

# The Tragedy of the “Tragedy of the Commons”



Achim Lerch<sup>1</sup>

*“Le premier qui ayant enclos un terrain, s’avisa de dire, ceci est à moi, et trouva des gens assez simples pour le croire, fut le vrai fondateur de la société civile.”<sup>2</sup>*

*“Give a man the secure possession of bleak rock, and he will turn it into a garden; give him nine years lease of a garden, and he will convert it to a desert....The magic of property turns sand into gold.”<sup>3</sup>*

## Private Property and Common Property

The prevailing liberal theory of property today – at least in the “western world” – essentially traces back to John Locke, in particular, to the chapter “Of Property” in the second of his *Two Treatises of Government* appearing in 1689.<sup>4</sup> The Lockean argumentation provides a justification for *private* property rights, which exist as natural rights, also independent of the consent of society. In contrast, for example, to a utilitarian view, where property rights are seen only as a means to an end (the end generally being utility maximization), property rights take on genuine importance in liberal social theory – among things, also as individual rights to defend against a superior (state) collective. This is based on the central notion that each individual has a property in his own person, that is, an unlimited right of disposition over himself, his own body, his own faculties, and his own labor. Gerald A. Cohen, Professor of Political Philosophy at Oxford, coined the phrase *self-ownership* to describe this concept.<sup>5</sup>

For Locke, the justification for private property rights directly follows from this premise of *self-ownership*, in connection with the need to use natural resources for survival. Everyone has a right to the fruits of his labor, to everything that he takes from nature and thus makes useable without requiring “any express compact of all the commoners.” (Locke 1986: 115[25]).

Precisely on this point, Locke’s position is diametrically opposed to Immanuel Kant’s view. Kant said, Locke’s justification for property in fact was not a real *justification* for property but merely a description of “what is universally valid and absolutely necessary.”<sup>6</sup> Locke mainly

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<sup>2</sup> “The first man, who, after enclosing a piece of ground, took it into his head to say, ‘This is mine,’ and found people simple enough to believe him was the true founder of civil society.” ROUSSEAU, J.J.: *A Discourse upon the Origin and the Foundation of the Inequality Among Mankind*. First publication 1755.

<sup>3</sup> YOUNG, Arthur: *Travels*, vol. 1, 1787; quoted here according to BRUBAKER, E.: *Property Rights in the Defence of Nature*. London Toronto (Earthscan). 1998. p. 214.

<sup>4</sup> The following quotes refer to the page numbering in the German translation LOCKE, John: *Bürgerliche Gesellschaft und Staatsgewalt. Sozialphilosophische Schriften*. Berlin. (das europäische Buch publishers). 1986. The paragraph numbers are additionally cited.

<sup>5</sup> COHEN, G.A.: *Self-Ownership, World-Ownership and Equality*. In: LACASH, F. (Ed.): *Justice and Equality Here and Now*. Ithaca (Cornell University Press). 1986. pp. 108-135.

<sup>6</sup> C.f. BROMLEY, D.W.: *Environment and Economy: Property Rights and Public Policy*. Oxford (Basil Blackwell). 1991 and WILLIAMS, H.: Kant’s Concept of Property. *Philosophical Quarterly* 27.

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

confused *empirical possession* with *de jure* or *socially recognized property*. According to Kant, physical appropriation was *necessary* but not *sufficient* to justify property. Empirical possession alone could not justify a property right. Rather, the nature of property was defined precisely by the fact that it continues to exist even if there is no physical possession. Locke thus overlooked that a social contract must logically precede property.<sup>7</sup>

Kant further argued that Locke's *self-ownership theory* was insufficient to legitimize private property rights to resources to the extent that appropriation is always linked to the use of *external resources*. It is not one's own labor alone but its mixing with resources that do not belong to the individual (e.g. land) that justifies private property. This too was one of Kant's objections to Locke: Kant also did assume that the individual had “undisputable property” of his own creations, but the individual was, at best, productive in his dreams. “The external objects of general will,” on the other hand, did not originate from labor or the will of the producer but belonged to all in common and could merely be modified through labor. But if resources are, from the start, the common property of all people, the *self-ownership theory* cannot alone justify any private ownership of resources. In principle, Locke sees it the same way. He assumes – just as Kant does – that the earth and its resources originally belong to *all people in common*.<sup>8</sup> To this extent, individual appropriation is, in principle, contingent on the consent of the co-owners. But he develops a cost argument because – as economic theorists would say today – the *transaction costs* involved in obtaining this consent seem too high to him. There was thus a risk, in Locke's view, that people would starve despite the abundance of natural resources available to them. (Locke 1986: 117[28]).

To resolve this dilemma, Locke not only posits the natural right to appropriate resources but also emphasizes a *natural limitation on property*. First, in each case of appropriation, enough must remain for others and second, each individual may appropriate only as much as he himself consumes. According to Locke, no one could deprive others of something by appropriating too much. These conditions are referred to in the literature as “Lockean condition(s).” According to Locke, compliance with these conditions in their natural state was ensured in that the mass of property was determined by nature. No one could either subdue or appropriate all for himself. No one could consume more of the natural resources than a small portion, and thus no property could be acquired at the expense of another.

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1977. p. 32-40.

<sup>7</sup> Kant's view of property as outlined here relates to his thoughts in the *Metaphysischen Anfangsgründen der Rechtslehre* (*Groundwork of the Metaphysics of Morals*) of 1797. In the 1760s, Kant still held a view that had much more in common with Locke's position. In the *Beobachtungen über das Gefühl des Schönen und Erhabenen* (*Observations on the Feeling of the Beautiful and Sublime*) of 1764, he developed a theory according to which the conscious will of man justified private property in connection with labor, virtually an amended version of Lockean thought. Kant himself had never published these early thoughts on property law and later distanced himself from them. (cf. BRANDT, R.: *Eigentumstheorien von Grotius bis Kant*. Stuttgart Bad Cannstatt (Frommann-Holzboog). 1974. p. 167 et seqq.)

<sup>8</sup> “It is very clear, that God, as King David says (. . .) ‘has given the earth to the children of men,’ given it to mankind in common.” Locke 1986: 115[25]. Kant, for example, speaks of an “innate right of common possession of the surface of the earth” and of the “original community of the soil and of the things upon it” as “objective reality.”(1986: 359 ).

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

These natural limits were, in Locke’s view, definitively overtaken by the invention of currency and the tacit human agreement to assign such a large value to it.<sup>9</sup> Thus, he himself, in principle, suggested that his justification for the natural property right was only to a limited degree applicable to most distribution issues in a monetized economy where capital is accumulated in proportion to labor. Locke views the uneven distribution of property in such a society as the result of a “tacit and voluntary consent” of men.<sup>10</sup> Thus, both Kant and Locke, in principle, assume that property rights always represent a social construct and that private property rights generally require the consent of the other members of society.

Consequently, private property rights, in principle, represent a special form of common property. Until today, there seems to be certainty about what constitutes “private property,” but enormous confusion continues to prevail with respect to the term “common property” and is encouraged by the frequently imprecise use of the term. Not least, the famous metaphor of the “tragedy of the commons” contributes to this confusion over the term. It therefore seems necessary to thoroughly analyze this “tragedy.”

### “The Tragedy of the Commons”

When we deal with the question of the common use of resources, *The Tragedy of the Commons* almost automatically comes up. The metaphor was coined by the American biologist Garrett Hardin in one of the most influential articles in the social sciences. The tragedy of the commons lies in the expectation that a resource will be overused when it is part of a “commons.”<sup>11</sup> Hardin uses the example of a jointly used pasture which is overgrazed by rational herdsmen because they are able to completely privatize the benefit of a larger herd while passing on the costs of overgrazing to all the herdsmen. Hardin was by no means the first to formulate such a theory. Aristotle already noted in his *Politics* that the least amount of care is given to that which jointly belongs to the greatest number of individuals. Thomas Aquinas also pointed out this problem. In 1833, William Forster Lloyd outlined a theory on the careless use of common property, which Hardin cites. In 1954, a similar problem was described by H. Scott Gordon in connection with the fishing industry. In his essay *The Economic Theory of a Common-Property Resource: The Fishery*, Gordon arrives at the now famous conclusion: “everybody’s property is nobody’s property.”<sup>12</sup> Still, Hardin’s article is viewed as *the* reference when it comes to questions of common ownership of natural resources.

Hardin applies his metaphor primarily to point out problems of overpopulation and the increasing pressure that it places on resources as well as the problem of environmental pollution. Yet he himself, by the way, doubts the possibilities of countering the tragedy of “the commons as a cesspool” through private property rights.<sup>13</sup>

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<sup>9</sup> LOCKE: Ibid., p. 121, et seqq. [36-51].

<sup>10</sup> LOCKE Ibid., p. 130 [50].

<sup>11</sup> HARDIN, Garrett: *The Tragedy of the Commons*. Science 162. p. 1243 – 1248.

<sup>12</sup> Hardin himself insists on the originality of his theories as opposed to Aristotle’s: “I was soon informed that there were a considerable literature on ‘common pool resources’ in economics and that Aristotle long ago had said, ‘What is common to the greatest number gets the least amount of care’. So what is new in my essay? Just this, I think: the *emphasis* on the tragedy of the situation. Aristotle’s statement is as bland as a bureaucrat’s: It hardly impels one to take action.” (Hardin 1980:115).

<sup>13</sup> “The tragedy of the commons as a food basket is averted by private property, or something formally like it. But the air and waters surrounding us cannot readily be fenced, and so the tragedy of the commons as a cesspool must be prevented by different means, by coercive laws or taxing devices that

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

Not least, Hardin’s image of the overgrazed pasture resulted in a widely uncritical reception and transfer of the tragedy of the commons to numerous situations of collective resource management. From a historical view, however, the metaphor needs to be seen in relative terms:

For example, the British historian Dahlman disputes that the cited tragedy actually occurred in the medieval open field system in England. The same can presumably be said for other countries. Various forms of commons management existed over centuries in northern Europe.<sup>14</sup> According to the central theory of Hardin’s critics, overuse was generally prevented within these systems through a sophisticated structure of norms practiced by the respective communities. “The existence of common property was (. . .) historically always linked to certain rules set by the community which prevented misuse of common resources.”<sup>15</sup> This restriction also pertains to current examples of common use of resources, as Elinor Ostrom in particular shows.<sup>16</sup> The tragedy of the commons has turned into a kind “ineradicable myth,” as even sharper critics have described it. Referring to Hardin’s analytically flawed description and quoting the crucial passage on page 1244,<sup>17</sup> Partha Dasgupta, an economist at Cambridge, for example, comments that it is difficult to find a passage of comparable length and fame that contains so many errors as the one quoted.<sup>18</sup> Aguilera-Klink even talks about conceptual errors in Hardin’s article that are consistently repeated by economists. She laments that possibly only a few have read much more than the title of the essay.<sup>19</sup>

Precisely because Hardin ignores the rules and norms that could possibly prevent overuse of common property resources, what he describes is in fact not a tragedy of common property structures but rather a tragedy of *open access* regimes.<sup>20</sup> One must also see Bromley’s comment in this context, when he says it would be difficult to find an idea (a concept) that has been as misunderstood as that of the commons and common property.

There is no such thing as a common property *resource* – there are only natural resources controlled and managed as common property, or as state property, or as private property. Or, and this is where confusion persists in the literature, there are resources over which *no property rights* have been recognized. The latter situation is one of *open access (res nullius)*.<sup>21</sup>

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make it cheaper for the polluter to treat his pollutants than to discharge them untreated.” (HARDIN: *ibid.*, p. 1245).

<sup>14</sup> Cf., et.al. BACKHAUS, J.: *Gemeineigentum: Eine Anmerkung*. In: BACKHAUS & NUTZINGER (Hrsg.): *Eigentumsrechte und Partizipation*. Frankfurt a.M. (Haag u. Herchen). 1992. pp. 103-124. Also: STEVENSON, G.G.: *Common Property Economics. A General Theory and Land Use Applications*. Cambridge, Cambridge University Press. 1991. Stevenson compares the Swiss commons system of Alps management with the English open field system.

<sup>15</sup> GEY, P.: *Zum Verhältnis von Theorie und Geschichte in der Property-Rights-Ökonomie (On the Relationship between Theory and History in a Property Rights Economy)*. In: BACKHAUS & NUTZINGER (Hrsg.): *Eigentumsrechte und Partizipation (Property Rights and Participation)*. Frankfurt a.M. (Haag u. Herchen). 1982. pp. 73-102.

<sup>16</sup> OSTROM, E.: *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge, Cambridge University Press. 1990. See also Elinor Ostrom’s contribution in this book.

<sup>17</sup> HARDIN, G.: *The Tragedy of the Commons*. Science 162. 1968. p.1244

<sup>18</sup> DASGUPTA, P.: *The Control of Resources*. Oxford. Basil Blackwell. 1982.

<sup>19</sup> AGUILERA-KLINK, F.: *Some notes on the misuse of classic writings in economics on the subject of common property*. Ecological Economics 9: 1994. pp. 221-228

<sup>20</sup> Hardin in fact writes: “Picture a pasture *open to all*.” (Hardin *ibid.* p.1244, emphasis added).

<sup>21</sup> BROMLEY: *Ibid.* Emphasis in the original.

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

Stevenson, who dedicates an entire book to common property economics, likewise points out a confusion of definition and then proceeds to clearly distinguish *open access* from *common property* in theoretical and conceptual terms.

Even though one should think that the main difference between common property and open access is now sufficiently known, the confusion persists. Just to name one of many examples, a reputable and otherwise outstanding and widely read textbook on microeconomics incorrectly defines “**common property resources**” as “**resources to which everyone has open access.**”<sup>22</sup>

If common property, in contrast to open access, is perceived for what it is – a form of common property for which clear institutional rules of use and restrictions on access exist – then it becomes evident that the problem of overuse, or the incentive to overuse, must be viewed in a more nuanced manner. Here, one must differentiate among various cases: \

First, it is possible for rules of access and use to be *insufficiently defined*, in other words, the proverbial “backdoor” is left open, thereby creating incentives for overuse. This case is clearly different from situations where overuse of the resource is based on the *violation* or *breach* of existing rules. It would be hyperbole to call this the “tragedy of the commons” (and thereby imply a structural flaw in the property rights structure), just as it would be hyperbole to interpret theft of private property as the “tragedy of private property.”<sup>23</sup> Rather, it is a problem of *control* and *enforcement* of existing property rules.

From the simplistic structure of this erroneously understood “tragedy of the commons” follow similarly simplistic recommendations for action. According to Ostrom, they essentially assert that problems of common resources can be resolved only either through a “Leviathan” system (in the sense of a strong government; sometimes, even an “eco-dictatorship” is suggested) or through total privatization. The work of R. J. Smith, senior fellow at the National Center for Public Policy Research, a conservative American think tank, is typical of this approach. For Smith, the problem of how to manage biological resources can be solved by answering obvious questions such as, Why was the American buffalo nearly exterminated but not the Angus or the Jersey cow? Why are salmon and trout overfished in the nation’s lakes and rivers and streams, while they thrive in private fish farms and private lakes? He promptly offers up the answer:

In all these cases, it is clear that the problem of overexploitation or overharvesting is a result of the resource’s being under public rather than private ownership. The difference in their management is a direct result of two totally different forms of property rights and ownership: public, communal, or common property vs. private property.

So, according to Smith, the American salmon are disappearing from most rivers or are being heavily depleted because they are being treated as part of the “common heritage of mankind” and, as a “common property resource,” they belong to everyone, can be caught by everyone, and essentially belong to no one. The (northern) European salmon, by contrast, are in much better shape, he asserts, because “some of the finest stretches of rivers are owned or leased by individuals, *groups of fishermen*, or fishing lodges, and the salmon are not overfished.”<sup>24</sup>

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<sup>22</sup> PINDYCK, R.S. & RUBINFELD, D.L.: *Microeconomics*. Munich et.al. (Pearson Studium). 2005.

<sup>23</sup> This is based on the inconsistent assumption that economic subjects always respect private property, but disrespect existing rules on the use of common property at every opportunity.

<sup>24</sup> SMITH, R.J.: *Resolving the Tragedy of the Commons by Creating Private Property Rights in Wildlife*. CATO Journal 1: 1981. 439-468. Quoted passages, pp. 444-448. Author’s emphasis.

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

This view of common property clearly describes more an open access condition along the lines of the above distinction in terms, while common property for clearly delineated communities (i.e. a *group* of fishermen!) is deemed private – instead of – collective property. One of the pioneers of environmental economics, K. William Kapp, expressed the concept much more clearly, long before Hardin:

*Wild und Fisch gelten nach amerikanischem Gesetz als freie Güter, bis sie gefangen bzw. Erlegt sind. Die Tatsache, dass Eigentumsrechte nur auf erlegte und gefangene Tiere geltend gemacht werden können, macht diese ‘flüchtigen’ Ressourcen besonders anfällig für die Ausbeutung durch private Jäger und die kommerzielle Fischerei. Die Tatsache, dass Ressourcen frei und weder Gemein- noch Privateigentum sind, verleitet den einzelnen Jäger oder Fischer dazu, seinen Fang zu maximieren, weil ihm sonst sein Konkurrent zuvorkommt.<sup>25</sup>*

Another approach would be to question the assumptions about behavior put forth in the parable of the “tragedy.” That, in certain situations, there are incentives to maximize one’s own benefit even at the expense of others (co-owners) does not necessarily mean that these incentives *always* determine actual behavior. Rather, the results of experimental economics of the past years indicate that individuals can indeed be assumed to show a general willingness to behave cooperatively. This willingness does, however, threaten to fade whenever cooperative behavior is repeatedly “punished” by the uncooperative behavior of others (also individuals). It is therefore especially important which specific (sanctions) rules are tied to various forms of (common) property.

In the case of open access, a distinction is to be drawn between the case of complete open access and situations where the number of resource users is limited but individual use of the resources is not. According to Stevenson, this case of “limited user open access,” like “complete open access,” also ultimately leads to overuse.<sup>26</sup> A pure access limitation, that is, a limitation on the number of users, therefore would not be sufficient. Additional rules are thus needed in order to sustainably manage a common property resource in an open access situation.

For Stevenson, a “private property, common property, open access trichotomy” ultimately exists. He compares these three forms in terms of group limitation and extraction limitation. Characteristic of the common property form is that both the group and the extent of resource use are limited by the individual members:

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<sup>25</sup> KAPP, K. William: *Social Costs of Private Enterprise*. Frankfurt a.M. 1988. p. 81. Emphasis added.

<sup>26</sup> STEVENSON, G.G: *Common Property Economics. A General Theory and Land Use Applications*. Cambridge. Cambridge University Press.1991.p.58.

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

	Property Institution			
	1	2	3	
	Private Property	Common Property	Open Access	
			Limited User	Unlimited User
Group	one	members	members	open
Limitation	person	only	only	anyone
Extraction	extraction	extraction	extraction	extraction
Limitation	limited by individual decision	limited by rules	unlimited	unlimited

Source: Stevenson 1991:58

Thus, two essential findings of this analysis are important to the discussion on the commons: First, a clear distinction is to be made between resources owned in common (*common property*) and resources for which no property rights have been defined (*open access*). Second, the much quoted phrase “tragedy of the commons” is, at best, unclear because it frequently describes not a tragedy of the commons but a tragedy of open access.

With a view to the destruction of tropical rain forests, Bromley accordingly states that the real tragedy of the commons is the process whereby the property rights structures of indigenous peoples is undermined and delegitimized.<sup>27</sup> This assessment is also shared by the U.S. National Research Council: “This is the real tragedy of the commons: traditional management systems that were effective for thousands of years became obsolete in a few decades, replaced by systems relentless exploitation of rural people and rural countries.”<sup>28</sup> “. . .the collapse of **traditional common property regimes and open access to resource exploitation leaves rural communities hardly any means to maintain sustainable resource management.**”<sup>29</sup>

Thus, the question concerning the efficiency of common ownership of resources, which is often hastily answered with the argument of the “tragedy,” remains, in principle, open. Every allocation of property rights, whether private or common, is associated with costs from an economic perspective. Which property rights option will ensure efficient resource use will depend in each individual case on these transaction costs.<sup>30</sup> “Not only is common property

<sup>27</sup> BROMLEY: *Ibid.*, p.104.

<sup>28</sup> U.S. National Research Council, Board on Science and Technology for International Development: *Conserving Biodiversity: A Research Agenda for Development Agencies*. Washington D.C. (National Academy Press). 1992.

<sup>29</sup> BARBIER, E.B.: *Community-Based Development in Africa*. In: SWANSON & BARBIER (Eds.): *Economics for the Wild: Wildlife, Wildlands, Diversity and Development*. London (Earthscan). 1992. p. 104.

<sup>30</sup> “Every solution, every combination of property rights and controls, has its costs. Private property rights are not costlessly created, modified, and enforced; (. . .) What solution is best must surely depend to some extent on the relative costs of the possible solutions. Hardin ignores them. Common property regimes may make more sense than private property when these costs are taken into account: perhaps the countless groups that have regulated (some of) their resources as common property knew what they were doing!” TAYLOR, M.: *The Economics and Politics of Property Rights and Common Pool Resources*. *Natural Resources Journal* 32. 1992. p. 635.

Berkes and Farvar follow entirely the same line of thought in the introduction to the Berkes collection:

distinct from open access and from private property, but it can be a solution to the open access problem, even as private property is,” Stevenson believes.<sup>31</sup> In the literature, numerous cases are analyzed, where collective property rights are preferable to private property rights: “Common property is the preferred solution to open access when the resource is unamenable to being split into individually controlled units, the control costs of sole ownership are prohibitive, or the technological characteristics of production (e.g. economies of scale) favor it over private property. It may also be preferred when social or cultural factors favor a group over an individualist solution.”<sup>32</sup>

### Rules for Use of Common Property

The main difference between resources for which collective property rights were allocated and open access regimes is that the former is regulated (in respect of both the group of entitled users and the rights of use by the group members); the latter, by contrast, is unregulated. If we now look at the institutional rules that counter overuse (the tragedy) within an effective common property regime, we see that the common property regime shares a great deal more similarity to private property regimes than to the unregulated condition of open access.

Elinor Ostrom has shown in various publications that the “dilemma of common property” can be successfully solved through institutional arrangements and cites various rules in light of their similarities.<sup>33</sup> From a similar perspective, Stevenson defines common property as a form of resource ownership with the following characteristics:

1. The resource unit has bounds that are well defined by physical, biological, and social parameters.
2. There is a well-delineated group of users, who are distinct from persons excluded from resource use.
3. Multiple included users participate in resource extraction.
4. Explicit or implicit well-understood rules exist among users regarding their rights and their duties to one another about resource extraction.
5. Users share joint, nonexclusive entitlement to the *in situ* or fugitive resource prior to its capture or use.
6. Users compete for the resource and thereby impose negative externalities on one another.
7. A well-delineated group of rights holders exists, which may or may not coincide with the group of users.<sup>34</sup>

These (and other similar) rules are ultimately interpreted within a collective property regime as an allocation of *individual rights of disposition* by the community. The difference between this sort of common property regulated by the community itself and private property, which

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**“It is no coincidence that traditional resources management systems are often based on communities.”** BERKES, F. (Ed.): *Common Property Resources: Ecology and Community-Based Sustainable Development*. London (Belhaven Press). 1989.

<sup>31</sup> STEVENSON: Ibid., p.58.

<sup>32</sup> STEVENSON: Ibid., p.76.

<sup>33</sup> See also Elinor Ostrom’s essay in this book.

<sup>34</sup> STEVENSON: Ibid., p. 40.

## Achim Lerch: The Tragedy of the “Tragedy of the Commons”

ultimately also consists of a bundle of variously defined or limited rights of disposition thus seems less clear than the difference between open access and common property: the criteria to distinguish between private and common property is the *exclusivity* and the *range* of the respective rights of disposition, in other words, the difference is *slight*. The difference between open access and defined property rights (private or common property), by contrast, is the difference between an *unregulated* and a *regulated* condition. The difference is *fundamental*.

The difference between open access and common property with corresponding rules, in particular with respect to limited open access, is also analogous to categories of classic economics. These distinguish between purely public goods and so-called club goods, where the distinction lies in the rivalry surrounding consumption and the exclusivity of access to use. Accordingly, public goods are such that no one may be excluded from their use and there is no rivalry surrounding their consumption. Several subjects can use a good in equal measure without “taking something away” from the other. The classic example is the light of a lighthouse. Club goods, by contrast, also do not feature any rivalry but are accessible only to club members in respect to their use – the resources of a sports club, for example. The major difference between club goods and purely public goods is thus the availability or unavailability created by a process of exclusion.

What is important about this analogy is – particularly also with a view to the issues discussed in this collection – that in the ideal case of a good, for which there is no rivalry to consume, the condition of open access is not harmful. This is often mentioned in connection with the commons of the mind. Yet it is up to political economists of the commons of the mind to describe this phenomenon.<sup>35</sup>

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<sup>35</sup> See also Yochai Benkler’s essay *The Political Economy of Commons* in this book.