

ENVIRONMENTAL GOODS AND SERVICES IN THE THEORY OF COMMONS¹

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Abstract

The modern and largely academic and urban initiated concern with environmental protection of landscapes, species, watersheds, biodiversity, ecosystem-services etc. are framed by a language suggesting that the main concern is the protection and preservation of precarious resources of common interests for mankind. Thus the values deserving the attention of environmental protection seem to be very different from the concerns shaping the evolution of traditional commons: the control of access to and extraction of resources seen as limited but essential for the survival of local communities. The paper will explore the theoretical differences and similarities of the two types of interests driving the concern for preserving values. It will be suggested that a basic difference lies in the distinction between values where there is rivalry in appropriation and values where there is non-rivalry. It will further be argued that in designing new institutions for managing protected areas, an understanding of traditional commons and how the new values to be protected are different from and interact with the old values will be important to achieve sustainability of resource use within the protected areas.

Keywords: *commons, environmental goods, landscapes, values, rivalry, excludability, property rights, public regulations, Norwegian littoral, interdependence*

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INTRODUCTION

The modern, largely academic and urban initiated concern with environmental protection of landscapes, species, watersheds, biodiversity, ecosystem-services etc. are framed by a language suggesting that the main concern is the protection and preservation of precarious resources of common interests for mankind. Thus the values deserving the attention of environmental protection seem to be very different from the concerns shaping the evolution of traditional commons: the control of access to and extraction of resources seen as limited but essential for the survival of local communities.

With a few notable exceptions (e.g. Bromley 1991 & Yandle 1997) environmental protection and management of common resources are not discussed together. The economic theory of environmental problems and policies is usually discussed as a problem of allocating responsibility for externalities (Baumol & Oates 1988, Devlin & Grafton 1998, Sandmo 2000). The environmental problem is described as consisting of the misuse of a resource currently being in the public domain with open access. The solution is seen to be either imposition of appropriate taxes for matching the use of the resource to its capacity, or it is seen as a problem of privatisation, to allocate private property rights to the resource in order to achieve the internalisation of externalities. However, in recent treatments of 'Environmental Economics and Policy' (e.g. Kolstad 2000, Tietenberg 2001) the discussion of property rights is expanded to common property and property rights have become a central concept in the discussion.

The legal discussions of environmental protection are more concerned with balancing rights and duties, but have a very noticeable emphasis on the manufacturing of products.² Its modern form originates with the need to control toxic and hazardous waste, but have come to encompass all sorts of public interventions to protect bits and pieces of our natural environment, including the much older tradition of protecting particular wilderness areas (Buck 1996, Weale et al. 2000). Other approaches to the environment-society relations, including studies of the cultural and material processes involved (Beck 1986, Murphy 1994, Smith 1999), would seem to be even further from the theory of the commons.

The present paper will argue that the current theory of commons might easily be expanded to environmental goods and services. This will facilitate the discussion of the interactions and interdependencies between the resources of the traditional commons and the goods and services that are the goal of environmental protection. As environmental protection expands into the preservations of values perceived in man made landscapes, the interaction between particular usages of wilderness resources and the particular landscape values become critical. Looking at both kinds of values in a common theoretical framework may facilitate both kinds of resource management. For the present discussion we will talk about old and new commons.

OLD AND NEW COMMONS

The old commons of North-Western Europe, whether conceived of as lands or rights, are remnants of the pre-medieval land use system where significant use rights were held jointly by the local population and managed by their customs³. Access to and use of the commons

² 'The cycle of resources from extraction to recovery is a natural one, but the law's approach to it is curious. Law generally uses a light hand as resources are taken out of the environment. It uses a heavy hand as resources are manufactured into products' concludes Breen (1993, 70).

³ In English jurisprudence rights of commons were said to be rights to remove something of material value from lands owned by somebody else. These rights were called *profits-à-prendre* rights. Some of these rights are of ancient origin and are said to be inalienable (appendant) from the dominant tenement (the commoner's land). Others, usually of more recent origin, were seen as alienable (appurtenant) from the commoner's land. Some could be attached to a particular person, in which case it was alienable (a right held 'in gross'), see Simpson

were significant additions to the outcome of privately held lands, often yielding goods it would be difficult or unprofitable to provide on privately held lands. The landscapes that grew out of this system by way of privatisation, particular usages, and diversification of control are today highly valued and considered both precarious and in need of protection. Today we can see the old commons as highly sophisticated forms of property rights with a social and political dynamic very different from what we might call ordinary individual private property.

One important fact needs to be emphasised from the start of this discussion: there is every reason to suppose that a particular landscape (seen as a culturally and socially delimited area) may hold several and possibly all of the mentioned goods and services, old as well as new. There is nothing remarkable in this except that it means many special interest groups have to co-exist within the same landscape, and it will be taken for granted that every interest group wants its special interests safeguarded. Those with interests in the old resources are protected by property rights. Those concerned with the new resources have turned to the state to get regulations protecting their interests. The remarkable thing is that they often have gotten, at least partly such special regulations without much consideration of the possible interactions and interdependencies there might be among the various resources of the regulated area.

In traditional commons the reasons for keeping some resource as common property are numerous:

- If there is enough for all with access to the resource there is no reason to incur the costs of enforcing property rights.
- If access to a resource is essential for the survival of a family it would be seen as unjust to deny anyone access to a minimum level of the resources.
- If traditional societies see that there is safety in numbers, maximising the number of people imply resource access for every member of the community.
- If there are technical difficulties of excluding particular persons from access to a resource, keeping it in common may be the only feasible way of managing it.

Thus, commons abound both in European history and in contemporary 'traditional societies'. In Europe a situation with multiple stakeholders within a common area have since medieval times and until the dominium plenum tradition of property rights became dominant been handled as if the person or group of persons with the highest interest in a particular resource had been awarded property rights to it, and access to legal remedies to sort out the points of conflict with other groups. The fact that different resources within an area had different owners, sometimes with conflicting interests, required a common organisation. The feudal system gave the territorial aspect an advantage that translated into ownership of the ground in the early modern state. The advantage of the ownership of the ground was extended to its ultimate end in the privatisation of the commons, the enclosure. Unifying the property rights to the resources within fixed boundaries internalised many conflicts leaving only the externalities suffered by neighbours and the questions of justice in relations to those excluded from the land.

But the simple situation (the fee simple) was of course too good to last. New problems appeared as new, environmental goods and services were 'discovered'. Instead of the multiplicity of property rights relations of the old commons, a separate sphere of environmental regulations was created, either ignoring old property rights or consciously overruling them. Today the fight is about the relative standing of the different regulations. Which bureaucracy is best able to promote its interests?

1986, 111-3, and Lawson & Rudden 1982, 127-36). Exactly the same definition will cover what in Norway is called 'commons' ("*almennning*"). But for the theoretical discussion and for the empirical realities around the world this definition is too restricted. For the purposes here 'commons' is defined as any area where a suitably delimited group of people, the commoners have legitimate rights to harvest of its resources or goods.

However, the societal dynamic threatening the old landscapes are often associated with the powers inherent in the recently (historically speaking) established *dominium plenum* private property regime. As urban society has matured and learned more about the goods and services provided by natural ecosystems in their various stages, a new concern about their management has emerged. The goods and services provided by nature and valued by urban society are in some ways very different from the goods and services valued by rural society and the owners of the old style commons. But in other ways they are similar. The goal of today's management concerns are the same: sustainability of resources and a just distribution of the benefits.

COMPARING RESOURCES OF OLD AND NEW COMMONS

Table 1 gives examples of resources found in the traditional commons and resources in need of environmental protection.

Table 1
Examples of resources, goods and services, identified with traditional commons and environmental protection

Resources of traditional commons	Environmental goods and services
Timber, Pasture	Environment as sink for pollution (including carbon sequestration)
Game, Fish	Recreation (landscapes as settings for non-work activities, routes for transition)
Windfalls, Dead Wood	Museum landscapes (protected areas ⁵ with scientific values, landscapes of historic interest ⁶)
Shrubs, Herbs, Fruits, Resin	Symbolic values (landscape elements as vessels for local and national cultural identities, heritage sites)
Fungi, Vines, Lichen, and Epiphytes	Biodiversity (ecosystems, species, genes, information and existence values)
Insects, Honey	Watershed protection (flood control, fresh water supply)
Peat, Soil,	Disaster mitigation (landslides and avalanches)
Minerals ⁴ (clay, sand, gravel, stones)	Local soil and climate management (soil erosion, wind chill, water runoff, air quality)
Water	...
...	

We can simplify Table 1 by focusing on the kind of motivations that sustains human activity within the landscape on the one hand, and, on the other, what level of human activity is

⁴ In Norway, the allocation of rights to metals and minerals with a specific weight of five and above (with a few exceptions) are independent of land ownership as determined by special legislation: Mining Act of 30 June 1972 No70.

⁵ IUCN promotes 6 Protected Area management categories (IUCN 1994). Recreation is included in the categories. However, it is interesting to note the absence of items like historical monuments or symbolic significance of landscapes or elements associated with landscapes. Presumably this is taken care of by the World Heritage Committee (see note below). The 6 categories are: 1) Strict Nature Reserve/Wilderness Area; 2) National Park; 3) Natural Monument; 4) Habitat/Species Management Area; 5) Protected Landscape/Seascape; 6) Managed Resource Protected Area.

⁶ The Convention Concerning the Protection of the World Cultural and Natural Heritage was adopted by the General Conference of UNESCO in 1972. The goal of the Convention is to identify and protect the world's natural and cultural heritage considered to be of 'outstanding universal value'. The Convention creates a list of sites, 'the World Heritage List', made up of natural, cultural, and mixed sites and cultural landscapes (<http://www.iucn.org/themes/wcpa/wheritage/wheritageindex.htm>).

required to maintain the landscape. In Table 2, the resources of traditional commons fall within the group where the landscape requires sustained human activity and products, in principle, can be exported. The new environmental goods and services are of three different types.

Table 2

Types of goods and services according to human goals and level of human activity within the same landscape (see below for derivation of Table).

	Landscape that require sustained human activity	Landscape that require almost no human activity
Landscape produces for export	<u>Agricultural area</u> Agriculture, forestry, other extractive activity	<u>Protected areas type I</u> Ecosystem services, sink for pollution
Landscape produces for consumption	<u>Recreation area:</u> Recreation (all types) Museum functions, heritage symbols, scientific knowledge, experience of biodiversity	<u>Protected areas type II:</u> Existence values: wilderness, ecosystems, biodiversity

Looking closer at the resources of agricultural areas and protected areas of type I (where the products of the landscape can be exported) we note the following characteristics:

- In general the goods derived from these resources are subtractable (private or CPR goods).
- In a commons the right to enjoy the traditional goods are independent of ownership of the ground. This does not preclude that the commoners may own the ground themselves. But also the right to enjoy ecosystem services (or suffer environmental pollution) is independent of the property rights to the ecosystem.
- The problems of equitable distribution of the goods and of ecological sustainability of the resources are the main management problems.

Recreation areas and protected areas of type II (where the goods produced by the landscape cannot be exported) have important differences in characteristics.

- The environmental goods and services are non-subtractable (public or club goods).
- Rights to enjoy these goods are independent of ownership of ground. This does not preclude that the state (or other public bodies) may own the ground over which policy is instituted. If private bodies own the ground, the environmental policy will introduce outside interests in the management of private lands where such interests have not existed. The multiplicity of particular stakeholder interests in the management of lands is reintroduced.
- The main management problem is to get compliance with regulations, including the compliance of the stakeholders in the traditional commons.

THEORY OF THE COMMONS

Property rights give rules of behaviour, rules of how non-owners shall behave relative to owners, and how owners shall behave relative to non-owners. Property rights can be distinguished from other rights in that they give the holder the maximum of security of tenure and legitimacy of possession a society can afford. In many societies this maximum protection is rather small scale and local, based on customary rules and practice and not enforced by state authorities. Individuals, and collectives as well as the state can legitimately hold property rights to valuable goods and services.

The theory of the commons tries to explain why collectives rather than individuals or the state hold property rights to natural resources and goods. Thus the key point of entry is the group of people holding rights together as a group. Some of the main problems discussed are

‘Why do they hold as a group and not individually? How is it possible to hold as a group without destroying the resource? (‘The tragedy of the commons’-debate.) Do groups manage resources better or worse than individuals?’ Such questions lead into some of the core problems of social science: the problems of motivation, the problems of cooperation or collective action, the problems of self-governance, and of good governance.

It is a moot point whether there is *one* theory of the commons. At present it seems best to describe the situation as several more general theories applied to the problem of governing the use of resources that are or could have been held in common (meaning resources that are, or ought to be enjoyed by several people rather than only one).

Types of goods

The values and goals seen in nature can be reinterpreted in terms of the kinds of goods perceived to inhere in land and renewable resources. These goods can usefully be described as being of four types: private goods, common pool goods, club goods, and public goods.

Table 3
Typology of goods

	Appropriators/users are:	
Resource is	Excludable	Non-excludable
Subtractable	PRIVATE	COMMON POOL
Non-subtractable	CLUB ⁷	PUBLIC

Source: adapted from Ostrom & Ostrom 1977.

A resource is subtractable if harvesting or appropriating from the resource by one owner/stakeholder diminishes the amount available for another. The use of ‘private’ and ‘public’ as labels of goods should not be confounded with the same labels used about stakeholders. Used about goods they are labels denoting an analytical characteristic of a good important for the collective action problems experienced by stakeholders wanting to coordinate their goals. Assuming open access to a common pool resource or free entry or exit from a club, one important implication, following from the typology, is a distinction between two types of appropriator-generated externalities affecting other stakeholders. They are most clearly seen in common pool resources with open access and club resources with unrestricted entry and exit.

An activity generates an externality if there is a material consequence for stakeholders not taking part in the activities generating the consequence. In common pool resources the externality is of the queuing type (first come, first served). Queuing causes competition among appropriators and distribution problems between those first in the queue and those last, but does not affect the utility of the good appropriated. Management has to consider the equity in the assignment of slots in the queue in relation to the finite volume of the flow of resource units.

In club goods the externality is cumulatively affected by the last stakeholder to enter or exit the club and will through a crowding (or thinning) process affect the utility of the good for all members of the club (the last drop causing the overflow or the last tread to break

⁷ ‘A club is a voluntary group deriving mutual benefit from sharing one or more of the following: Production costs, the members’ characteristics (e.g. members’ scholarly activities in learned societies), or a good characterised by excludable benefits’ (Cornes & Sandler 1986, 24). To this last item I would add to ‘excludable ‘but non-rival’ benefits’. Thus not all clubs need to be based on club goods in the sense used here. But all club goods can give occasion for the creation of a self-governed club just as common pool goods can give occasion for a self-governed commons.

causing the collapse). This type of externality produces distribution problems in relation to non-members and causes threshold effects in the utility of the good. Management can preserve the utility of the good by setting the number of club members to something under the threshold (if overuse is the problem) or over the threshold (if the service level depends on a certain minimum number). But also equity problems between members and non-members have to be addressed. Positive externalities from the preservation of some club good, such as watershed protection or preservation of biodiversity are often considered public goods. Distributional and management challenges arise from the discrepancy between costs borne by resource managers and the benefits enjoyed by others ('free riders'). The concepts of rivalry/non-rivalry for benefits and exclusion/non-exclusion of beneficiary applied to landscapes give us four types of goods generated by the means of the landscape (Table 4).

Table 4

Four types goods generated by the means of the landscape.

	Appropriator or producer necessary (beneficiary excludable)	Appropriator or producer not necessary (beneficiary non-excludable)
Rivalry for benefits (subtractable)	1) Landscape produces goods or services for export by sustained human activity	3) Landscape produces goods or services for export without human activity
Non-rivalry for benefits (non- subtractable)	2) Landscape produces goods or services for local consumption by sustained human activity	4) Landscape produces goods or services for local consumption without human activity

Based on the classification of goods it would seem reasonable to conclude that there ought to be systematic differences among the 4 types of land use areas labelled

- Agricultural area: mostly private goods: agriculture, forestry, other extractive activity.
- Recreation area: mostly club goods: all types of recreation, landscapes used for information or experiences such as museum, heritage, scientific knowledge, experiences of biodiversity.
- Protected areas type I: mostly common pool goods: ecosystem services; sink for pollution.
- Protected areas type II: mostly public goods such as elements of nature with existence value: wilderness, ecosystems, biodiversity.

THE CASE OF PUBLIC ACCESS TO THE NORWEGIAN LITTORAL

Since 1965 we have had an open political and cultural struggle between two powerful groups both interested in using the seashore for recreational purposes: the landowners and all the rest of the population interested in access to the shore areas. Every summer we get a new chapter in the saga of the struggle for control of access to the coastal areas of Norway. People valuing the coastal landscape want to walk along the shore, picnic and bathe, they also want to land their boats and do the same.

Landowners that hold title to a parcel of the coast and value the coastal landscape will want to build cabins close to the sea, quays for their boats, and in general be left alone with their picnicking and bathing. The number of owners relative to non-owners is fairly low. But still in certain densely populated parts of Norway the owners occupy most of the coast. Many of the non-owning people experience the access to the coastal landscape to be difficult, and of less value for recreation than it might have been if there were fewer owners

using the shore. The owners experiencing the non-owning stakeholders feel invaded. In some areas – notably in the Oslo fjord littoral – these two groups of stakeholders have come to clash. The fight is framed as a political struggle around the coastal planning legislation.

The historical basis of the conflict

The two groups of stakeholders in the littoral, the landowners and those exercising their right of access are based on two long traditions defining their customary and legitimate rights. Traditionally private property reach into the water to the shelf of the shore or as far out under water as to a dept of two meters measured at ebb tide. The tradition of open access to non-arable lands ("*allemannsretten*") gives the public access to the coast where such access is seen as unproblematic for the landowner. The customary rights are in both cases formalized in statutory law. For private property rights there are many acts, but its strongest defence may in this case be based on custom and habit. The public right of access is formalized in the *Act on outdoor recreation* (28 June 1957, No 16). This act secures access for all people to non-arable lands provided suitable observance of owner interests. Thus we can in the littoral of Norway observe two old and well-entrenched institutions in direct conflict.

A theoretical interpretation of the conflict

The problems of the use of the littoral can be described as being a result of crowding. In the club of seashore stakeholders, the landowners have filled up the locality to a threshold where their combined activity generates club type externalities for the rest of the group of stakeholders. The approach of this threshold was felt early on in central parts of the country. Already in 1965 an interim act on building along the coast was enacted. This was replaced in 1971 by the *Act on planning in coast and mountain areas* (10 December 1971, No 103). Current regulations are included in the 1985 Act on planning and building⁸. The problem is that the effect seems to be small to non-existent. Why should it be so difficult to stop building close to the shore? We may note that:

1. Private property rights to the shore area have a long tradition, and unlike the Anglo-Saxon world it reaches into the sea. Some landowners erect physical hurdles making access difficult.
2. Non-owners acknowledge the status of private property also along the shore and can overcome the signals of private property to enjoy access to the shore only with difficulty. Often the difficulty lies in the perception and interpretation of physical implements as signals of private property and a concomitant unease of trespassing at least personal cultural boundaries of appropriate behaviour. The customary rights of open access do not apply close to houses.
3. Along most of the Norwegian coast the crowding is negligible and the municipal practice of allowing buildings have no great consequences locally. The local social pressure towards another use of the littoral is low. Thus the political understanding of the problem is very unevenly distributed across the electorate. The group representing the general public in the crowded parts of the littoral may not have the clout to institute a stricter enforcement since it according to current legislation will have to apply across the whole country.

Discussion

Let us sum up the theoretical implications of what we have said:

Recreation in nature is a club good.

Utility is excludable and non-rival but subject to crowding effects (thresholds).

Maintaining a club with thresholds requires gatekeepers (landowners and cultural norms).

⁸ Act of 14 June 1985, No 77: §17-2 prohibits building along the shores of Norway up to 100 m measured horizontally from the high tide mark, except where approved land use plans exist.

We are all potential members of the recreation club in the coastal zone. Much of our coastline is not accessible at all except by looking from a boat on a nice day. Here we may say that nature keeps all out. Only a small fraction of our coastline is well suited as a recreational landscape. Where entry is possible either by boat or on foot both public regulations and cultural mechanisms take hold.

The general rules governing the usage of the littoral are today the same everywhere, but they are of course applied according to the precepts of the bureaucrat working in the municipality. One might reasonably guess that most of them will apply the cultural standards of private property in judging what is reasonable in each case. If one can determine specific values for the thresholds, one might use them to improve on planning and regulation of local governance by making decisions dependent on the value of the degree of crowding relative to the thresholds for suitable sections of the coast.

Public regulations are always founded upon a system of behavioural norms and informal institutions. For club goods we can conceive of these mechanisms as gatekeepers whose task it is to protect the utility derived from access to the club. Since the public regulations evidently do not work the control is left to the informal institutions, and we may ask who has the power to create gates and how do those arriving at the gate react to its presence?

In so far as a gate controlling a recreational club needs some kind of physical presence near the club area the power to create it resides with the landowner. The landowner may in theory need permission from public authorities but this requirement does not have a strong cultural foundation or a strong public enforcement. Few landowners seem to feel bad about putting up the kind of physical implements that most people will interpret as a gate.

Thus the control of access has two aspects to it, the construction of the gate and the perception and interpretation of the gate. Landowners put up physical implements that they know other people will see as hurdles, discouraging access. Against these hurdles stand our feelings about the right to access to the littoral both by boat and on foot. Now, which type of hurdle is most important? Local municipal authorities listed ca 6000 physical hurdles along the coast of Østfold (Table 5).

Table 5
Various physical hurdles along the Østfold coast

Annexes to cabins:	11	Flag pole:	280
Trailer cabins:	40	Shed/boathouse:	306
Jetty:	50	Lawn:	333
Lighting/lamps:	65	Patio:	409
Signs:	85	Fence:	631
Roads:	94	Movable objects:	815
Portals:	114	Stairs/walkway:	818
Cabins:	188	Quay/diving board:	943
Railings:	238	Others:	535

Source: Dagbladet 12 August 2002.

Why do owners put up devices like these? And why are they interpreted as hurdles? Why do people feel uncomfortable crossing private roads, lawns, or jetties? Not all of the constructions are hurdles in the meaning of making passage difficult in any physical sense. Fences and railings are the only 'real' 'hurdles' and even some of these may be easy to pass. The rest can basically be called signs of private property and personal space. These are counted as hurdles because they cry out to the would-be visitor: do not disturb this space. The landowner and the visitor share an understanding about whose personal space this is and what appropriate behaviour consists of. Yet the desire to access the seashore is strong, and people know their theoretical rights. Some call for the police to fine cabin owners who in such ways try to discourage non-owners from exercising their rights. But in general both people and police are reluctant to enforce the legislation. The reaction by both police and

people to these kinds of hurdles is a testimony to the strength of our cultural precepts about private property rights, the legitimacy of ownership, and our preference for civilized behaviour in relation to access to land.

Conclusion

The effort to institute the all people's rights as being more important than the land owner's rights cannot be seen as a success. In the long struggle between the urban interest in open access to the littoral and the traditional property rights interests of landowners it would seem that the landowners are winning. And if the occasional visitor to the shore can win only by giving up on the cultural norms defining civilized behaviour in relation to private property, the repercussions in other fields may be too high a price. This may create an occasion for rethinking the problem. To overcome the cultural precepts about private property one might think of creating special rules for the littoral. One needs rules adapted to the existing rules of property rights, rather than rules that largely ignores them. One way of doing this might be to redefine the littoral, or rather the parts of the littoral that is well suited for recreation into a new type of commons. Even if we do not change policy but in the end still manage to protect the coastal zone, a new type of commons may in fact be what the final outcome will be.

Coastal commons encompassing recreational interests is not quite comparable to the old style commons comprising timber, pasture and wild game. We need to explore further the differences and how the theory of the commons may aid in the management of the new urban interests in nature.

APPLYING THE THEORY OF THE COMMONS TO ENVIRONMENTAL GOODS AND SERVICES

Real world goods such as pasture, wildlife, timber, landscapes providing recreation, environmental services, or biodiversity will usually be a mixture of the various types of analytical goods, and thus the property rights to the resource need to solve the particular mix of externality problems found in each case. Problems of exclusion and subtractability, as well as the characteristics of externalities, are shaped in profound ways by the technology used in the appropriation of the good. The particular consequences of using a resource depend not only on the institutions but also on the available technology, including knowledge about how to transform resources into something more desirable.

Stopping/limiting toxic emissions

While a clean environment can be considered a public good, toxic emissions to the environment from a point source can be considered a common pool resource (of negative value: a bad). It is difficult or impossible to exclude 'consumers' individually from suffering the bad. The bad is also cumulative in the sense that it becomes worse with increasing deposits of pollution. This is so whether there is only one actor polluting or it is decided by several individuals in uncoordinated actions. Usually it is assumed that there is a threshold for how much pollution the environment can handle by itself (variable by substance and ecosystem). If too many stakeholders put too much pollution into the environment the negative impact (the externality) will escalate and propagate down the queue from the point of emission. Thus those closest to the head of the queue will be worst hit by the pollution.

Protecting/enhancing ecosystem services

Ecosystem services such as protection against floods, soil erosion, avalanches, and landslides can be considered club resources (of positive value). In the relevant local setting it may be difficult but not impossible to exclude consumers individually from enjoying the benefits of such services. The benefits themselves are non-subtractable. Often such benefits

are maintained by one or more individuals refraining from removing material benefits like forest cover or water. If the maintenance of the environmental capacity to provide services is jeopardised, the bad that follows will be a common pool bad similar to the toxic emission. Usually it is assumed that there are thresholds for forest cover and water tables below which there is a rapidly increasing probability of catastrophic reorganisation of the environment with repercussions propagating along the queue from the point of reorganisation. Thus, in this case lack of maintenance of the club good transforms it into a common pool bad.

Protecting/enhancing recreational, symbolic, and information values

Landscapes providing recreation are club resources. For recreation you have to enter the landscape to enjoy it, hence exclusion is possible even if difficult. The enjoyment is not subtractable. However, it is subject to crowding. With increasing crowding above some threshold the enjoyment tend to become increasingly diminished. The discomfort is experienced uniformly throughout the club (except for individual variations in tolerance of crowding).

Landscapes giving symbolic values (heritage sites) or scientific information values (nature reserves and other protected areas) are basically public goods as long as their existence values are emphasised. A resource such as knowledge is non-subtractable and there is no rivalry in its consumption unless patent legislation introduces such rivalry. By awarding patent rights to some piece of information about the genetic diversity the public goods character of the information is transformed into a private good. If one has to visit a particular locality to enjoy the information or symbolic value vested in the landscape it becomes a club good similar to recreation.

Comment

It is interesting to note that environmental goods and services can be seen as club goods as long as they are maintained, but that they transform into common pool 'bads' if the service or good is not provided any more. This means that the theory of commons will be interesting for pollution management. Cleaning up an environment entails the collective action problems studied in the theory of commons. Maintaining the desired level of non-pollution of an environment entails the problems encountered in maintaining a club. For ecosystem services depending on the non-usage or stunted usage of traditional resources such as forests or water, the collective action problems of common pool resources are present in the 'production' of the goods and services. The specific persons or groups holding rights to these resources bear the cost. It would seem reasonable that their forgone income were compensated. But since the benefits of the resulting ecosystem goods and services have the character of a club good this entails the problem of free riding for its production. The costs of production have to be covered in ways avoiding the possibilities for free riding.

This link between traditional resources (water, forest) and the ecosystem services is of general interest. Recreation and biodiversity will for example depend heavily on how traditional resources are utilized. The interdependence of many of the goods and services of different types is in one sense obvious. But is it acknowledged by the legislation? And where it is acknowledged, how is it dealt with?

PROPERTY RIGHTS TO ENVIRONMENTAL GOODS AND SERVICES

Analytical studies of the management of natural resources rely on contributions from many disciplines (theories of collective action, theories of neo-institutional economics, theories of the construction of social reality, theories of cultural evolution, and theories of ecosystem dynamics). Currently they seem to be converging on the study of the creation, maintenance,

and transformation of property rights⁹ to explain and understand empirical regularities in the rather frequent failures of natural resources management efforts.

We noted above that while an acceptable level of environmental goods and services were maintained they could be classified as club goods. This means that since all members of the club will enjoy the benefits, the problem of crowding has to be monitored and controlled by membership. A club good differs from a pure public good only by being local in relation to the surrounding social system. Local public goods may be produced and managed by either private or public actors. Public actors will usually be able to cover the cost of production by taxing every member of the club. For private producers of club goods a diversity of mechanisms have been identified (Olson 1965, Cornes & Sandler 1986), usually combinations of membership fees bundled with suitable private goods.

For environmental goods and services the efforts or expenditures required to maintain the level of service will in most cases appear as incomes foregone by not exploiting goods like forest or water. These costs are not evenly distributed. Depending on the distribution of property rights to the traditional resources, the level of conflict around the institution of new public regulations will vary. If the club is to be a private undertaking (a private recreation area) the organisation must either include landowners and other stakeholders or in other ways accommodate their interests to align incentives for maintenance and enjoyment. One would expect that environmental goods and services should be the task of local public actors with powers to tax its constituency.

CONCLUDING REMARKS

At the outset it was assumed that there was a difference between values where there is rivalry in appropriation and values where there is non-rivalry. The discussion has basically confirmed this. Perhaps more importantly, the discussion has shown that the characteristic of rivalry is not static. It changes with how the context is defined or interpreted. Genetic information may be a public good or it may be a private good depending on the institutional setting. Thresholds in use or enjoyment may also trigger shifts in the character of a good. The club good of a clean environment may at a certain level of pollution become a common pool bad.

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⁹ In the Anglo-American world rights and duties in relation to land and resources are for historical reasons usually referred to as tenure rights. Here they will be called property rights. Property rights will also be taken to comprise the customary usufruct rights to resources as well as the statutory rights and duties enforced by state authorities.

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