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Chapter 2

Common Property: What Is It, What Is It Good For, and What Makes It Work?

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For more than a decade now, I have been involved in the study of "common-property regimes" for natural resources, or what might more comfortably be described as institutional arrangements for the cooperative (shared, joint, collective) use, management, and sometimes ownership of natural resources. Given this definition, common-property regimes broadly speaking should range from communal systems of resource use among hunter gatherers to mixed systems of, for example, communal pasture with individually owned arable fields, all the way to gigantic collective farms in socialist economies and even, for that matter, to the assertion of community and other broadly shared rights to regulate the environmental consequences of individual behavior in industrial economies. However, although policymakers have "picked up" on the importance of property rights in affecting environmental outcomes, they are currently designing radical changes in property-rights arrangements in transitional economies with virtually no knowledge of the specifics of what we are learning about common-property regimes for natural resources.

"Privatization" of property rights is a global fad right now: privatization of public enterprise in capitalist countries, decentralization of control over public enterprises (that nonetheless remain publicly owned) in socialist countries, privatization of property rights in general in post-socialist countries. In the developing world (which is largely capitalist), there is also great enthusiasm for the privatization of traditional community lands and some government-owned lands. I am in basic agreement with the **objectives** of this conversion: to increase efficiency (when is wasting human effort or natural resources ever justifiable?), to enhance the incentives for investment and, most crucially in the case of environmental resources, to create the incentive for resource protection and sustainable management. But at the same time, I fear that this "privatization" is being conducted without sufficient consideration of such issues as these:

a. In whom (to how many persons, to which persons, with what distributional consequences) should property rights be vested?
b. Which rights should be transferred—full ownership with rights of transfer, or just use rights?
c. What kinds of resources should be privatized? Are all objects equally divisible? Should ecosystem boundaries matter?

Silly as it may seem, I am convinced that part of our problem is semantic: we use the same pair of adjectives, "public" and "private," as labels for three different pairs of things. We use them to distinguish between two different kinds of goods (public goods and private goods), between two different kinds of rights (public rights and private rights), and between two different kinds of bodies that may own things (public entities or governments, and private entities or individuals). Economists have for decades agreed that the privateness of a *good* is a physical given having to do with the excludability and subtractability of the good, and that these two attributes of a good are crucial to understanding what humans can and cannot do with different kinds of goods. This definition of goods, creating the four-way typology shown in Table 2.1, goes virtually unchallenged, although it is sometimes forgotten or misused as we will see below.[1] The privateness of a *right* refers to the clarity, security, and especially the exclusivity of the right: a fully private right specifies clearly what the rights-holder is entitled to do, is secure so that the holder of the right is protected from confiscation by others, and is exclusively vested in the holder of the right and definitely not in nonholders of the right. It is important to note here that the privateness of a right has to do with the right, and not the entity holding it; there is no requirement that this entity be a single individual. Finally, the privateness of a *body* has to do with its representational claims, in that a *public body* claims to represent the general population and not just one interest within that population, whereas a private body represents only itself.[2]

This confusion of the publicness and privateness of **goods** (a natural given), **rights** (an institutional invention), and **owners** of rights (entities that make different representational claims) has led to serious errors. First, we get **goods and owners** mixed up, falling very easily into the habit of thinking that public entities own and produce public goods while private entities own and produce private goods and

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[1] *The nature of a good can change with technology. Thus, TV broadcasts from satellites are pure public goods when the satellite signals are unscrambled. The advent of scramblers, cable services, and purchasable descrambler boxes converts TV broadcasts into excludable and nonsubtractable goods (thus toll goods or club goods). The advent of cheap illegal descramblers converts TV broadcasts back into nearly public goods again. But at any particular technological moment, the nature of a good is indeed a given.*

[2] *This definition obviously does not include all governments. Many autocratic governments neither intend nor accomplish the representation of the general public, and would be better described as private government.*

that anything produced by government is a public good and anything produced by private parties is a private good. In fact, of course, there is no intellectual reason for this simple pairing-off. Public entities are perfectly capable of producing private goods, and private entities occasionally produce public goods (though not often intentionally). Second, we get **goods and rights** mixed up, and often attempt to create public rights in private goods and private rights in pure public goods or common-pool goods, with tragicomic effects (e.g., awarding an infinite amount of rights to an exhaustible resource, or awarding exclusive rights to resources that cannot be exclusively held). Third, we get **rights and owners** mixed up, thinking that private entities hold private (exclusive) rights and public bodies hold public rights, when in fact public rights (rights of access and use that do not include the right to exclude others from such use) are generally held by private entities because public bodies have created such rights for citizens. Similarly, public bodies hold both public rights (say, the use of an assembly hall or a courtroom that is also open to all citizens as observers) as well as private rights (say, to the use of individual legislator's offices, staff, and equipment).

Table 2.1: Type of good, by physical characteristics

	Exclusion Easy	Exclusion Difficult or Costly
Subtractable (rivalrous in consumption)	**Private goods** trees, sheep, fish, chocolate cake	**Common-pool goods** forest, pasture, fishery, any environmental sink over time
Nonsubtractable (nonrivalrous in consumption)	**Club or Toll goods** Kiwanis club, camaraderie	**Pure public goods** defense, TV broadcasts, lighthouse beams, an environmental sink at a given instant, a given level of public health, a given level of inflation

Why should we care about getting the **privateness and publicness** of **goods, rights, and owners** straight? Is this simply a theoretical issue to keep scholars busy, or are there practical implications? Not surprisingly, this chapter argues that there are serious practical consequences that make definitional clarity worthwhile. First, in examining privateness and publicness of goods we slip easily into thinking that this dyad of private goods and public goods is complete when it is not. In fact, since we know that private goods are not problematic (they get produced in just the quantities we want, and efficiently too, and they are subject neither to nonprovision nor to depletion), this dyad would lead us to conclude that all of our problems arise

from pure public goods. But, we would be quite wrong; in fact, the class of pure public goods is shrinking rapidly as crowding effects turn many of them into the hybrid variety that this dyad omits, common-pool goods. The omission of common-pool goods from the public-private dyad is dangerous because it is precisely the overlooked but growing class of common-pool goods where almost all environmental resources fall. Second, in separating goods from property rights we can improve the match or fit between property rights and goods, improving our ability to provide and maintain common-pool goods. Third, if we fail to sort out the publicness and privateness of owning entities we risk falling into the simplistic and the sloppy habit of thinking that only individual persons can be private entities capable of owning private property, and overlook the possibility that groups of individuals can be private organizations whose individual members share private rights. Finally, I would argue that definitional clarity is a foundation upon which we can begin to detect the circumstances in which common-property arrangements are appropriate, desirable, and even in some situations utterly essential to sound resource management. We need definitional clarity to understand how a group of individuals might be a *private owner* that can share property rights and thus create a regime of *common property rights* for managing *common-pool goods*.

Because of the errors itemized above, the campaign to "privatize" ignores the nature of the goods or resources involved and confuses owners, rights, and goods with each other. By assuming that many of these resources are problematic "public goods" and therefore need "converting" into nonproblematic "private goods" (the only other class of goods they may recognize), the privatizers often imagine that they can change the nature of the good. Instead, of course, they should recognize the nature of the good as a given and recognize that what humans can manipulate are systems of rights and the identity of owning entities. Failing to recognize the nature of common-pool resources, privatizers too readily campaign on behalf of chopping up natural resource systems into environmentally inappropriate bits and pieces, and of awarding rights in the bits to individuals—rather than maintaining resource systems as productive wholes and awarding rights to groups of individuals (private groups of private individuals). The danger of this fuzzy thinking—collapsing goods, rights, and owners into a single blur, and imagining that private goods/rights/owners and public goods/rights/owners subsume the universe of possibilities—is that we have no adequate way to recognize or classify common-property regimes for common-pool goods, we misdiagnose the cause of our difficulties as the failure to force all goods to be private goods, we destroy functioning common-property regimes that already exist, and we fail to create them where they should be considered. The rest of this chapter concerns common-pool goods (not public goods) and the common-property regimes (systems of shared private rights owned by private entities) that have been and can still be devised to manage these resources.

Common-property regimes, used by communities to manage forests and other resources for long-term benefit, were once widespread around the globe. Some may have disappeared naturally as communities opted for other arrangements, particularly in the face of technological and economic change, but common-property regimes seem in most instances to have been legislated out of existence. This happened several different ways: where common-property regimes, however elaborate and long-lasting, had never been codified they may simply have been left out of a country's first attempt to formalize and codify property rights to the resources in question (as in Indonesia, Brazil, and most of sub-Saharan Africa). Where common-property regimes had legal recognition, there may have been in essence a land reform that transferred all such rights to particular individuals (as in English enclosure) or to the government itself, or both (as in India and Japan).

Among the many justifications usually advanced for eliminating community ownership of resources was the argument that individual or public ownership would offer enhanced efficiency in resource use and greater long-term protection of the resource. But in many instances around the world today, it is apparent that the arrangements that emerged to replace common-property regimes are ineffective in promoting sustainable resource management. Where people still live near the resource their lives depend upon, the transfer of their traditional rights into other hands does not simultaneously transfer the physical opportunity to use these resources. The people who live nearest these resources still have ample opportunity to use them, but when they lose secure property rights in the resources to others, they also lose any incentive they might have felt in the past to manage these resources for maximum long-term benefit. Now they might as well compete with each other and new users and claimants in a race to extract as much short-term benefit from the resource as possible. Thus in many instances, the transfer of property rights from traditional user groups to others eliminates incentives for monitoring and restrained use, converts owner-protectors into poachers, and thus exacerbates the resource depletion it was supposedly intended to prevent. Thus, there is renewed interest both in the lessons to be learned from successful common-property regimes of the past and present (see McKean, 1992a, 1992b; Netting, 1981; Berkes, 1992; Agrawal, 1994; Blomquist, 1992; Ostrom, 1986; and Thomson, 1992) and in the possibility of reviving community ownership or management as a practical remedy where appropriate.

This chapter begins by exploring what common property is, then itemizes some of the potential advantages of using common-property regimes to govern and manage environmental resources, and concludes with a short summary of what we already know about the attributes of successful common-property regimes.

Definitions

Common-pool resources

Before one can talk about what value there may be in common-property arrangements, it is necessary to define terms. Unfortunately, there is a long history of confusing and conflicting usage. The first task is to distinguish between types of goods. I will use "common-pool resources" to refer to goods where, as with public goods, it is costly or difficult to exclude potential users, but which are subtractable or rival in consumption (and can thus disappear), like private goods (see Table 2.1). The term "common-pool resources" therefore refers to the physical qualities of a natural resource, and not to the social institutions human beings have attached to them. I use "common property" or "common-property regime" to refer to a particular property-rights arrangement in which a group of resource users share rights and duties toward a resource. These terms therefore refer to social institutions, and not to any inherent natural or physical qualities of the resource.[3]

As Table 2.1 indicates, common-pool resources have two defining traits. First is the exclusion problem: it is costly to develop institutions to exclude potential beneficiaries from them, as is the case with public goods. Without institutional mechanisms to exclude noncontributing beneficiaries from common-pool resources, they are essentially open-access resources available to anyone and therefore unlikely to elicit investments in maintenance or protection. Second is subtractability: the resource units harvested by one individual are not available to others—they are subtractable or rivalrous in consumption, like private goods, and can thus be depleted. The subtractability of consumption means that *de facto* open-access arrangements lead quickly to resource depletion.

A **pure public good** is one whose consumption does not reduce the quantity available to others to consume; it is therefore ubiquitous, and in being nonrivalrous or nonsubtractable or joint in supply it cannot be depleted. The chief problem with pure public goods is provision—how will they get produced?—and not with depletion of whatever supply happens to materialize. But **common-pool goods** pose both challenges of provision or supply and the risk of depletion. Not only is it difficult to get them produced but it is easy to deplete the supply of whatever does get produced. Many goods once described as pure public goods (nonsubtractable in consumption) in economics textbooks—air, water, roads, bridges—really are not pure

[3] *I prefer to avoid the often-used term "common-property resources" because it conflates property (a social institution) with resources (a part of the natural world). I will also avoid using the acronym CPR in the text that follows, since that could easily stand for any of the three terms (common-property resources, common-pool resources, or common-property regimes—not to mention cardio-pulmonary resuscitation!).*

public goods at all. They are, in fact, subject to crowding and depletion. Roads and bridges may be accessible by anyone, but they really cannot hold an infinite number of people or cars, as anyone who has ever been stuck in a bad traffic jam understands quite well. And, even if use is not all simultaneous but sequential, a road or a bridge has a finite lifetime, and has only so much weight-bearing capacity before it crumbles or collapses. Air and water sinks have only so much absorptive capacity for pollution before they become seriously degraded. Since most environmental resources as well as the absorptive capacity of any environmental sink are common-pool goods over time, the task of environmental management contains both the challenges of provision and of maintenance or depletion-avoidance. Although there has been a great deal of theoretical work and experimental economics done on pure public goods, the truly problematic category, into which natural resource systems and environmental resources fall, is common-pool goods. Common-pool goods do not fulfill the pure public good requirement of nonsubtractability—they are, regrettably, depletable. Thus, there is some risk that we might extract overly optimistic lessons from theoretical and experimental work that actually concerns (nondepletable) pure public goods. Fortunately, new game-theoretic and experimental work based on common-pool goods is also being done (see Ostrom, Gardner, and Walker, 1994).

Common-property regimes

The nature of a good is an inherent physical characteristic, not susceptible to manipulation by humans. But property institutions are human inventions. The "privateness" of property rights refers to the clarity, specificity, and especially the exclusivity of the rights, and not to the identity of the rights-holder. Thus, most of the permutations and combinations of resource types, property-rights types, and rights-holders theoretically exist. Surprisingly, there is very little agreement about which of these combinations and permutations are wise or efficient. There is overwhelming consensus on perhaps only two points about the appropriate combination of property rights and goods: (1) that private goods are best held as private property and (2) that private property is an inadequate arrangement for public goods/bads (i.e., where we have positive/negative externalities). There is also consensus, though weaker, on the inefficiencies due to principal-agent problems and rent-seeking that inevitably follow from vesting ownership in any entity other than a single individual with a central nervous system. Thus, there is considerable controversy over when it improves matters (whatever the criterion for improvement that one chooses) to vest ownership in public entities or collectivities. And we are left with a gnawing problem. What kind of property-rights arrangement **do** we design when we know that simple individual private property is inadequate—when there are externalities and when we are concerned with pure public goods and common-pool goods? These are not problems we can ignore: human beings want public goods and common-pool goods, and deserve to

have them efficiently provided, and natural resource systems on which we depend utterly are, like it or not, common-pool resources.

I argue here that, far from being quaint relics of a hunter-gatherer or medieval past, common-property regimes may be what we need to create for the management of common-pool resources, at least if we can identify the factors and conditions that lead to successful regimes. Sharing rights can help resource users get around problems of exclusion. They can patrol each other's use, and they can band together to patrol the entire resource system and protect it from invasion by persons outside of their group. Solving the exclusion problem, then, begins to solve the problems of provision and maintenance. But people can bullheadedly insist on creating fully individualized and parcelled private property rights on common-pool resources, and end up with management problems because they do not acknowledge the physical challenge of exclusion. This may well be the fate of privatization schemes inappropriately applied to common-pool resources. And people can also decide, possibly for reasons of ideology or romantic nostalgia, to create common-property regimes to govern perfectly private goods that require no coordination among persons for their management.

Oddly, the term "common property" seems to have entered the social science lexicon to refer not to any form of property at all but to its absence—nonproperty or open-access resources to which no one has defined rights or duties (Gordon, 1954; Scott, 1955; Demsetz, 1967; Alchian and Demsetz, 1973). The inefficiencies and resource exhaustion to which open-access arrangements are prone are well known.[4] Open access is an acceptable method for resource management only when we need not manage resources at all: when demand is too low to make the effort worthwhile. In a common-property arrangement, on the other hand, a particular group of individuals share rights to a resource. Thus, there is property rather than nonproperty (rights rather than the absence of rights), and these are common not to all but to a specified group of users. Thus, common property is not access open to all but access limited to a specific group of users who hold their rights in common (Runge, 1981, 1984, 1992; Bromley and Cernea, 1989; Bromley et al., 1992). Indeed, when the group of individuals and the property rights they share are well defined, common property should be classified as a form of shared private property—a form of ownership that should be of great interest to anyone who believes that private property rights promote long time horizons and responsible stewardship of resources.

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[4] *Garrett Hardin's (1968) classic essay on the tragedy of the commons points out the hazards of open access, without stating clearly that the problem was the lack of a property-rights or management regime (the openness of access), not the sharing of use (common use). Hardin (1994) has taken steps to rectify this oversight in more recent work that distinguishes between the unmanaged (unowned) commons subject to tragedy and the managed (owned) commons where property rights may be able to prevent misuse of the resource.*

American economists (North, 1990; North and Thomas, 1973; Demsetz, 1967; Alchian and Demsetz, 1973; Anderson and Hill, 1977; Libecap, 1989; Johnson and Libecap, 1982) have argued persuasively that property rights emerge in response to conflict over resource use and conflicting claims over resources, and that well-defined property rights help to promote more efficient use of resources and more responsible long-term care of the resource base.[5] A complete bundle of rights would include assorted rights of use (the right to use, to change the use of, all the way to the right to destroy a resource), as well as rights of alienation (e.g., transfer through bequeathing rights to heirs and/or selling rights).

Economists (Locke, 1965; De Alessi, 1980, 1982; Libecap, 1989) usually argue, in addition, that economic growth results from the creation of private property rights to the extent that they have the following four attributes: (a) they should be *clearly specified*, setting out exactly what the holder of the right is entitled to do; (b) they must be *exclusive,* vested in the holder of the right and **not** in **non**holders of the right; (c) they must be *secure*, so the holder of the right is protected from confiscation by others and by the state alike; and (d) they should comprise an *intact* bundle of rights, so the holder of use rights also holds the right to change the way the resource is used, even to destroy it, as well as rights of alienation through sale or bequeathal (Schlager and Ostrom, 1992, 1993).[6] It is important to note here again that the definition of private property rights has to do with the *rights,* not with the nature of the entity that holds them. The privateness of private property rights does not require that they be held by individual persons. Private property rights can be vested in groups of individuals as well. All of us acknowledge that private property rights can be vested in business partnerships and joint-stock corporations. We need to understand that a common-property regime can be similar to these.

Scholars who have designed taxonomies to point out the difference between open-access arrangements (no arrangements, rules, or property rights at all) and common property usually distinguish four "types" of property: public (state-owned), private, common, and open access (Berkes et al., 1989; Feeny et al., 1990; Bromley and Cernea, 1989; and Ostrom, 1990). Although it is extremely important to

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[5] *Note that this evolution is only probable, not guaranteed. Conflict over resource use can simply continue without efficiency-enhancing evolution of clearer property rights. Tai-Shuenn Yang (1987) argues that the retention of residual imperial prerogatives over all resources in China made all property rights that did evolve there merely temporary and insecure and inhibited economic growth in China for two millennia. Peter Perdue (1994) disputes this explanation, however.*

[6] *I agree with points (a), (b), and (c), but I can envision circumstances in a congested world of layered externalities in which a reconfiguration of bundles of rights might be more socially efficient. I am intrigued, for instance, with the idea of allocating use rights to wildlife to people who live near the wildlife resource, but allocating the right to destroy (and thus also to preserve) the species itself, and the genetic material that individuals in a species carry, to an international body that acts as trustee for all humans. But this is an argument for another time and place.*

recognize that common-property regimes are not open access, this four-way taxonomy unfortunately creates the regrettable impression that common property is not private property either, and does not share in the desirable attributes of private property. I think it extremely important to point out here that common property is shared private property, and should be classified wherever we put business partnerships, joint-stock corporations, and cooperatives. The property rights in a common-property regime can be very clearly specified, they are by definition exclusive to the co-owners (members of the user group), they are secure if they receive appropriate legal support from governments, and in some settings are fully alienable. Some Swiss alpine common-property regimes, some Japanese agricultural and forest common-property regimes, and all Japanese fishing cooperatives permit trading in shares (the individually parcelled rights to flow or income), and all have mechanisms by which the entire common-property user group may actually sell its assets (the shared rights to stock or capital assets of the user group or corporation) (Netting, 1981; Glaser, 1987; McKean, 1992a).

Sharing private property does have its weaknesses: all arrangements of shared private property, from firms to resource cooperatives, contain internal collective-action problems because they are comprised of more than one individual owner. Just as there can be shirking and agency problems in a firm, there can be temptations inside a common-property regime to cheat on community rules. But there are productive efficiencies to be captured through team production that may be larger than losses due to shirking, making centralized or large-scale forms of production like the firm worthwhile anyway. Similarly, there may be gains from joint management of an intact resource that can outweigh losses due to cheating (or the cost of mechanisms to deter cheating) in a common-property regime (Coase, 1937; Miller, 1993).

Advantages of common-property regimes

Once we understand the difference between goods and property rights (discussed above), we can understand common-property regimes as a way of privatizing the *rights* to goods without dividing the *goods* into pieces: in effect, privatizing rights to **flow** without privatizing or parcelling the rights to the **stock** or resource system itself. Consider, for instance, the various ways in which two people may own a typewriter. They could try to parcel the typewriter—chop it in half perhaps down the middle of the keyboard so that one can produce documents consisting mostly of "ASDFG" and the other can compose documents containing a lot of "YUIOP." But even the most rivalrous pair of aspiring typists will understand that parcelling the typewriter itself destroys most of its use value. A second scheme would be for one to own the typewriter and rent out occasional access to it to the other person (equivalent to the classic landlord-tenant relationship on the land). And a third scheme would be for them to share ownership of the typewriter itself and divide access to it into equal

time-shares. They might even allow mortgaging or subletting or subsequent sale of their time-shares. In this way they share ownership of the productive stock without chopping it in half, and they parcel the flow of use units into individually owned rights (equivalent to shared private ownership, or common property). Natural resource systems have something in common with the typewriter of this example: they can be far more productive when left intact than when sliced up.

Similarly, common property offers a way of parcelling the flow of skimmable or harvestable "income" (the interest) from an interactive resource system without parcelling the principal itself. It would obviously be desirable when the resource system, like the typewriter in our example above, is most productively managed as an intact whole rather than in uncoordinated bits and pieces. Inherent in this basic characteristic of common property—the combination of individually parcelled rights to flow with shared rights to an intact stock—lies the explanation for its appearance among human institutions. Historically, we find common-property regimes in places where a resource production system gets congested (demand is too great to tolerate continuing open access nonmanagement) so property rights in resources have to be created, but some other factor makes it impossible or undesirable to parcel the resource itself (see Table 2.2).

Table 2.2: Stock and flow attributes of property-rights regimes

	Individual Property Rights	Common Property Rights	Public Property Rights
Rights to flow	parcelled	parcelled	intact
Rights to stock	parcelled	intact	intact

Indivisibility

The resource may have physical traits that literally forbid parcelling; the production system may simply not be amenable to physical division or demarcation. Either the resource system cannot be bounded (the high seas, the stratosphere) or the resources we care about are mobile over a large territory (air, water, fish, wildlife). Land, particularly forests, may seem much more divisible (and fenceable) at first glance than other kinds of resource systems, but in fact where forests are being managed not only for products that can be taken from it but also for their value in protecting water and soil, not to mention local climate, forests need to be managed in large units of at least the size of watershed basins. Basically, these resources have to be managed in very large units. Humans have only recently acquired interest in biodiversity, but leaving natural systems unparcelled and managing them in large units

multiplies the biodiversity provided, sometimes exponentially, compared to managing the same acreage in separated parcels.

Uncertainty in location of productive zones

In fragile environments, nature may impose great uncertainty on the productivity of any particular section of a resource system, and the location of the unproductive sections cannot easily be predicted from year to year, but the "average" or "total" productivity of the entire area may be fairly steady over the years. Management efforts focused on the entire system are not plagued with uncertainties and may therefore be quite successful. In this situation, the resource system holds still and may even have fairly obvious boundaries, but the productive portions of it do not hold still. In effect, nature imposes compulsory fallowing on some resource systems by randomly rendering portions of them unproductive. In such resource systems, resource users may well prefer to share the entire area, and decide together where to concentrate use at a particular time, rather than parcelling the area into individual tracts and thereby imposing the risk of total disaster on some of their members (those whose parcels turn out to be bad ones that year). Creating a common-property regime is a way of acknowledging that this risk is substantial, and sharing it rather than imposing all of the risk, randomly, on some particular users each year.

Productive efficiency via internalizing externalities

In many resource systems, hilly ones for instance, uses in one zone immediately affect uses and productivity in another: deforesting the hillside ruins the water supply and downhill soil quality. If different persons own the uphill forests and the downhill fields—or, for that matter, small adjacent patches of forest and pasture—and make their decisions about resource use independently and separately, they may well cause harm to each other. If these externalities are substantial, they will want to negotiate Coaseian contracts with each other (Coase, 1960). Either the downhill farmers would pay uphill forest-owners not to cut all the trees they might want to, or uphill forest-owners would cut all the trees they want to and instead compensate downhill farmers for damaged fields with the extra earnings from timber sales.

An institutional alternative to this series of bilateral exchanges is to create a common-property regime to make resource management decisions jointly, acknowledging *and internalizing* the multiple negative externalities that are implicit in resource use in this setting. People who use a common-property regime to manage their uphill forests all share ownership of the upland forests, restrain timbering to prevent soil erosion and damage to fields below, and earn more from their downhill farms than they sacrifice by not cutting as much uphill timber. Just as a Coaseian exchange permits people to enhance their joint efficiency by dealing directly with an

externality, so joint resource management through common-property regimes may enhance efficiency by internalizing externalities. Common-property regimes may become desirable when more intensive resource use multiplies Coaseian considerations due to externalities between parcels. There is probably some threshold at which economies of scale in negotiating take over, and collective decision making, collective agreement on fairly restrictive use rules, and collective enforcement of those rules becomes easier (less time, lower transaction costs for the owners) than endless one-on-one deals.

Administrative efficiency

Even if resources are readily divisible into parcels, where nature is uniform in its treatment of different parcels so that risk and uncertainty are low, and where intensive independent use of adjacent parcels does not produce problematic externalities, the administrative support to enforce property rights to individual parcels may not be available. The society may be too poor to support a large court system to enforce individual land titles, and even cheap fencing would be expensive by this society's standards. Creating a common-property regime here is a way of substituting collective management rules—which function as imaginary fences and informal courts internal to the user group—for what is missing. It is cheaper in these circumstances, and it is within the power of a group of resource users to create (even if they cannot create a nationwide system of courts and cannot afford barbed wire). Common-property regimes can be particularly attractive in providing administrative efficiency when resource management rules can simply be grafted onto the functions of a pre-existing community organization.

In many situations, particularly where people are interested in making good use of a resource system capable of generating multiple products, more than one of these conditions applies. All around the world we have such situations: ecologically fragile uplands that make vital contributions to the livelihoods of poor people. The reasoning above would indicate that common property may be the most efficient form of property institution for such situations. We do seem to be increasingly willing to understand that nomadic pastoralism or agro-pastoralism based on common-property arrangements are the most productive use of arid lands that can support limited and occasional grazing and temporary cultivation but nothing else. The poor soils of the African continent, a geologic misfortune not likely to be remedied by humans,[7] may not tolerate much agricultural intensification and may need, in the long run, to be managed in large units with long fallowing periods—a situation for which common property is very well suited.

Even in resource systems that seem eminently divisible, where risk and uncertainty are low and uniform across the resource system, where externalities seem minor or manageable through individual contracting, and where administrative support for individually owned parcels is ample, there may be reasons to maintain common property at least at some level. Natural resource systems are fundamentally interactive—forests provide watershed control, species are interdependent in ways we are often unaware of, etc.—and may well be more productive in large units than in small ones. In order to optimize the productivity of their own parcel, owners of individual parcels may want to guarantee that owners of adjacent parcels stick to compatible and complementary uses on their parcels, maintain wildlife habitat and vegetative cover intact, allow wildlife transit, refrain from introducing certain "problem" species, and so on. In effect, owners of individual but contiguous parcels may have an interest in mutual regulation of land use—the equivalent of zoning.[8]

To review then: private property rights in resources evolve only when demand for those resources makes the extra effort of defining and enforcing property rights worthwhile, i.e., when resource use intensifies beyond some point. These may take the form of common property rights—individually owned rights to flow based on shared rights to stock—when it is impossible, undesirable, or very expensive to divide the stock (the resource base or production system) into parcels. A common-property regime consists of joint management of the resource system by its co-owners, and is more likely to exist when the behavior of individual resource users imposes high costs on other resource users—that is, as mutual negative externalities multiply. Vesting clear, specific, secure, and exclusive rights in private entities encourages investment and protection of resources. Vesting those rights in large enough groupings of individual resource users so that they can then coordinate their uses to match ecosystem requirements internalizes environmental externalities.

Embedded in this observation is a very important theoretical proposition. That is, mutual regulation through the institutional equivalent of a common-

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[7] *The African continent, having been the one from which other continental plates split off, was not fortunate enough to have been crashed into by other plates. It is this collision of plates that produces gigantic upwelling of old sea floors into new mountain ranges, and it is such mountain ranges that over geologic time erode into the rich alluvial plains of the world's breadbasket regions. The mountains formed (as in East Africa) when a plate slides across areas of volcanic eruption consist of molten lava with no organic enrichment, and although they too erode and contribute to topsoil, it is of much lower agricultural value (David Campbell, Department of Geology, Michigan State University, personal communication, 28 June 1995).*

[8] *In fact, zoning and urban planning are actually the creation of common or shared property rights in choices over land use, and the vesting of those rights in the citizens of a municipality. Just as zoning would be an absurdly unnecessary effort in a frontier area where population density is low but increasingly desirable—to control externalities—in more densely populated areas, so common property becomes more desirable, not less, with more intense resource use.*

property regime is **more** desirable, because of its capacity to cope with multiplying externalities, as resource use **intensifies** and approaches the productive limits of the resource system. Further, since it is people who use resources, we should also find that common property becomes **more** desirable—not necessarily more workable but more valuable and thus more worth trying—as population density **increases** on a given resource base. If human beings depend on extracting as much out of a resource system as the system can sustainably offer, then careful **mutual** fine-tuning of their resource use becomes essential. Common-property regimes are essentially a way to institutionalize and orchestrate this kind of fine-tuning when resource systems are pushed to their limits.

Private property rights stimulate long-term planning, investment in the productive quality of a resource base, and stewardship. Sharing these private property rights is a way to solve some of the externality problems that arise from population pressure and intensification of use. If we fail to solve these problems through Coasean bargains or collective management of resources, we inevitably deplete those resources and reduce their productive potential well below what it could have been, if not all the way to zero.

Too many observers and policymakers today now throw up their hands in despair when they see population pressure and resource depletion, condemn common property as quaint and unworkable, and recommend privatization. But what they mean by "privatization," as they use the term, is either an outright award of the entire resource system to a single individual, without regard to the political consequences of enraging all other former users of the resource, or parcellization, rather than shared private property or common property that should be encompassed in the notion of "privatization." **The advocacy of "privatization," then, tends to overlook what may, in fact, be the most appropriate form of privatization in some instances!** I would argue that common-property regimes may be the most appropriate things to create where resource systems are under *both* environmental and population pressure, at least where prevailing cultural values support cooperation as a conflict-solving device. Like individual parcellization, common property gives resource owners the incentive to husband their resources, to make investments in resource quality, and to manage them sustainably and thus efficiently over the long term. But unlike individual parcellization, common property offers a way to continue limited harvesting from a threatened or vulnerable resource system while solving the monitoring and enforcement problems posed by the need to limit that harvesting. Sharing the ownership of the resource base is simply a way of institutionalizing the already-obvious need to make Coasean deals to control what are externalities for a parcelled system and internalities for a co-owned intact system.

Attributes of successful common-property regimes

The findings to date from many individual case studies of successful and failed common-property regimes can be initially synthesized into a set of broad policy recommendations related to the conditions that are associated with successful common-property regimes (based on Ostrom, 1990; McKean, 1992b; and Ostrom, Gardner, and Walker, 1994).

User groups need the right, or at least no interference with their attempt, to organize. There is a stark difference between resource user groups such as those in Switzerland and Japan that have both legal standing as property-owning entities and long-documented histories of community resource management, and indigenous peoples from Kalimantan to Irian Jaya to the Amazon, and from Zaire to India, who have practiced community resource management for decades or even centuries but have no legal protection. As soon as products from the resource system become commercially attractive, persons outside of the traditional user community become interested in acquiring legal rights to the resource. If the traditional users have those legal rights in the first place, then they essentially have the commercial opportunities that their resources create. In Papua New Guinea, for instance, where traditional community forest rights are legally valid, portable sawmills used by villagers turn out to be more economically efficient overall, and to bring more wealth into the village, than timbering by multinational corporations. Where local communities' resource claims go unrecognized by national governments, the best they can then hope for is that higher layers of government will overlook them rather than oppose them. The farming villages of Andhra Pradesh that use an open-field system to manage planting, harvesting, grazing, and irrigation do so successfully only because and as long as the state and national governments ignore them (Wade, 1992).

The boundaries of the resource must be clear. It is obviously easier to identify and define both the natural physical boundaries for some resources—a forest or a pasture or a coastal fishery for instance—and the legal boundaries for a particular community's land, in contrast to the challenges of defining boundaries for, say, a highly mobile species of fish in the high seas. Once defined, these boundaries can then be patrolled by community guards. Clearly marked or even well-understood boundaries can be an inexpensive substitute for fencing. Indeed, fencing may be an effective barrier against some animals, but not against human beings, who can climb over most fences and, in any case, usually acquire wire clippers and saws at the same time they get hold of fencing material. Rather, the social function of fencing, one that can be performed equally well by unambiguous demarcation of property lines, is that it offers impartial notification of boundaries. Thus, those who invade others' territory know they are doing it, and those who are invaded can prove readily that they have

been invaded. Fencing eliminates innocent error and ignorance as excuses for trespass and theft.

The criteria for membership in the group of eligible users of the resource must also be clear. The user group has to share solid internal agreement over who its members are, and it is probably best if eligibility criteria for membership in this group do not allow the number of eligible users to expand rapidly. Many Swiss villages limit eligibility to persons who live in the village *and* purchase shares in the alp, so that new residents must find shares to buy, and shareowners who leave the village find it in their interest to sell their shares because they are unable to exercise their village rights from elsewhere. Thus, the size of the eligible user group remains stable over time. Japanese villages would usually confer eligibility and shares of harvest on households rather than individuals, and were also likely to limit membership to long-established "main" households rather than "branch" households. These practices assured that no special advantages went to large households, those that split, or new arrivals. Not only did this rule limit the number of eligible users and the burden on the commons but it also discouraged population growth. Communities elsewhere may be less strict—at their peril—about defining eligibility for membership in the user group. Vondal describes an Indonesian village whose communal resources are under stress in part because the community opens membership in the user group not just to all village residents but also to all kin in neighboring villages (in McCay and Acheson, 1987). Thus, this user group has expanded rapidly, without any consideration yet for matching its size or its aggregate demand for resources to the capacity of the resource system.

Users must have the right to modify their use rules over time. Inflexible rules are brittle and thus fragile, and can jeopardize an otherwise well-organized common-property regime. In a magnanimous but ill-considered attempt to extend legal recognition to common-property regimes over forest and pasture land in the Punjab, the British decided to codify all of the rules of resource use in different systems. The undesirable consequence was to freeze in place use rules that really needed to remain flexible (Kaul, 1995). The resource users are the first to detect evidence of resource deterioration and resource recovery, so need to be able to adjust rules to ecological changes and new economic opportunities. If the commons displays signs of distress, the village might alter the rules so as to reduce or even eliminate the incentive for each family to cut all that it can when allowed entry into the commons. The village might choose to lengthen the period of closure on land that is being degraded. Or, it could alter distribution rules from allowing each family to keep what one able-bodied adult can bring out of the commons in one day during entry season, to aggregating the cut from each family, dividing it into equal amounts, and reassigning bundles of harvest to each household by lottery. Japanese villages that have

retained full title to their common lands are not only free to adjust regular use rules as they see fit but are also free to take advantage of attractive commercial opportunities. They may hire loggers to clear 1/50 of the mountain each year for 50 years. They may "manage" the forest for commercially valuable bamboo or fruit trees. Villages in Kyushu often use their commons as pasture for animals. Or, villages may lease surface rights to hotels and ski resorts. They are even free to sell off the commons, by unanimous vote, if they want to reap the capital gains on appreciated land values.

Use rules must correspond to what the system can tolerate and should be environmentally conservative to provide a margin for error. Successful user groups appear to prefer environmentally conservative use, possibly to give themselves a margin to invade during emergencies. Japanese villagers in the Mt. Fuji area knowingly overused their commons during the depression of the 1930s (removing more fodder for packhorses and more wood for charcoal than they should have), but also knew that they—and the commons itself—could afford this in a temporary emergency of that kind precisely because they were intentionally conservative in their use during good times. The commons was both an essential part of everyday living and a backup system maintained in reserve. When forestry scientists told Nepali villagers that their forest could easily tolerate the extraction of both leaf litter and kindling, the villagers rejected this advice and opted instead to ban the cutting of fuelwood altogether, because they feared that allowing any cutting of wood would threaten the total population of deciduous trees and thus could reduce the supply of the leaf litter they used as fodder and fertilizer (Arnold and Campbell, 1986).

Use rules need to be clear and easily enforceable (so that no one need be confused about whether an infraction has occurred). Common-property regimes frequently establish quantitative limits on amounts of different products that an individual user may extract from various zones of the commons, but this means that a suspected infraction involves much measurement, weighing, and discussion between resource user and guard about whether this limit applies to that species or another one, and whether this kindling was collected from one zone or two, whether these branches are of too wide a diameter or not, and so on. Sometimes other kinds of rules can be simpler to understand and enforce. Restrictions on the equipment a user takes into the forest may be just as effective in restraining harvesting and also be simpler to enforce. Having too large a saw, or a pack animal rather than a backpack, might then be an infraction even before one begins to cut. Opening and closing dates are similar: being in the forest or on the pasture during the off-season is simply unacceptable, whatever the excuse. Clear enforceable rules make life easier for resource users and for monitors representing the user group, and reduce misunderstandings and conflict.

Infractions of use rules must be monitored and punished. Obviously, rules only work when they are enforced. Agrawal (1992) found that communities in Uttar Pradesh differ widely in the extent to which they devote village resources to enforcement, particularly hiring guards or assigning villagers to guard duty by some rotational scheme. The communities with healthy common forests were those that recycled the fines and penalties they collected into providing for their guards. The communities with degraded forests were those that had fewer guards, enforced the rules less, collected much less in fines, and put the fines into a general village budget rather than into the enforcement mechanism. There is also evidence that penalties need not be draconian: graduated penalties, mild for first offenses and severe only for repeated infractions, are adequate (McKean, 1992b; Ostrom, 1990).

Distribution of decision-making rights and use rights to co-owners of the commons need not be egalitarian but must be viewed as "fair" (one in which the ratio of individual benefit to individual cost falls within a range they see as acceptable). It comes as a surprise to observers who have romanticized the commons that common-property regimes do not always serve to equalize income within the user group. Communities vary enormously in how equally or unequally they distribute the products of the commons to eligible users. Decision-making rights tend to be egalitarian in the formal sense (one user household, one vote) although richer households may actually have additional social influence on decisions. Entitlement to products of the commons varies to a surprising extent. In some communities, especially in India, the commons do turn out to be a welfare system for the poor: the wealthy members of the community may be entitled to use the commons but do not bother to exercise that right because of the high opportunity cost of their labor, leaving *de facto* access to poorer members, those willing to invest their labor in collecting products from the commons. In other communities, including most long-lived common-property regimes (Switzerland, Japan, and virtually all regimes governing grazing and irrigation), products of the commons are distributed to families in the same proportions as their private assets off of the commons. If any subgroup feels cheated—denied "adequate" access or a "fair" share—vis-a-vis another subgroup, the angry subgroup becomes unwilling to participate in decision making, unwilling to invest in maintaining or protecting the commons, and motivated to vandalize the commons. An important key to the cohesiveness of farmer-managed (as opposed to government-organized) irrigation systems is the power of tailenders to withhold their labor from maintenance of canals, channels, and sluicegates when they feel that headenders are taking too much water. Successful irrigation systems have very well-calibrated mechanisms to distribute water in the same proportions as the labor required of co-owners (Tang, 1992). Rules that award more benefits to those who invest more, and no benefits to those unwilling to invest, seem to have the best chance of winning the allegiance of both rich and poor.

There need to be inexpensive and rapid methods of resolving minor conflicts. Successful common-property regimes assume that there will often be small disagreements among users, and provide regular opportunities for these disagreements to be aired and rules clarified or adjusted if necessary. Swiss commoners make Sunday church outings the regular occasion for discussing problems and collecting levies. Japanese villagers are so organized (it is not unusual to find more committees than households in a village) that they have constant opportunities to air grievances. Most conflicts can be resolved at a low level because persons with multilayered social relationships can usually design a satisfactory compromise.

Institutions for managing very large systems need to be layered with considerable devolution of authority to small components to give them flexibility and some control over their fate. Some forests, grazing areas, and irrigation systems may have to be managed in very large units, but at the same time the persons living near each patch or segment of the resource system need to have substantial and secure rights in the system in order to have the incentive to protect it. A large resource system may be used by many different communities, some in frequent contact with each other and some not. The need to manage a large resource system as a unit would seem to contradict the need to give each of that resource system's user communities some independence. Nesting different user groups in a pyramidal organization appears to be one way to resolve this contradiction, providing simultaneously for independence and coordination. The most successful examples of nesting come from irrigation systems serving thousands of people at a time (Ostrom, 1990, 1992).

It must be recognized that some common-property regimes falter and that other sorts of institutional arrangements can also work effectively. But it would be a grave mistake to dismiss common-property regimes as relics of the past, intrinsically unworkable, or incompatible with contemporary society. The theoretical arguments above indicate that there are circumstances where common-property regimes may be quite suitable, and there are, in fact, many documented cases where resource users themselves have crafted institutions consistent with our findings above. But there are still many gaps in our knowledge and information about the effects of diverse institutions on forest conditions. Before we destroy or create institutions willy-nilly, we need much continued effort to enlarge the body of information we draw upon in the effort to reduce rates of deforestation and loss of biodiversity around the world.

Although we are a long way from certainty about what makes successful common-property regimes work, I would be willing to offer the following propositions for devising common-property regimes:

—**sociocultural support:** Common-property regimes will work better where the community of users is already accustomed to negotiating and cooperating with each other on other problems than where there are numerous existing conflicts and no indication of a willingness to compromise.

—**institutional overlap:** Reviving recently weakened institutions, where the habits and techniques of negotiation and compromise are still in evidence, will be easier than trying to invent wholly new institutions among people who have never worked together before.

—**administrative support:** Reviving or creating common-property regimes where local and national governments are hostile is almost impossible. There is no point in trying unless local and national elites, or significant portions of them, are sympathetic to the attempt. This kind of support means legal recognition to strengthen the security and enforceability of common property rights.

—**financial support:** Apart from limited help with local start-up costs, financial support to local common-property regimes is probably *un*desirable because it might well undermine local cooperation. If an institutional form is being adopted because it is efficient, it should pay for itself (by definition!) and not require subsidy.

—**conflict reduction:** Where the size of productive management units permits a certain degree of segmentation or parcelling of the resource, it is probably preferable to create nonoverlapping commons for different communities rather than to have several communities sharing a single huge commons. It is probably best for the communities involved to make this choice rather than to have an outsider insist on splitting the resource system into several separate commons.

Common-property regimes are being promoted at long last in a number of resource-poor developing countries as a way of restoring degraded lands and building up a community resource base. I argue here that common property may be more appropriate than individual property when externalities among parcels of land multiply due to intensive use and high population pressure. It is crucial, then, not to eliminate common-property arrangements where they survive; but, rather, to view common property as a legitimate and very suitable variety of private property in some circumstances when conducting property-rights reform, and to pay careful attention to the nature of the resources in question (are they common-pool goods?) before tampering with property rights to those resources.

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