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Common Property Debate: A review

In December 2008 40 years will have passed since Garret Hardin's article on "The Tragedy of the Commons" was published. These days our changing climate is at the top of our mind. The tragedy of the atmospheric commons is a fact. Global commons such as the atmosphere, the Polar Regions, and the oceans have reacted to our unrestrained use of them. We have known for a long time that something needs to be done. But what should be done? How can we avoid destroying commonly held resources? The problem is old, the debate is old. The present article is an attempt to survey the debate on the commons. What have we learned? As a start it may be useful to distinguish between the political debate and the academic debate, even if it is academics that conduct both.

The political debate on the commons

The political debate on the costs and benefits of commons can trace its history at least back to 1236 when the English Parliament enacted its first law on enclosure. Many more acts followed. In the hundred years preceding the 1836 act it is estimated that some 4000 acts on enclosure were passed (Pugh 1953, Halsbury's Statutes of England , Third Edition 1968). The 1836 act heralds a shift of interest. The last act on enclosure is dated 1876. The long history of enclosure of English commons provided constant fuel for a passionate debate on the moral and ethical aspects of excluding poor people from access to land.

During the early 19th century enclosure of the commons had very strong ideological support (Kingston-Mann 1999). Many pamphlets argued the virtues of private property and the "improving landlord" was the hero of the day. One strong enthusiast was Arthur Young. His conviction had little to do with the facts of on the ground. He noted on several occasions the "inexplicably" good crops obtained from open field cultivation but continued to insist on the superiority of the enclosed fields. He left behind meticulously gathered data and recent analysis of these (Allen 1992) shows no difference in productivity between enclosed and unenclosed fields.

The politics of enclosure with its emphasis on property rights in the context of markets is seen as part of liberalism. Since the 1980ies a new surge of liberalism has been concerned about privatisation of various public utilities and services. This neo-liberal political agenda has had a strong input from the commons debate. And the politics of enclosure for example in the ocean fisheries has been affected and shaped by the broader neo-liberal discourse (Mansfield 2004).

The driving force for enclosure was hardly economic need. Scott (1998) presents the case for individualization of lands from the perspective of the early modern state. The driving force for the state was a need of an information system useful for taxation purposes more than any concern about productivity. This entailed not only mapping land and awarding title to persons. Even more important was that land was linked to *identifiable* persons. But of course, the top bureaucrats were as convinced of the economic benefits of enclosure as their contemporary academics. But by the mid 18th century enclosure was basically a dead horse in the polities of

Western Europe. Protecting old commons and creating new ones was the new agenda (Berge and Carlsson eds. 2003). But the belief in enclosure remained in thought styles and attitudes. A majority of academics seemed to hold a general and deep-seated mistrust of the commons.

In the last century the commons enclosed were the customary lands of developing countries. And the debate continued. In conjunction with the report of World Commission on Environment and Development (WCED 1987) and the Earth Summit in Rio in 1992 The Ecologist (1992) published a passionate indictment of the long history of enclosure. However, the World Bank's faith in individual titling schemes seemed unshaken.

The current ongoing episode in this debate was triggered by Henrando de Soto's (2000) book on "The Mystery of Capital. Why Capitalism Triumphs in the West and Fails Everywhere Else". De Soto does not write about the commons. He writes about property rights for poor people in urban areas in developing countries. He writes about the extra-legal sector, in matters of land tenure usually seen as a core sector of customary law.

De Soto's book is a popularisation of what many scholars of land tenure and property rights think they know about the role of property rights in economic development. It says some important things, and at difficult points in the argument it is appropriately vague. The book is very readable and, apparently, many read it. In 2005 it inspired some influential persons to start the High Level Commission on Legal Empowerment of the Poor. The creation of this commission and the appointment of de Soto as co-chair with Madeleine K Albright sparked a loud reaction. There are now several web sites devoted to critiquing the commission. The foremost critique is that enclosure of agricultural land can only lead to increased poverty. The poor will not benefit from yet another land titling exercise. Other critical points concern the missing participation in the commission by poor people, indigenous people and women.

If de Soto's book is read by those who believe that introduction of land titles will be a starting point for a positive economic development process it probably is sufficiently unclear that a superficial reading of it may confirm their belief. The book does not actually advocate land titling, at lest not in the way it usually has been done. But it does advocate formalisation of property rights. De Soto's advice is to formalise the customary law. He writes:

> "Where have all the lawyers been? Why haven't they taken a hard look at the law and order that their own people produce? The truth is that lawyers in these countries are generally too busy studying Western law and adapting. They have been taught that local practices are not genuine law but a romantic area of study best left to folklorists. But if lawyers want to play a role in creating good laws, they must step out of their law libraries into the extralegal sector, which is the only source of the information they need to build a truly legitimate formal legal system" de Soto (2000:187).

I have no problems agreeing to this. This is how it should be done. But I know of no titling program in developing countries having tried this approach. So, why not try to follow de Soto's advice? Why do we get an automatic indictment of any formalisation scheme? The question will not be resolved here. But as the debate stands it brings to mind earlier debates on the commons.

I have two kinds of problems with the political indictment of formalisation. My first problem is the emotional way of arguing. I do accept that injustice was done and needless suffering resulted. I do see that powerful factions use all kinds of means including enclosure to bolster their power and increase their wealth. My sympathy lies with the poor and oppressed. But still there is more than a little doubt about the aggregate result of what actually happened on the ground, particularly in European history. In European history the counterfactual argument that

it would have been better if nothing had been done is not in general very persuasive. Neither is it convincing to argue that it should have been done differently. Intellectual models for improving the world have a record of backfiring. It is conceivable that doing it differently might have produced considerably worse results. There is one unexplored difference in the enclosures in European history: that between enclosures allowed to develop within a customary law context and enclosures that were engineered by the state. I have a hunch the latter were considerably worse than the former. In developing countries it is even more difficult. We know the failures of centrally designed titling schemes. But the locally developed enclosure processes are almost invisible (Benjaminsen and Lund 2003). So there is doubt about what really happened and what still is happening on the ground. What was, and what is the alternative to enclosure?

My second problem is intellectual. How is it possible to read de Soto and find confirmation for the idea that a standard titling exercise will be the solution to poverty? Why is there no development in political beliefs about property rights and resources? Why is the reaction to de Soto basically the same as the reaction almost 40 years ago to Garrett Hardin's essay on "The tragedy of the commons"? Is there nothing to be learned from the empirical investigations and theoretical development in between?

Hardin's metaphor of the tragedy of the commons was taken to provide solutions to all kinds of problems ranging from forest destruction to chronic under-funding of public health. For some people the obvious solution was enclosure or privatisation, for other people it was equally obvious that state ownership and control was the solution. Well, de Soto's book probably does nothing much for those who believe in state property. But I am left with a strong impression that eloquent and imprecise prose makes it possible to read into texts just the kind of conclusions that suits a person's already established world view. This implies that the Thomas theorem applies: if people believe something to be real, it will have real consequences. If people believe the tragedy of the commons is happening, efforts to avert the tragedy may easily create or compound the tragedy. To understand and improve on the political debate politicians need better concepts of what links there are between land tenure and poverty. Politicians need to learn from the academic debate on the commons.

The academic debate on the commons

The modern academic debate about the commons started with Garret Hardin's 1968 article "The Tragedy of the Commons". After this article the problems of resource destruction such as over-fishing, land-erosion, forest- and pasture-destruction, and environmental pollution of all kinds were associated with the commons through the metaphor of "Tragedy" that he introduced. For a time it seemed that most unwanted outcomes of human activities could be used as examples of the tragedy of the commons. And no matter what the problem was, the solution proposed was either privatisation or state property and control. The commons was "a priori" seen as the problem. The impact of this article on science and policy debates in the ensuing decades can rival that of Rachel Carson's (1962) book "The Silent Spring".

Hardin was arguing about unsustainable population growth. In 2003 the editor of Science observed:

> The population/resource collision has only grown more important since Hardin's *Science* essay. Earth's population then was about 3.5 billion; it has since grown by a factor of nearly 2, to 6.3 billion. That growth, amplified by global increases in affluence and the power of technology, has brought escalating pressures on "common-pool" resources such as air, fresh water, and ocean fisheries that are accessible to many potential harvesters who can extract

> marginal personal benefits at a cost that is low because all other harvesters share it. (Kennedy 2003)

The ultimate cause of our problems is population growth, but the proximate cause is the faulty management of common pool resources: harvesters are able to extract marginal personal benefit at low cost since costs are shared by all harvesters. There is a discrepancy between the individual incentives and the outcome for the group of harvesters. It is today taken for granted that the tragedy applies to open access resources.

But this topic, the sustainability of open access resources is, as usual for important problems, older. The basic problem was described by Hobbes in his 1651 study "Leviathan". In 1819 Jane Marcet, an early populariser of science, shows in her publication "Conversation on Natural Philosophy" that she is conversant with the idea of the incentive problems of the open access resource (see quote in Baumol and Oates 1988:28 n23). In 1911 Jens Warming noted that the problem of resource depletion occurred in fisheries. More formalised models for resource depletion in fisheries were presented by Gordon in 1954. The problem was repeatedly discovered and described, but it was Garrett Hardin that got the attention of the scholarly community. In 1968 it was an idea whose time had arrived and it kicked off not only policy debates but also a new research agenda.

The debate was from the start marred by conceptual problems, some semantic and some theoretic. In 1992 Daniel Bromley concluded that "it would be difficult to find an idea (that is, a concept) as misunderstood as 'commons' or 'common property' "(1992:3). The word commons was used to denote those parts of the physical environment that were not owned privately or by the state or closely regulated by the state. But the word commons had from old on also been used about an area where a group of people were using the resources jointly or in common. Some places the documented history of these commons could be counted in hundreds of years without causing resource or environmental destruction (Ciriacy-Wantrup and Bishop 1975, Netting 1981, Ostrom 1990). It became necessary to be more specific about what kind of commons one wanted to discuss.

The semantic confusion was compounded by hidden assumptions built into the concept of the tragedy metaphor. The discussion of the tragedy was based on some taken for granted assumptions about how actors think and the conditions for cooperation - or the lack of it - in resource management. Hardin's outline of the metaphor was at least based on single-minded profit maximisation, inability to communicate, and no common history for the appropriators. But neither the conditions for cooperation nor the various resources seen to be in danger were as simple as the metaphor of the tragedy assumed.

The catching metaphor of "Tragedy" became the focus for prolonged investigations and was eventually transformed to an integrated part of the theory of political action. But let me start with Hardin in 1968. What did he really say?

Garrett Hardin and the tragedy of the commons

In 1798 Thomas Robert Malthus published "An Essay on the Principle of Population". There he stated that a population always will grow faster than its means of subsistence. The population is kept in line with its food supply by positive checks such as natural causes (death, accidents), misery (war, famine, diseases) and vice (infanticide, murder) and preventive checks such as moral restraint (postponement of marriage and sexual abstinence).[1]

[1] See http://www.econlib.org/library/Malthus/malPop.html (accessed 13 April 2007)

There has been a continuous debate about this ever since. In 1967 the biologist Garrett Hardin took this as his point of departure for his presidential address to the Pacific chapter of "The American Association for the Advancement of Science". In 1968 a revised version was printed in Science as "The Tragedy of the Commons". The commons was the resources of the planet Earth and the tragedy was our inability to curtail the growth in population. But this is hardly what we remember when we talk about the "The tragedy of the commons". What we usually remember is his explication of why the tragedy occurs and his proposals for solution. Hardin (1968) explains:

> The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.
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> As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.
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> 1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.
>
> 2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of 1.
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> Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit--in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Hardin had seen that private ownership of land seemed to prevent destruction of pastures, and based on this he proposed that similar solutions ought to be found for population growth. Contrary to Malthus Hardin denies that moral restraint can be a solution. In the long run the group not practicing moral restraint would grow faster and replace those practicing moral restraint. Other mechanisms were needed. Just like we have agreed to respect each other's lands and to prohibit bank robbery, we need to reach an agreement about rules for the number of children we get, says Hardin. The only solution he can think of is "mutual coercion, mutually agreed upon by the majority of the people affected". Translated into modern social science he says that we need to develop democratic institutions that can balance population against resources.

The Tragedy of the Commons enters academic curricula

While Hardin focused on the population problem, the debate following his article has focused on the pasture owned in common. This is what references to Hardin contain. In text books on

resource management a discussion of the tragedy of the commons is almost mandatory[2]. But the quality of the discussion is highly variable.

Not everyone have kept up with the extensive research and the development of theory that has transformed the metaphor to an analytic model bridging the theory of collective action and the management of non-excludable private goods.

In an otherwise sophisticated textbook on "Ecological Economics" (Costanza ed. 1991) Colin W. Clark writes:

> "Three fundamental classes of anti-sustainability bias will be discussed: common ownership of resources, future discounting and effects of uncertainty. ….. The exploiters of a common resource stock have little incentive for conservation of that resource. Garrett Hardin, an American biologist, has called this the "tragedy of the commons" (Hardin 1968). His example was that of a common grazing ground: Each cattle owner will tend to add to his herd as long as doing so increases his income. But when all herders do the same, the inevitable result is degradation of the land and ultimate impoverishment of all herders." (p.321)

Clark takes for granted that it is the exploitation without any institutional structure that defines the commons[3]. Probably he has the global commons in mind, and the solution he sees is "Some form of, or proxy for, private ownership of the resource seems essential, although community ownership might succeed in some circumstances."(p.328). However, property rights imply support from the state and close management and control. The models do not distinguish formally between state ownership and individual ownership. The proposed solution to the tragedy is an institutional transformation from unregulated competition to single ownership. Single ownership may either be private or state ownership. Hence the choice of solution will be coloured by the ideological attitudes of the reader.

Already in 1975 Ciriacy-Wantrup and Bishop pointed out the important distinction between characteristics of the resource and characteristics of the ownership institutions governing the use of the resource. Colin Clark's discussion is not up to what one might expect in 1991. Hardin's article initiated a long debate between model oriented (basically economists and biologists) and empirically oriented (basically anthropologists and sociologists) researchers focusing on resource management[4]. Model people found the logic of Hardin's story convincing. If everybody behave as rational harvesters and maximise personal utility the final result will be catastrophe for everybody. This difference in outcome between individually and collectively rational actions fascinated most researchers and was formalised and eloquently communicated by the "Prisoners Dilemma". The resource users were trapped in situations formally congruent with the prisoner's dilemma. The metaphor transformed by game theory

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[2] Early examples are Bennett (1976) and Cotterell 1978. A more resent selection with various approaches are Pearce and Turner 1990, Bromley 1991, Meffe &Carroll 1997, Yandle 1997, Devlin and Grafton 1998 and Tietenberg 2000. Some relevant Norwegian publications are Jentoft 1986, Brox 1989, Stenseth, Trandem og Kristiansen (red.) 1991, Baklien 1995, Bates og Skogseid 1997, Pedersen 1998 og Skonhoft og Johannesen 2000. The level of scholarship in the discussions is very variable. Some textbooks discuss the problem of management in an unregulated resource without reference either Hardin or his metaphor (Fisher 1981, Hansen, Jespersen and Rasmussen 1995). But the tragedy of the commons appears also in more foundational discussions of the conditions for collective action such as in Hernes (udatert: ca 1985) and Hovi og Rasch 1993. Norwegian contributions to the international literature on the tragedy of the commons are rather few; but see Brox 1990, Hannesson 1996, Vedeld 1997, Sjaastad 1998, McCay and Jentoft 1998, Jentoft (ed.) 1998, Skonhoft 1999, Hønneland 1999 og Sandmo 2000.

[3] Other books treat the arguments about the commons more extensively, such as in Bromley 1989, Bromley 1991, Ellis 1993 and Tietenberg 2000.

[4] Hardin contributes to a survey of the situation in 1977 in Hardin and Baden (eds.) 1977.

had become a model (see Taylor 1987) and the distinction between model and reality became accepted (Brox 1990). A model is not so much right or wrong as it is more or less useful in a particular investigation and the formal model of the tragedy of the commons proved useful in the study of what actually happens in various cases of resource management.

The debate had now made it possible to avoid the semantic problems. But, of course, it had also uncovered new problems. It was recognized that there are important differences between for example the large global commons[5] (such as fisheries) without any agreed upon or enforceable rules (these became know as open access resources or "res nullius") and the resource systems owned in common (or jointly) by a group of people who had both fashioned rules for the usage of the resource and were able to enforce those rules (a common property regime). The tragedy of the commons was said to apply to the open access resources[6].

The problem for most model people was – and may still be – the ability to discover rules and mechanisms of governance in resource systems owned in common (or jointly) [7]. The fact that model people basically are economists and biologists may not be a coincidence. Classical economic theory has profound problems introducing institutions as a variable in the models. The only institution they recognise is full private ownership of resources. Varian's (1999) discussion of the tragedy of the commons is for example similar to Clark's 1991 presentation. It is the pasture in full private ownership that is held up against the village where the pasture is held in some form of common ownership that apparently is seen as equivalent to an open access resource. The tragedy of the commons is expected to obtain in this kind of commons. Only at the end of his discussion will he admit:

> "Of course, private property is not the only social institution that can encourage efficient use of resources. For example, rules could be formulated about how many cows can be grazed on the village common. If there is a legal system to enforce those rules, this may be a cost-effective solution to providing an efficient use of the common resource. However, in situations where the law is ambiguous or nonexistent, the tragedy of the commons can easily arise. Overfishing in international waters and the extermination of several species of animals due to overhunting are sobering examples of this phenomenon." (p.555)

The empirically oriented people were not much impressed by the model and its logic. They asked: "But is it true"? Hence they went out to look at pastoralists to see if they behaved the way the metaphor outlined. The pastoralists did not. A lot of these communities had been using their commons for hundreds of years without destroying their pastures (Netting 1981). People did not behave they way Hardin's metaphor of the tragedy of the commons and the simple model of the prisoners dilemma predicted. On the other hand evidence accumulated that the fishers of the large international fisheries were behaving this way. During the 1980ies this became accepted. In a much used textbook on resource management (Pearce and Turner 1990:357-8) it is said that

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[5] For more extensive discussions of global commons see Buck 1998, Keohane and Ostrom (eds.) 1995.

[6] In 1998 Hardin was looking back on the debate and concluded:

> "..,the weightiest mistake in my synthesizing paper was the omission of the modifying adjective "unmanaged." In correcting this omission, one can generalize the practical conclusion in this way: "A 'managed commons' describes either socialism or the privatism of free enterprise. Either one may work; either one may fail: 'The devil is in the details.' But with an unmanaged commons, you can forget about the devil: As overuse of resources reduces carrying capacity, ruin is inevitable."

[7] Schelling (1978) may illustrate these problems. He writes "Common pasture in a village in England or Colonial New England was not only common property of the villagers but unrestricted available to their animals." (p.111). This is certainly wrong for England (cpr. Neeson 1993) and one may reasonably doubt that it was the existence of commons that was the problem in New England (cpr. Cronon 1983).

> "Much of the literature based on this idea[8] is overly simplistic, but the main germ of the idea has validity. Several observations are in order:
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> 1. Common property regimes are not static or homogeneous. There are many examples of them working well and, in particular, working well in terms of sustaining the stock of natural environmental capital on common land. What matters is the set of communal rules applied to each person and the sanctions for breaking those rules. In many African contexts there are close, effective rules of social cohesion which guarantee proper resource management.
> 2. The "tragedy of the commons" is more aptly applied to *open-access* resources i.e. those for which there are no communal rights at all. Such an arrangement is distinct from common property arrangements, and while economic theory would predict that some open-access resources can achieve equilibrium short of extinction, it is clear that these resources are at grave risk of destruction.
> 3. Privatisation often occurs "naturally" as land starvation sets in and opportunity cost of overgrazing and resource over-use becomes clear. Privatised ownership is more widespread than might appear. Moreover, common-property systems frequently contain significant household and farm rights on an individual basis.
> 4. Many changes in pastoral societies are nonetheless altering some common property back to open-access resources. Factors of relevance here are improvements in transport for people and animals, government declarations making grazing land public property, competition between ethnic groups, loss of social cohesion in rural areas and rapid population growth.
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> Blanket recommendations that common-property regimes be replaced by privatised ones are simplistic. Too little is known about costs and benefits of changing tenurial regimes and there is little option but to approach the issue on a case-by-case basis.

In a survey of "The Public Economics of the Environment" Agnar Sandmo agrees:

> "The Coasian approach to the solution of the tragedy of the commons would be to establish property rights in the resource base so as to create better incentives for its long-run preservation. However, one should be careful about identifying such property rights exclusively with private property as usually conceived. It is tempting to conclude that in the absence of private property there is no one who takes an ownership interest in the common resource. But it has been documented, notably in the work by Ostrom (1990), that there exists a variety of institutions for regulating the use of common property, so that the absence of private property rights does not automatically imply that the resource in question will be overexploited. When this happens, it may well be that the best reform is not privatization, but rather the development of better institutional forms for collective management." (Sandmo 2000:142)

Probably the most problematic aspect of the history of the tragedy of the commons is precisely this: the automatic recommendations of dividing the commons into individually owned parcels or to institute state ownership. One may speculate that the popular appeal of the metaphor originated with the fact that the proposed solutions of private ownership or government control "fitted" too well to a conception of a liberal capitalist economy on the one hand and on the other a social democratic conception of the state as a benevolent entity responsible for sustainable resource exploitation. If people noted a problem of resource management the metaphor provided an explanation and the solution was already a part of one's ideology. No more was needed for intervention. The fact that the interventions as often increased the problems they were supposed to solve was difficult to discover for both development consultants and politicians. It is a common failure of public policy to forget about the evaluation of outcomes (see Gibson et al 2005).

The Tragedy of the Commons and the frontier of research

Between 1968 and 1987 the knowledge about the tragedy of the commons grew significantly while the popular interest waned. But with the report of the Brundtland commission (WCED

[8] The tragedy of the commons metaphor.

1987) the popular interest in the phenomenon returned[9] and new scholarly investigations were initiated. The studies were pursued along several lines:

1. conceptual development: actors, goods, institutions
2. embeddedness of commons: community, state, ecosystem
3. case studies of historical development: long lasting sustainable use,
4. modelling rational action and social dilemmas: actor models vs rationality, evolutionary models of institutions

1. Conceptual development

Types of goods and types of management regimes

Pearce and Turner makes good use of the distinction between resource system and property rights regime (resource tenure). An equally important classification was introduced by Elinor and Vincent Ostrom in 1977. They proposed a typology of four types of resources and provided a discussion of which kind of property rights regime would be most appropriate for each type. It conforms to our intuition that a private property regime ought to fit with "private" resources and that a common property regime out to be suitable in those cases where it would be difficult or very costly to exclude users from a resource where the resource units were subtractable from a pool. And of course state ownership for public goods.

Table 1 Typology of goods

resource is	appropriators are: excludable	non-excludable
subtractable	**PRIVATE**	**COMMON POOL (POSITIONAL[10])**
non-subtractable	**CLUB (TOLL[11])**	**PUBLIC**

Source: Adapted from Ostrom and Ostrom 1977

The simple intuitive links between type of good and property regime was of course too good to be true. In this classification as well is there semantic confusion (McKean 2000). The usage of "private for both a type of good and a type of regime can only lead to confusion. One may list types of actors, types of goods, and types of property rights regimes beside each othe as below.

Table 2 Classifications of actors, types of goods and property rights regimes

Type of Actor	**Type of Good**	**Property Rights Regime**
Individual (private)	Private	Private
Collective (private or public)	Common Pool	Common (private or public)
State (public)	Public	State (public)

Listing them like this may easily make us think that each line belongs together. But one does not have to consider details of the property rights regimes for long before one see that all can be linked to (almost) all. For example: the state may be linked not only to public resources

[9] In 1991 the UNESCO journal 'Nature&Resources' had a special issue devoted to "Managing our common resources", Vol.27(4), and in 1992 'The Ecologist' presented their special issue "Whose Common Future?", Vol.22(4).

[10] For resource management "common pool" conveys the intended characteristic. But the non-excludability for a common pool good is not absolute. However, there are absolutely non-excludable, subtractable goods such as some status indicators (e.g. the rank order of the consumer in a queue). These goods might usefully be called positional goods, see Hirsch 1977.

[11] Ostrom and Ostrom label these goods "toll goods". But there is now an established theory of clubs that fits with this typology, see Sandler 1992, Cornes and Sandler 1986-

(roads) but also to private resources (office buildings for state bureaucracies) and common pool resources (fish in the ocean, forests in the mountains). The state can as an actor operate in all property rights regimes: private, commons and state. Individuals and collectives can of course not operate within the state property regime, but a collective can be responsible for private goods, common pool goods, club goods and public goods. This makes the discussion of the tragedy of the commons rather more complicated. The dynamic of the model must apply both to private and common pool resources. And indeed, there are examples of resource destruction of privately owned resources. However, then the destruction is not labelled "the tragedy of the private lands" but it is explained by the owner having "too high" a rate of discounting. But rate of discounting can of course, as Bromley (1989) shows, be discussed as a problem of allocation of property rights. Should future generations be given rights in our current resources?

2. Embeddedness of commons

The theory of collective action is at the outset both abstract and ahistorical. The early empirical studies made abundantly clear that resource users do not exist in isolation. They are members of communities and communities are embedded in a state and all have a history. Model oriented studies had so far not been able to handle any of this. Modelling of the developmental dynamic without explicitly taking history into the study would not be helpful. This has been observed many times and in several ways. McCay and Jentoft (1998) ask for "thick" description of local communities of commons users, seeing this as a necessary part of efforts to understand both success and failure of commons regimes. They warn against becoming so focused on the failure of the open access resource that one does not see how failures at the community level such as lack of trust and ability to cooperate also can result in tragedies of the commons. They identified three types of failure: the market failure of the open access resource, community failure and state governance failure.

Market failure

The first models of resource appropriation in an open access resource predicted tragedy (e.g. Gordon 1954). The situation is called market failure since it is explained by missing incentives for optimal resource allocation (property rights). Without any way of valuing outputs and trading off against costs across actors resource destruction can proceed without any individual incentives for checking its course. The model describes a situation without history. But resource use definitely has a historical dimension.

Community failure

Communities and groups of people organising resource usage have a history where some institutions have been adapted to the natural environment during generations of trials and failures. In some cases failures accumulate across generations. For political action this is important. Repeated failures to establish cooperative solutions in the commons erode norms of cooperation and makes the next effort that much more difficult. While market failure (lack of property rights) in principle can be remedied by appropriate legal reforms, failure in the cooperative norms, attitudes, and sentiments among resource users is much more difficult to change by centrally designed interventions. In the worst case scenario interventions to alleviate a perceived market failure will not only fail (lack of property rights was not the real problem), it will also make the situation for the local resource users worse by destroying the system of customary rules in force and make a contribution towards the creation of the homo economicus actors that in the next generation will produce the tragedy-

Governance failure

In 1998 Sneath published a very graphic illustration of how national policy can impact resource usage. Studies of satellite photos of the pastures on the border between Mongolia, Russia and China show seriously degraded pastures in both Russia and China but not in Mongolia despite the fact that it is Mongolian nomads that use the pastures in all three countries. The most significant difference between the nomads in the three countries is that those living in Mongolia basically have been left to govern their pastures on their own. Both Russia and China have had active policies to assist the nomads becoming sedentary through large state owned farm enterprises (in Russian "sovkhozes") and industrial production of fodder. The conclusion is that interventions by the state have to be tailored to both the culture of the local resource users and the ecology of the area. It is a failure of governance not to factor these two basic conditions into the intervention. The result may be as tragic as Sneath documents. Many will say a similar failure of governance has obtained in Norway in the Saami reindeer pastures, particularly in Finnmark (Eggertsson 1998).

3. Case studies of historical development and institutional design

Theoretically informed studies of cooperation in management of common pool resources

The most important development in relation to Hardin's metaphor did not come from theoretical modelling, but from empirically oriented investigations of the rational actor assumed by the model of the prisoner's dilemma. The rational actor has been a foundation for neo-classical economics. But its restricted assumptions have also been under continuous critique (cpr. Hardin 1982, Cook and Levi 1990). Today there are serious attempts to reformulate "Microeconomics" with more empirically oriented assumptions about behaviour (Bowles 2004). The debate on the tragedy of the commons contributed significantly to this development by the accumulation of empirical evidence (mostly from history and anthropology) showing that people in many situations do not behave as the theory predicted[12]. People are very often capable of fashioning the mutually coercive rules that Hardin sees as necessary. And people are able to do this on their own without the intervention of "Leviathan" as Hobbes saw as necessary. But the studies also identified situations where people seem to be unable to fashion the necessary rules.

The most problematic situations, those similar to the prisoner's dilemma in decision structure, were labelled social dilemmas. If all actors were behaving as rational actors each one would end up with less utility than what might be feasible with a different (by definition non-rational) strategy. Sometimes people were able to fashion rules helping them overcome the dilemma, sometimes they were not. What circumstances would be conducive to fashioning the necessary rules? This was the point of departure for Elinor Ostrom's influential study "Governing the commons". By a theoretically informed study of cases of long lasting commons and comparing them to cases of short lived commons could she distil some common rules for fashioning long lasting management systems (Ostrom 1990:90):

[12] See for example McCay and Acheson (eds.) 1987, Berkes (ed.) 1989, and Bromley (ed.) 1992. Feeney, Hanna, and McEvoy 1996 summarise this development in relation to its consequences for the management of fisheries.

Table 3 Design Principles of Long Lasting and Well Working Management Systems for Common-Pool Resources[13]

1. Clearly defined boundaries: geographically of resource system and socially of user group(s)
2. Congruence between benefits and costs given the local conditions
3. Collective-choice arrangements are available for participants/ users
4. Monitoring of users and conditions of resources by people responsible to the local community
5. Sanctions of rule breaking are graduated
6. Conflict resolution mechanisms are available with rapid access and at low cost
7. Local rights to organize the resource usage has a minimal recognition by external authorities
8. Nested enterprises if the local resource system is part of a larger system

Source: Elinor Ostrom, 1990 "Governing the Commons. The Evolution of Institutions for Collective Action", Cambridge, Cambridge University Press, page 90.

Institutional Design

The many common property regimes studied showed upon closer inspection large variation (Berkes ed. 1989, Bromley ed. 1992, Berge 1996, Sevatdal 1998). In addition it became apparent that new (regulated) commons were created for example in Portugal (Brouwer 1995) and in Norway (NOU 1997:4, Berge and Carlsson eds. 2003, Berge 2005). Of particular interest are empirical observations of long lasting commons regimes (Ostrom 1990, 1995, 2005, Hanna and Munasinghe eds. 1995b) seen in relation to theoretically oriented studies of how to design good democratic law (Ostrom, Feeney and Picht eds. 1993, Goodin ed. 1996). One important approach is the development of more formal models of rule systems (Crawford and Ostrom 1995, Ostrom 2005).

Typically this research, as in other approaches, increasingly goes into details. For institutional design studies this means attention to the evolution of legal frameworks. Formal (statutory law) as well as informal (customary law) rules need to be linked to field observations of actual resource usage (see e.g. Brouwer 1999). One has to go into specific resource management systems to see how characteristics of the resource interact with details in the property rights regime (see e.g. Kooiman, van Vliet and Jentoft (eds.) 1999 on fish and Gibson, McKean, and Ostrom (eds) 2000 on forest).

4. Modelling rational action and social dilemmas

Developing theory of collective action

The subtitle of Ostrom's book is important. The book is about "The Evolution of Institutions for Collective Action" and confronts empirical observations with theoretical predictions from the theory of collective action (Olson 1965, Axelrod 1984, Taylor 1987). The general conclusion is that neither field observations of the performance of commons[14] nor laboratory studies of how people behave in relation to a common pool resource[15] suggest that the tragedy of the commons is inevitable. The theory is correct in some cases, but is in need of revision in other cases. The assumptions going into the actor model needed modifications. The theory of rational action needed expansion to account for collective action in social dilemmas.

Studies of the problem of cooperation among rational actors had a point of departure in Mancur Olson's (1965) study of "The Logic of Collective Action" (see e.g. Sandler 1992, 2004, Ostrom 2003). Cooperation is not something that can be taken for granted. At least

[13] For a resent update Ostrom 2005 chapter 9
[14] For surveys see Ostrom 1990, 1998, Baland og Platteau 1996, Platteau 2000
[15] For surveys see Ostrom, Walker, and Gardener 1994, Gintis 2000, Camerer 2003

since Hobbes (1651) cooperation among independent actors has been a core problem for political science. Is it possible to find an alternative to the central coercion enacted by the state, that is Hobbes' Leviathan? Yes, said Ostrom; Walker, and Gardener (1992) in their article "Covenants with and without a Sword: Self-governance is possible." In this article, and later in the book "Rules, Games and Common Pool Resources" (Ostrom, Walker, and Gardener 1994), they supplement earlier field observations with experimental studies of cooperation in social dilemmas.

Experimental studies

The first research frontier where the tragedy of the commons has affected the theory of rational choice is experimental studies of decision making in social dilemmas. In experimental studies an established model for the management of a commons (such as classical rational action in game theory) is applied to a series of different decision contexts on cooperation or defection varying systematically the parameters suspected of affecting the outcome. The idea is to discover what conditions encouraged cooperation to achieve socially optimal outcomes rather than defection into individual profit maximising strategies.

Experiments suggested early that there may be different types of actors. In a population one should expect to find one small group behaving as pure egoists (homo economicus) and another small group behaving altruistically, but with the bulk of the population somewhere in between. This large middle group was seen as conditional cooperators. One might call them rational opportunists or conditional altruists. But these distinctions soon became too course. Today there is a long list of actor models providing alternatives to homo economicus (the self-regarding sociopath of neo-classical economics) such as homo egualis, homo reciprocans, and homo parochius (Gintis 2000). This work on expanding the repertoire of actor models is closely related to efforts at modelling an evolutionary dynamic for cooperation in general (Gintis 2000) including also commons management (Richerson, Boyd, and Paciotti 2002)

Experiments suggest that if a resource appears to have characteristics like a common pool resource behaviour will be different compared to similar situations with private goods. In particular the use of norms of reciprocity appears to be important for establishing cooperating coalitions. If sanctioning was permitted coalitions of cooperators would often be able to dominate those who consistently behaved as homo economicus. A long series of experiments demonstrate clearly the importance of duration of play, system of communication, ability to sanction co-players, and possibility for fashioning new rules. All factors are central to the kind of cooperative outcomes one obtains (Ostrom 1998). If participants are able to communicate, the level of cooperation increases. Face to face communication ("cheap talk") works better than written messages. This is taken to mean that non-verbal communication is essential for establishing a reputation as a trustworthy player. Theoretically it was expected that plays without any perceived endpoint would be able to encourage cooperation (cpr. the tit-for-tat strategy in the repeated prisoner's dilemma game, Axelrod 1984). The longer the play lasted, the more cooperation was found but with a significant drop in cooperation in the last rounds of the play. The larger the payoff in the game, the lower the level of cooperation was found. With an ability to sanction defectors the level of cooperation increased significantly and in some cases it approached 100% (Fehr and Gächter 2002).

Use of experiments to test out the link between marginal changes in behaviour and marginal changes in institutional determinants is now well established as a useful tool. In particular the interplay between field studies and experiments has provided rapid progress (Janssen and Ostrom 2006). During the last 10 years experiments in collective action have been taken back

to the field with real users of the commons participating (Henrich & al. eds. 2004). These studies revealed much greater variation in experimental outcomes than earlier studies. But the variation in outcomes is substantially consistent with variation in culture and social structure. No case support the homo economicus assumption. The internal variability of egoists, altruists and conditional co-operators remained as in the original studies. It is suggested that this fact might support an assumption about a common distribution of some kind of basic predispositions to act pro-social or anti-social.

Rational choice theory

The development of new models of rational choice has been fuelled by long series of both field observations and experimental studies. These document actual behaviour in social dilemmas as consistently different from what the simple model of homo economicus predicted. Rationality is no longer seen as equal to the narrow self-serving strategies of homo economicus but is seen as the most efficacious pursuit of any given goal. This may, as shown by Gintis (2000), just as well be equality among community members (homo egualis), the intentions community members show each other (homo reciprocans), or protection of a community against intruders (homo parochius). An important conclusion is that a model of rational choice needs to be able to accommodate heterogeneity in preferences among actors. There are also efforts to make these models dynamic with the preferences determined at least partly by the history of the individual including both individual learning ability and the institutional (structural) characteristics of the situation. Model studies show convincingly that the aggregate characteristics of a population are sensitive to marginal changes in the distribution of preferences as well as institutional structure. The result is a kind of co-evolution of preferences and institutions (Bowles 2004).

Modelling development

A second research frontier where new models of the tragedy of the commons play a key role is the study of the historical dynamic of specific resource systems. Questions addressed are both more specific ones about sustainability and management (Eggertsson 1992, Higgs 1996, Moor, Shaw-Taylor, and Warde 2002) and more sweeping ones about the evolution of resource tenure systems and relation to economic growth (Baland and Platteau 1998 and Platteau 2000)[16].

The standard evolutionary theory of property rights explains the development of property rights as a process of increasingly detailed and well specified (implicitly assumed private) property rights. The process is driven by resource scarcity and competitive advantages from lower transaction costs. There have been raised critical questions about this theory. Four problems have been pointed out (Platteau 2000:92-112). The theory relies heavily on efficiency as an engine of historical change. Exactly how this is possible is not discussed. There are three questions to the substance of the theory. One is about the lack of a state. As Sneath (1998) demonstrates the activities of the state can affect resource management in decisive ways such as pushing it in the direction of a tragedy. The second question points out the theory's missing link to effects of different levels of social capital. As pointed out by McCay and Jentoft (1998) community failure due to lack of cooperative norms and values is one road to the tragedy. Development of specific societies will usually follow a path heavily conditioned by their past institutions (North 1990, 2005, Landa 1997). The ability to institute marginal institutional change to improve resource management depends on the social capital inherited from earlier attempts to deal with similar problems. The third question concerns the

[16] Early contributions are Boserup 1965, North and Thomas 1973, Dahlman 1980, and Hayami and Ruttan 1985

distributional consequences of enclosure (the individualisation of resource control and access). Actors are not in general motivated by "efficient" equilibrium solutions in an economy, not even of Pareto optimal allocations. People are basically interested in what they themselves and their community have left when a day's work is at end. These questions are of course related to the developments within rational choice theory (Baland and Platteau 1997).

The Tragedy of the Commons at the start of the twenty-first century: what have we learned?

Based on specially invited papers for the 8th conference of IASC in 2000 two books appeared: "The Commons in a New Millennium" (Dolšak and Ostrom eds 2003) and "The Drama of the Commons" (Ostrom et al eds. 2002). One of the challenges they identify for the new century is to design institutions that can enclosure the open access global resources: the atmosphere and the large international ocean fisheries. It is necessary to avoid the tragedy. From its metaphorical start in 1968 the tragedy of the commons debate developed into a theory and helped transform the theory of collective action. Empirical and experimental studies had demonstrated that the tragedy outcome perhaps was rare, but it was in some cases a reality. Its translation into game theory made it a core element of three avenues of research: rational choice theory, historical dynamic of development and the theory of institutional design. Hopefully we know enough about the links between the welfare of resource users and dynamics of resource usage to avoid the old mistakes in the politics of enclosure.

The studies of commons have taken us to a point where I think we can give some good advice to those who want to change existing management systems. Changing a management system means changing the property rights. Even just introducing regulations of environmental services change property rights.

If, and when, governments want to change property rights there are some issues that need to be considered. One question that needs to be considered carefully is the purpose of ownership. Acting as a trustee, as most public ownership is about, requires a different institutional environment than ordinary ownership. Another issue is the choice between individual and collective ownership. There are good arguments for preferring collective ownership if for example:

1. Resource characteristics and available technology imply that it is impossible, difficult or too costly to exclude appropriators,
2. Resource interactions imply a necessity for appropriators to coordinate activities so that a commons regime will providing a setting for solving their collective action problems,
3. The problems of distribution of goods and equity in access to vital resources will be easier to solve. The commons may provide a safety net for the poor, and new generations.

In a choice between "resource" or "community" based management there seems today to be good arguments favouring the community approach. Both resource interactions and distributional problems within the community would suggest so. Also the role of uncertainty about dynamics of the local resource system and the importance of early information about changes in the resource conditions will favour a responsible local level governing body. In structuring the relation between the central state and local communities an approach where procedures and justice are emphasised by the state and local power of substantive decisions are exercised by the community might be recommended in many cases. In particular one

should think about how the legal framework might be shaped or changed from below without losing consistency with important global goals about human rights and welfare distribution.

The consensus today is that the tragedy of the commons is a real world process that may obtain in certain circumstances such as if

- management is impossible or too costly. Use of the atmosphere as a sink for pollutants is one example of this,
- shifts in technology of appropriation makes depletion of a common pool resource easier. The destruction of international stocks of fish such as the cod on the Great Banks of north eastern America is one example of this,
- shifts in access to markets for a common pool resource. There are abundant examples of how shifts in access to markets for timber have led to forest destruction,
- social dislocations (wars or natural disasters) drive populations into new territories with unknown dynamics or concentrate populations on small territories creating unsustainable exploitation. Besides wars and disasters also government policies involving large scale tenure reforms may have similar consequences.

Seen as a management regime the commons is of course necessary for a ”real” common pool resource But it is also recognized that it is the best management regime in several other situations, such as if moral and political choice dictates that all persons within a group shall have a minimum level of access to a resource system.

We must also recognise that in many resource systems, such as forests, the number and variety of useful resources within a reasonable ecosystem unit are so large that the size of a workforce for optimal use is considerably larger than a single family (even in its extended form). Allocating specific resources to different families may be done but usually one will find that resources are interdependent in ways that require collective action to organise use and maintenance. It is also recognised that the internal dynamic of some resources, or their spatial requirements require management systems spanning more time and space than individual humans can be expected to handle in a reasonable fashion. A commons regime may in such cases be a reasonable solution.

Finally we must understand that the dynamics of complex resource systems is unpredictable in ways that make central or state management difficult if not impossible with ordinary bureaucratic technology. A traditional commons organisation may be better than individual ownership in overcoming the inherent uncertainty of the resource dynamic, and transforming experiences into practical management decisions.

The Tragedy of the Commons in the Service of Capitalism

In the work to get the details correct it may be easy to loose the larger picture. The academic debate on the commons is embedded in the politics of resource access and control. Goldman (1997) raises a fundamental critique of the “commons thinkers”. Both those who have used Hardin’s metaphor and those who have criticised the metaphor and developed more sophisticated models where the tragedy occurs a special case have problems seeing the larger picture. They are bound by established thought styles or ways of thinking about development and modernisation. Most projects of the diverse portfolio of social, political and economic development projects are failures judged from substantial criteria. But they often do succeed in promoting values, ways of thinking and economic mechanisms that are particularly detrimental to the commons and their users. In this way the “commons thinkers” become, no

matter what they think about the tragedy, useful tools for the more destructive aspects of modern capitalist development[17].

Conclusion

Next year in 2008 it will be 40 years since Hardin published his article. At the thirtieth anniversary in 1998 several reviews appeared (Baden and Noonan eds 1998, Ostrom, Burger, Field, Norgaard, and Policansky 1999, Ostrom 1999), even Hardin (1998) took a look at his earlier work. He does not go into details. And at the general level he argued in 1968 and where he still is in 1998 he is probably right in concluding:

> "the weightiest mistake in my synthesizing paper was the omission of the modifying adjective "unmanaged". In correcting this omission, one can generalize the practical conclusion in this way: "A 'managed commons' describes either socialism or the privatism of free enterprise. Either one may work; either one may fail: 'The devil is in the details.' But with an unmanaged commons, you can forget about the devil: As overuse of resources reduces carrying capacity, ruin is inevitable."

Significantly he does not see the possibility that a commons managed by and for a collective larger than a household but smaller than a state can be a solution to the problem of tragedy.

My conclusion is that the theoretically important and exciting side to Hardin's metaphor precisely was found in the study of the details.

The first steps were to learn to differentiate between the resource and the management system, the governing system of property rights. During the 70ies and early 80ies this was achieved. Later in the 80ies and towards the end of the 90ies this was followed by development of models based empirical studies of how behaviour of resource users can be linked to the statuses of the resource. The metaphor of the tragedy of the commons became part of the theory of collective action. Parallel to developments in the theory of collective action studies in the dynamics of institutional systems gave insights into ways of promoting institutional solutions helping people overcoming the tragedy.

But during this period the catchy metaphor and the kind of half-baked insight it provided has caused severe and real problems for many people, particularly nomadic peoples. Well meaning development consultants and aid workers have tried to implement the insight about the real world they believed the metaphor provided.

One very important lesson from this must be to emphasise the distinction between model and reality. The distinction is as the metaphor and model of the tragedy of the commons shows, more than a methodological tenet. It is very clearly an academic version of the Thomas theorem: if academics believe a model is real, then the model will have real consequences. Academics need a more humble attitude to what they think they know. And if public authorities decide to intervene, the intervention should as far as possible be seen as an experiment where one does not assume a priory that intended results will obtain, but evaluate developments with the goal of learning and adjusting theoretical predictions as well as interventions based on observation of real developments.

Another important lesson is for the policy debate: the world is more complicated than participants in the policy debate would seem to think.

[17] The Ecologist's 1992 special issue "Whose Common Future?" argues this forcefully among many other rhetorically well argued criticisms of the enclosure of customary held resources.

In hindsight the most remarkable thing about the tragedy of the commons debate is how immediately the metaphor was adopted as a true description of reality by bureaucrats and politicians as well as academics more interested in models than in observations. The same seems to have happened to de Soto's advice about formalising property rights.

This observation raise questions about the education and world-views of professionals and reminds us about the need for empirical verification of the obvious "truths" we take from our world views to justify specific policy interventions. The simplistic and across the board application of "privatisation" as the solution to any and all problems of resource governance may have created more tragedies than it prevented.

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From Ostrom 2003
Netting identified five attributes that he considered to be most conducive to the development of communal property rights:
1. low value of production per unit of area,
2. high variance in the availability of resource units on any one parcel,
3. low returns from intensification of investment,
4. substantial economies of scale by utilizing a large area, and
5. substantial economies of scale in building infrastructures to utilize the large area.

In addition to the environmental variables discussed above that are conducive in the first place to the use of communal proprietorship or ownership, the following variables related to the attributes of participants are conducive to their selection of norms, rules, and property rights that enhance the performance of communal property-rights systems (E. Ostrom, 1993):
1. Accurate information about the condition of the resource and expected flow of benefits and costs are available at low cost to the participants (Blomquist, 1992; Gilles and Jamtgaard, 1981).
2. Participants share a common understanding about the potential benefits and risks associated with the continuance of the status quo as contrasted with changes in norms and rules that they could feasibly adopt (E. Ostrom, 1990; Sethi and Somanathan, 1996).
3. Participants share generalized norms of reciprocity and trust that can be used as initial social capital (Cordell and McKean, 1992).
4. The group using the resource is relatively stable (Seabright, 1993).
5. Participants plan to live and work in the same area for a long time (and in some cases, expect their offspring to live there as well) and, thus, do not heavily discount the future (Grima and Berkes, 1989).
6. Participants use collective-choice rules that fall between the extremes of unanimity or control by a few (or even bare majority) and, thus, avoid high transaction or high deprivation costs (E. Ostrom, 1990).
7. Participants can develop relatively accurate and low-cost monitoring and sanctioning arrangements (Berkes, 1992).

Today we may at least observe that the rich and powerful did not get it quite right. They did not manage to keep it all. Democracy did develop. And not many developing countries today can match England of the 17th century Black Act (Thompson 1975). This includes a wonder about the all encompassing concept of enclosure in the political debate on the commons. Even if it suits rhetoric it does not help in practical politics.