problematic. The physical nature of the resource is such

that controlling the access of potential users is costly and, in some cases, virtually impossible. Migratory or fugitive resources such as fish and wildlife pose obvious difficulties. Similarly, ground water, range and forest lands, and global commons⁸ such as the high seas, the atmosphere and the geosynchronous orbit, pose problems of exclusion.

The second key characteristic of

right to exclude others from using the resource and to regulate its use. (3) Under communal property, the resource is held by an identifiable community of users who can exclude others and regulate use. Some shellfish beds, range lands, forests, irrigation and ground water have been managed as communal property. (4) State property or state governance means that rights to the resource are vested



Cree Amerindian fishermen of James Bay, seining river eddies for whitefish. The use of the resource is regulated under rules agreed upon by all — groups of fishermen wait their turn for the best sites during the short fishing season. (F. Berkes.)

common-property resources is subtractability; each user is capable of subtracting from the welfare of others. This characteristic creates a potential divergence between individual and collective economic rationality in joint use³. As one user continues to pump water from an aquifer, others experience increased pumping costs; as the number of fishing boats increases, the catch per unit of effort for each declines. On the basis of these two characteristics, we define common-property resources as a class of resources for which exclusion is difficult and joint use involves subtractability.

As a second step in the analysis, a taxonomy of property-rights regimes is needed⁹⁻¹¹. Common-property resources are held in one of four basic property-rights regimes. (1) Open access is the absence of well-defined property rights. Access is free and open to all, as with ocean fisheries of the past century. This is the regime implied in Hardin’s model. (2) Private property refers to the situation in which an individual or corporation has the

exclusively in government, which controls access and level of exploitation. Examples include crown lands and resources such as fish and wildlife held in public trust. These four categories are ideal, analytical types. In practice, resources are often held in overlapping combinations of these four regimes, and there is variation within each.

We now briefly summarize selected case studies. These studies show the workings of communal-property systems not recognized in Hardin’s model, as well as the limitations to the use of state governance in some situations.

Our first case concerns wildlife hunting territories in James Bay, Quebec, in northeastern Canada¹². Hunters in this subarctic area have traditionally used resources communally, as do many Amerindian groups, and have a rich heritage of customary laws to regulate hunting. Beaver is an important species both for food and, since the start of the fur trade in James Bay in 1670, for commerce. ▶

The beaver is vulnerable to depletion because colonies are easily spotted. A community-based hunting territory system, with senior hunters and their families acting as stewards of specific territories, at present ensures sustainable use. The beaver resource in James Bay, however, has not always been used sustainably. In the 1920s, a large influx of non-native trappers followed the new railroad into the area to take advantage of high fur prices. Amerindian communities lost control over their territories and all trappers, including natives, contributed to a "tragedy of the commons". Conservation laws were eventually enacted after 1930, when beaver populations were at an all-time low, and outsiders were banned from trapping in James Bay. Amerindian community and family territories were legally recognized and customary laws became enforceable, resulting in productive harvests after about 1950¹². The experience of the 1920s and 1930s is not unique. Periods of cut-throat rivalry among fur companies had led to non-sustainable use of resources twice before: in the mid-1700s and in 1825–29. Gradually, however, local control was restored and stocks recovered¹².

Our second and third cases deal with lobster and fish management on the east coast of the United States^{13,14} and show that communal territories exist even in societies that subscribe to the ideal of freedom in the commons. In the US tradition, marine resources belong to all citizens but are controlled by state governments as a public trust. Privatization of some marine resources such as shellfish beds is feasible but not always socially desirable or politically acceptable¹⁵. Government management is similarly difficult: limiting the number of licences is considered an infringement of citizens' rights. Even so some groups of users are able to restrict access and manage common-property resources.

The lobster resource is vulnerable to overharvesting, but lobster stocks in Maine have remained sustainable. Although some managers have for decades been predicting a resource collapse, the Maine lobster catch has been remarkably stable since 1947¹³. The state government establishes lobstering regulations but does not limit the number of licences. In practice, however, there is exclusion through a system of traditional fishing rights; to go lobster fishing at all, one has to be accepted by the community. Once accepted, a lobsterman is only allowed to fish in the territory held by that community. Interlopers are usually discouraged by surreptitious violence.

One cannot say if the resource could

have been used sustainably in the absence of such locally enforced exclusion and regulation. But we have compared the productivity of exclusively used territories with areas in which claims of adjacent communities overlap. We found that fishermen in the exclusive territories catch significantly more and larger lobsters with less overall effort¹³.

The third case, a trawl fishery in the New York Bight region, provides an alternative community-based solution to the commons dilemma¹⁴. The fishermen who belong to a cooperative specialize in the harvest of whiting. They have ready

Beaver hunters in north-eastern Canada (this one was sketched in 1891) used resources communally until the coming of the railroad in the 1920s brought an influx of 'outsiders'.

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was essentially unregulated. The rapid commercial exploitation of teak in Thailand in the late nineteenth century led to the nationalization of all forests. State ownership fails to provide consistent enforcement, but it also serves to deny users the authority to manage local forests. Illegal logging, followed by further land clearing for cultivation, is widespread. Although much of this land is suitable for cultivation, there are few safeguards for conserving environmentally sensitive areas; this results in overall damage to land.

The lack of enforcement of state-forest property rights leading to accelerated degradation is not unique to Thailand. The nationalization of forests in Nepal (1957) and Niger (1935) produced a similar outcome¹⁷. In Nepal, the situation is being ameliorated by the re-creation of communal management at the local level¹⁸. Without effective control by government, nationalization has often converted traditional communal property into *de jure* state property but *de facto* open-access.

Having reviewed a few cases, we return to the tragedy of the commons model to explore its problems in relation to the findings. Hardin asks the reader to assume a pasture "open to all"¹. Each herdsman acts in an individually rational fashion by adding animals to the common pasture. For him, the private benefits of adding one more animal exceed the private cost. Because each herdsman does the same, the overall result is overgrazing and disastrous losses for all.

Hardin's model provides insight about the divergence between individual and collective rationality. But it fails to take into account the self-regulating capabilities of users. It assumes that the herdsmen are unable to limit access or institute rules to regulate use. Therefore, overexploitation is inevitable — unless privatization or government controls are imposed. These conclusions have been used as part of the justification for nationalization¹⁸, privatization of land resources¹⁹, and the widespread practice of top-down development planning that ignores local institutions^{4,6}. The social and ecological costs of these practices have often been tragic in their own right.

Recognition that users have the potential and, under some conditions, the motives and means to act collectively opens up other policy alternatives and provides questions about why some communal management systems fail and others succeed. The success or failure of common-property resource management has to do with the exclusion and regulation

access to the best whiting grounds in the region, and often dominate the regional whiting market in the winter months.

The cooperative maintains relatively high prices for members through supply management; it limits entry into the local fishery and establishes catch quotas among members. Limited entry is achieved through a closed membership policy and the control of docking space, effectively excluding non-members from access to whiting grounds and markets. Quotas are based on the estimates of what the cooperative can sell to the regional market, and are achieved in ways that reward individual initiative but also discourage 'free-riding'. By contrast with government-imposed regulations, which are considered by fishermen to be inflexible and which in any case are ineffective because they do not address the fundamental problem of access, self-regulation through the cooperative is considered to be both flexible and effective in maintaining sustainable use¹⁴.

Forests in Thailand comprise our fourth case¹⁶. Traditionally the exploitation of high-value timber was regulated by local governments; the use of low-value timber

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Woodcutters near Bhatang, Nepal — nationalization of Nepal's forests led to over-exploitation, but the situation is now being improved by the re-creation of local communal management.

of joint use. Forest destruction in Thailand, for example, occurs because villagers do not own the forest and cannot exclude others. Local people therefore have little incentive to conserve and every incentive to cut down trees before someone else does¹⁶.

By contrast, in other examples — hunters in James Bay, lobstermen in Maine, trawlermen in the New York Bight area, communal forest users in Nepal, and irrigation water users in South India²⁰ — groups are able to exclude other potential users and regulate their own joint use. They are therefore able to reap the benefits of their own restraint. Our examples are not isolated, but are consistent with a large body of literature on grazing lands²¹, forests²², water²³ and coastal marine resources²⁴, covering a wide range of regions and cultures throughout the world.

What accounts for the many exceptions to the predictions of the conventional theory? How can Hardin's model be improved to obtain a more comprehensive theory of common-property resource management? First, the Hardin model confuses common-property resources with open access — the absence of property rights. By equating common-property resources with open access, and then assuming that open access leads to overexploitation, the model falls into the trap of equating the commons with over-exploitation.

Second, the model assumes that the individual interest is unconstrained by existing institutional arrangements. In many communities, common-property resource users are compelled by social pressure to conform to carefully prescribed and enforced rules of conduct.

Third, the model assumes that resource users cannot cooperate toward their common interests. This is not necessarily so; under certain circumstances, voluntary

collective action is feasible²⁵, and sustainable outcomes are not unusual^{14-7,20-24}.

More fundamentally, the model overlooks the role of institutions that provide for exclusion and regulation of use. Cultural and historical factors underlying such institutional arrangements are a key to the success of communal management of coastal marine resources in Japan and several Pacific-island nations²⁴, in addition to the cases we describe above.

Finally, the set of solutions offered by the model is too limited. Privatization or the imposition of government control are not the only viable policy options. In fact, the conventional reliance on these approaches is overly sanguine. By definition, common-property resources are ones for which exclusion is difficult and so privatization is often not feasible. Although dividing a commons and assigning individual property rights can increase efficiency under some circumstances, it might not in others. Similarly, state control

has worked in some cases, but the example of Thailand forests illustrates its potential for failure.

In general, we propose that successful approaches to the commons dilemma are found in complementary and compatible relationships between the resource, the technology for its exploitation, the property-rights regime and the larger set of institutional arrangements. We also propose that combinations of property-rights regimes may in many cases work better than any single regime. The success of local-level management, for example, often depends on its legitimization by central government; James Bay¹² and recent experience in Nepal¹⁸ are examples. Such nested relationships are also found in fisheries in Japan and Oceania²⁴. In some cases, cooperative management arrangements (co-management) are needed, involving the sharing of power between governments and local communities²⁶.

In sum, sustainable common-property resource management is not intrinsically associated with any particular property-rights regime. Successes and failures are found in private, state and communal-property systems. Recent research highlights the potential viability and continued relevance of communal-property regimes, nested systems and co-management. Studies after that of Hardin have shown the dangers of trying to explain resource use in complex socio-ecological systems with simple deterministic models. □

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