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Commons in Urban Industrialized Society

Lars Carlsson

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Indiana University, 513 North Park, Bloomington, Indiana 47408-3895 U.S.A.
Phone: 812-855-0441 • FAX: 812-855-3150 • Email: workshop@indiana.edu

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1. COMMON FORESTS IN URBAN, INDUSTRIALIZED SOCIETY

ABSTRACT

Common forests are often associated with developing countries. Overpopulation, lack of technical and economic resources, deforestation and a tension between central bureaucracies and local people are significant characteristics for a great number of commons in these countries. This paper focuses on a quite different situation: the role of common forests in an industrialized country. The Swedish common forests have survived for more than one hundred years; no deforestation has been observed and the total amount of biomass is increasing. The commons are regarded by experts as well managed both in terms of efficiency and with regard to the preservation of biodiversity. Compared to other types of ownership the commons have a very special organization. The base consists of 25,000 individual shareholders with property rights in the forests. This medieval pattern of ownership seems to survive; moreover it seems to be quite prosperous within the realm of modern society with its highly competitive forest industries. This paper explains why the Swedish common forests have survived as vital and competitive actors in the timber market. Three main explanations are discussed: the commons' conscious attempts to reduce transaction costs, their general inventiveness in adjusting to changed circumstances, and their acclimatization to the logic of the negotiated economy characterized by fuzzy borders between different sectors.

Community managed forests are by no means a characteristic only of non-industrialized, developing countries, where overpopulation, lack of technical and economic resources, deforestation and a tension between central bureaucracies and local people contribute to the ongoing processes of disintegration and devastation. This situation is alarming and, therefore it is important to focus on these problems. Valuable insights are also made as a result of research concerning sustainable forestry in developing countries (Ascher, 1995). Nevertheless, community managed commons in industrialized societies can also provide useful knowledge for the understanding of institutional arrangements and common-pool resources (CPR) in general.

Numerous articles and books have focused on commons and CPR problems in industrialized societies: *fisheries*, (Buck, 1988; Pinkerton, 1994; Sandberg, 1994; Wilson, 1993); *groundwater*, (Blomquist, 1992; E. Ostrom, 1990; Schlager, 1995); *irrigation* (Munro, 1993; E. Ostrom, 1990; Roe, 1994), and *forestry/agriculture* (Beckett, 1989; Carlsson, 1995; Edwards, 1995; MacKean, 1992; Merlo, 1995; Netting, 1981).¹

¹ Three excellent bibliographies compiled at the Workshop in Political Theory and Policy Analysis, Indiana University, U.S.A. can provide the reader with a more complete list of literature covering

Some commons in industrialized society are definitely “relics from the past” (McKean and E. Ostrom, 1995; see also Zimmermann, 1995), but a significant part of them are well integrated in the national, and sometimes also in the international, economy. The industrialized society is not aware of any isolates without connections to its social and economical principles. Even communal fisheries are dependent on world market prices of fish, and for example forest commons are influenced by the timber prices. Thus, it can be assumed that commons which have survived over centuries have done so, not due to their isolation, but rather because of their general inventiveness to find ways to adjust to ongoing changes in the society.

The Swedish common forests provide an illustration of this. Although, built on medieval principles of organization, they succeeded in adjusting their activities, and today they are regarded as well managed and quite competitive at the timber market. At the same time, however, there are no signs of devastation of the common forests. On the contrary, only about 70% of the annual production of biomass is harvested.² How can this be explained? This is the task of this paper. The paper is organized as follows.

First, in an introductory section called “The Swedish Common Forests” the history and the organizational concept of the Swedish commons forests is described. In the following section, “The Common Forests Produce Both Public and Private Goods,” the institutional framework of the commons is discussed, both in relation to their role as producers and as providers of private and public goods. It is demonstrated that compared to private forest companies, the commons are faced with a different set of transaction costs to overcome.

In the third main section, “Reducing Transaction Costs,” the problems how to reduce transaction costs is discussed. Using five types of principle problems, it is demonstrated how the commons try to solve them, and keep the transaction costs at an acceptable level. This leads to the fourth section, “Criteria of Performance,” where the performance of the commons is discussed. In this section it is asked to what extent the commons can be regarded as efficient institutions for managing their forest resources. By using five general criteria for assessing institutional performance, it is shown that the Swedish common forests score high at three of them.

Finally, in the last section, “Conclusion,” it is concluded that the commons have been able to utilize the fragmentation of industrialized society to their own advantage, and that a fabric of co-management with the state and the timber industry has been established. This adaptation is suggested to be the main lesson to be learned from the Swedish Common Forests: their

CPR problems in industrialized countries (Martin, 1989 and 1992; Workshop in Political Theory and Policy Analysis, May 1989).

integration, rather than their separation, from the logic of the negotiated economy of the industrialized society.

2. THE SWEDISH COMMON FORESTS

Even before Sweden adopted its first written constitution, 1350, different types of commons were codified in the old county-laws. The Swedes (which was the name of the inhabitants in one of the counties) called them "allmänningar," viz. commons. In direct translation this word would mean "public areas." Two hundred years later in 1523, under King Gustav Wasa, the country became independent and united. Huge areas of land were confiscated from the nobility and from the church. The kingship became hereditary. Lutheran Protestantism replaced Catholicism as the official religion. A new Protestant State Church and a strong, national bureaucracy were created.³

The King declared that all "unclaimed land" belonged to the Crown/State. In the countryside, people used some lands as commons, such as, pastures outside the villages, remote chalets, fishing waters, and forests. Since the King laid claim to all "unclaimed" land, it had to be decided what belonged to him and what belonged to the villages. The claim of the Crown and some laws contradicted each other. For example, in a Forest Act from 1647, some commons were accepted. ("häredsallmänningar" = commons between jurisdictional areas, "sockenallmänningar" = parish commons between the parishes, and "byallmänningar" = village commons, roads, waters, gravel pits, etc.) In the 17th century a process of *Delimitation of Crown Land* started. After 300 years the process is now regarded as finished.⁴

The process of delimitation of Crown land proceeded together with another change of property rights, *The Great Redistribution of land Holdings*, starting in the middle of 18th century. In 1828 this development was intensified, and because of the reparcelling of the arable land, the villages was disrupted. During these procedures, a great number of common lands were privatized. Both the processes of delimitation and redistribution of land had the same purposes. The first purpose was to create bigger and more productive farms, thus strengthening the local economy. The second, but related purpose, was to widen the base of taxation—the King, wars⁵ and the bureaucracy must be financed.

³ Still, today the State, the Church and the Municipalities have the rights to tax people!

⁴ Not when it comes to the Sami people, however.

⁵ In the 17th and 18th century Sweden was involved in extensive wars.

These reforms proceeded in a fairly uneven manner. The big problem was the northern part of the country, where most of the land were "unclaimed." Changes came late to these northern areas. However, these areas (i.e., the main part of the country) were also the homeland for the Sami people, and the place where the "green gold" of the forests grew. This was the situation at the beginning of 19th century. It was in this context the common forests were created as separate juridical entities.

As a result of the delimitation, the farmers were allotted their own, private forest lands, but to many farmers, these allotments only had a minor value. Arable land was scarce, the forests areas were enormous, and the farmers were not yet aware of the market value of their forest resources. Therefore, in the beginning of industrialization, companies bought the rights to harvest, and sometimes they could possess whole villages, all in order to provide sawmills along the Baltic Sea with timber. In order to provide a good base for taxation, the settlers and the farmer was supposed to become wealthier, not poorer. Therefor, this situation called for control by the State. The county governor (i.e. the long arm of the State) in Norrbotten suggested that 1/3 of the lands allotted to the farmers would be detached for the purpose of creating commons. This was not always popular among the farmers, and the process was delayed.

The first common was created in 1861, and new units were added well into the beginning of this century. The already existing medieval type of common, "häradssallmanning," was used as an organizational blue print for this new type of forest commons. As a result, 33 common forests were created—today, they encompass about 730,000 hectares of forest lands. These commons are regulated by an uniform law which has been virtually the same for one hundred years.⁶

2.1 The Common Forests, Concept and Organization

For purposes of taxation each farm was designated as containing a certain number "assessment units of land" (in Swedish "mantal" = the area sufficient to feed one person) which were based on the arable land. These units were used as the base for each farmer's share of the common. Although "mantal" no longer is a valid unit of measurement, it is still used with regard to the commons. Figure 1 illustrates the relation between the single farmer and the common forest.

Only via ownership of "share holding farms" (i.e., farms assigned rights to a common forest) single farmers, and other types of owners possess

⁶ *Lag om allmänningskogar i Norrland och Dalarna. (Act Relating to Collectively-Owned Forest Lands), Swedish Code of Statutes, SFS 1952:167.*

property rights in the commons. The only way an outsider can get access to a common forest is to buy, inherit, or in some other way acquire a share holding farm. Consequently, not only single farmers but also groups of people, companies, the church, and even the state are legal owners, and thereby also shareholders, in the Swedish common forests. Still, about 68% of the shares are in the hands of private persons; 18% belong to companies and the remaining 14% are possessed by the church, the state and other corporate owners.

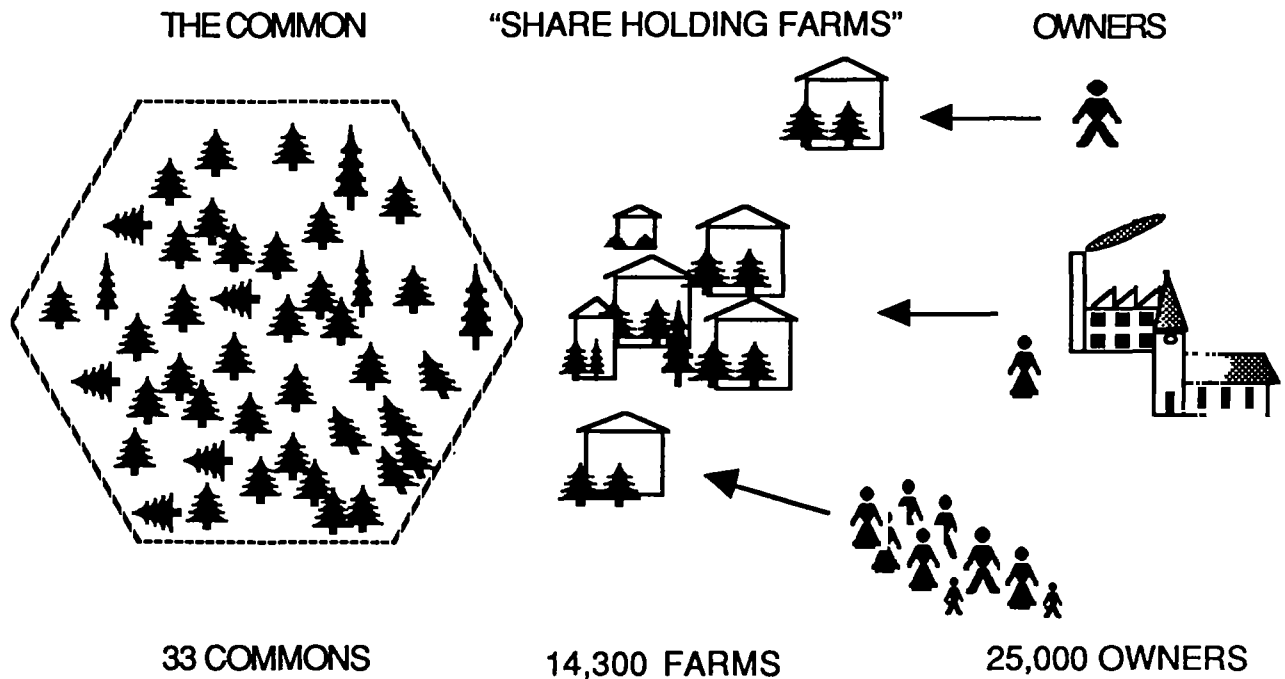


Figure 1. The relation between owners, farms, and the common forests.

A great number of the commons are located in sparsely populated areas. About 20% of the 25,099 owners can be regarded as remote owners. The formal hierarchy of the Swedish common forests is indicated in figure 2. The assembly of shareholders elects a board, which is responsible for the management and the economy of the common. According to the law, a professional forest manager must be attached to the common. This person, who usually is employed by the common, is responsible for the forest management.

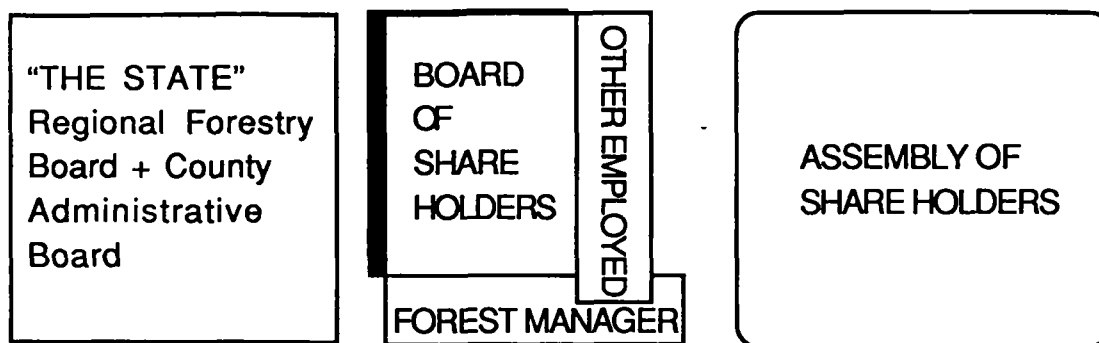


Figure 2. The formal hierarchy related to the Swedish Common Forests

As all other forest owners, the commons also are subject to control from the regional State Forestry Board. In addition, the commons are formally controlled by the State County Administrative Board. As research indicates to a great extent, this is only a formality.⁷ Today, many commons are run like big forest companies—the three biggest each possess about 60,000 hectares of productive forest lands⁸ and have a significant amount of machinery and employees. About half of the commons also run subsidiary companies or pursue commercial enterprises.

The benefit for the single shareholder is threefold.⁹ First, he¹⁰ is eligible to appropriate revenue from the forest—as annual cash amounts—in accordance with his amount of shares. Second, he may lay claim to monetary subsidies paid to the shareholders for draining, buildings, fodder, etc. Finally, the shareholders have benefits from the commons' general support to the local area, such as roads and fishing water.

It has been demonstrated by state investigators and others that the Swedish common forests are quite successful, and that they manage their forest resources in an sustainable manner.¹¹ Given that they are formally regulated by the same law as when they were created more than one hundred years ago, it seems astonishing that they still are competitive producers, operating in a relatively tough timber market. How can this success be explained? This will be elaborated in the next sections. First it is discussed to

⁷ For example, the administrative board collects the common's compulsory "distress funds" that are no longer are used for its original purpose, namely, to prevent famine among the commoners.

⁸ The commons vary from 527 to 58,000 hectares of productive forest lands. The average is 22,558 hectares (Carlsson, 1995:13).

⁹ Remember that the share holder also can be a corporate owner.

¹⁰ Note that "he" always can be a "she".

¹¹ See Carlsson, 1995 or *Skogsallmänningar (Common Forests)* The Swedish Commission on Collectively-Owned Forest Lands, Ds Jo 1984:15.

what extent the commons differ from an "ordinary" timber producing company

3. THE COMMON FORESTS PRODUCE BOTH PUBLIC AND PRIVATE GOODS

One statement in this article is that the Swedish common forests have succeeded fairly well in comparison with other big forest owners. Maybe this is more remarkable than we first realize. Companies owning comparable areas of forests basically "produce" timber.¹² The costs of this production, and the provision of the products, are mainly covered by the buyers—the costs are reflected in the timber price. The commons, however, also produce and provide public goods. They do harvest, and sell timber, but they also reinvest their money in the district. Regularly they subsidize the farmers, build and maintain roads, support local villages, and provide hunting lands and fishing waters. Accordingly, the commons have to pay attention to the costs related to the production *and* provision of the *both* public and private goods (Ostrom, Schroeder and Wynne, 1993:73 ff.). Compared to forest companies, the commons possess the quality of being both production and provision units in one organizational body.

When it comes to the provision of public goods the distinction between production and provision is quite important. This has been elaborated in Ostrom, Tiebout and Warren, 1961. "The organization of provision [...] relates primarily to consuming, financing, and arranging for and monitoring the production of good and services" (Ostrom, Schroeder and Wynne, 1993:75) while production has to do with the "manufacturing" of products and services. For the purpose of this paper; it is essential to note that the processes of production and provision are associated with different types of transaction costs. Consequently, a common engaged in producing and providing public and private goods faces *a broader set of costs*, compared to a forest company, which mainly engages in the production of timber for the market.

The problem can be conceptualized as follows. The economic activities the commons perform generate income (I). When the costs (C) associated with these activities are deducted a residual (R) is available, $R=I-C$. This residual is used in the following way. Some of the resources end up as *savings* (s), both in the foundations the commons are obligated to form or voluntarily hold, and in stock portfolios. As described earlier, a substantial

¹² About 25% of the Swedish forest area is owned by private companies. The other parts are owned by farmers and other individuals (50%), the State (20%). The remaining 5% belong to the church, municipalities and commons. The emphasis on the word "produce" refers to the fact that only nature produces—this use of language is also recognized by forest ecologists and forest rangers.

amount of money is paid to the shareholders as *cash amounts* (c) or/and *subsidies*(z).

In addition to this, the commons also contribute to the social development in the areas they are located. These costs can be called social development costs (i, f and g) They finance, or support a variety of *infrastructure facilities* (i), such as roads, mills, electricity systems, water purification plants and saw mills.¹³ Most commons also contribute to, or complement, *local public financing* (f). They maintain public roads, they support schools, and provide public fishing waters, etc.¹⁴ A third type of *general engagement in social development* (g), are the economic contributions the commons give to local non-profit organizations, such as local sports clubs and hunting clubs. Even commons which mainly distribute their economic residual as cash amounts, always practice some type of support to local organizations.

Finally, some part of the residual is used for *reinvestment in productive capital* (p), such as technology, and regeneration of the forest resource. To summarize, this gives the following two equations.

$$I - C = R \text{ [Income - Costs = Residual]}$$

$$R = s + c + \underline{z} + (\underline{i} + \underline{f} + \underline{g}) + p \text{ [residual = savings + cash amounts + subsidies + social development costs + reinvestments in productive capital]}$$

Given the assumption that a common and a forest company generate the same residual, the commons will use its residual differently. Applied to the companies, all underlined letters in second equation, can be removed.

$$R = s + c + p$$

A company does generates profit for its owners, but it does not deliberately subsidize (z) them. Nor do companies frequently spend their resources on social development (i + f + g), and if they do, this is either a

¹³ All of the commons do not deal with all these things, but the majority contribute to some type of infrastructure. Historically financing and maintenance of infrastructure has been the main object for the commons (Liljenäs, 1977).

¹⁴ Today this is only a low level of engagements. There are, however, examples of commons buying music instruments for public schools and providing public fishing waters for the citizens. Before World War II, some districts were totally dependent of the resources generated by the common forests for the financing of public purposes. Orsa Common Forest is the most significant example. This common contributed all the funds needed for the municipality of Orsa until 1934. Therefore, no local taxes were levied for the purpose of financing schools, roads, and other types of public services. During World War II the common bought two anti-air craft guns which were given to the military for the defense of the district.

by-product of their main activities or just goodwill money. For example, forest companies may build lorry roads which later can be utilized by local people; occasionally, they also support local sports clubs, etc., but never as systematically as the commons do.

It could be argued that the only difference between a common and a company is that the common utilizes its residual differently; i.e. it has chosen to spend its resources on public service instead of distributing them among the shareholders or reinvesting the money. Such a conclusion, however, does not pay any attention to the transaction costs associated with the commons' provision of public goods. "In the private sector, transaction costs include the time and effort devoted to such activities as searching for buyers or sellers, bargaining over price, and enforcing contracts" (ACIR, 1987:9). These costs are indeed relevant for both a timber "producing" common and a forest company operating at the timber market, but in its role as a producer and provider of public goods a common is faced with an additional set of transaction costs.

"In the public sector, transaction costs consist of time and effort devoted to making collective decisions, including the cost of elections, communications and meetings, and reporting to secure accountability" (ACIR, 1987:9). Likewise, the commons are faced with the problems of collectively deciding what kinds of goods, and services to provide, the quality and quantity of these, how to regulate related activities, how to arrange production of them, how to finance the provision, and finally, how to monitor the performance (Ostrom, Schroeder and Wynne, 1993:74). These decisions generate coordination, information and strategic costs related both to the production and the provision of goods and services, and to the extent a common forest will continue to be a robust institutional arrangement, these costs must be controlled. How have the Swedish common forests dealt with these problems? Before answering this question, it will be explained *why* the production, and provision of goods and services are more expensive for a common than for a forest company. This is the topic for next section.

4. REDUCING TRANSACTION COSTS

Generally, the control of access, and the appropriation of forest resources are more costly for a common forest than a private forest company. Why is this the case? This has to do with the collective quality of the common. Figure 3 illustrates the general relationship between the access to a resource system, and the appropriation of resources. The Hardin version of "the tragedy of the common" (Hardin, 1968) has the characteristics of square one—a quality untypical of commons (Arnold, 1993). Square two and three,

however, are quite realistic; they reflect an unstable situation which usually calls for more regulation.

Appropriation of Resources			
		Not regulated	Regulated
Access	Open	1	2
	Closed	3	4

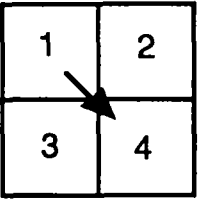


Figure 3. The relation between access and regulation in a common. (After Pettersson, 1987)

The problem is that every move in the direction of the arrow is associated with increased transaction costs. Logically, the common forests have two options. The first would be not to regulate access and appropriation, which obviously is not the case in the Swedish common forests. The second would be to keep the costs for such a regulation as low as possible and thereby be able to compete with other owners. How can this be done in a common formally regulated by an ancient juridical framework, staffed with people without special education to deal with these matters, and ultimately depending on the claims and opinions of thousands of owners?

It can be anticipated that it is more costly to regulate access among thousands of shareholders in a common than to manage the owners in a private company. It can also be assumed that it would be more expensive to regulate the appropriation of the forest resources of a common compared to a company. A forest company presumably has easier to keep up with technology than a common. It can also be assumed that companies have established channels for the gathering of information about the market, and about their competitors, all of which is part of what we call transaction costs. In addition, it can be assumed that a company can more easily conform to rules and regulations connected to modern forestry; a good deal of competence and information is needed to learn and adjust to the numerous laws and regulations circumscribing Swedish forestry. How have the commons dealt with all these problems? This is described in next section.

4.1 Means and Methods of Reducing Transaction Costs

In the previous section it was assumed that all commercial actors, commons as well as forestry companies, are faced with the same types of problems. Thus, the Swedish common forests have to, gather information about rules, regulations, markets, competitors and forestry technology. They also have to spend time and resources in defending and regulating access and appropriation of their forest resources. In this section five concrete problems, related to these more general problems will be discussed. First, the problems associated with growing number of shareholders is discussed. Second the commons relation the forest authorities is analyzed. Third, it is described how the commons have succeeded in keeping pace with the development of forestry technology. The fourth problem that will be analyzed is the presumptive conflict with the Sami population. Finally, hunting and fishing are discussed as sources of increased pressure on the commons.

The costs of solving (or trying to solve) these four problems can be subsumed under the notion *transaction costs*. Generally transaction costs are the costs associated with the exercise of property rights, i.e., to keep the transactions going. Transaction costs can be divided as long term and short run costs. Empirically, it is not easy to distinguish between activities aimed at a long term reduction of transactions costs or for more immediate purposes. In the following discussion no distinction between short term and long term costs will be made.

4.1.1 The jeopardizing of the share holding system

One problem with the Swedish commons forests is the increased number of remote owners. People move from the countryside, but they tend to keep their farms and therefore also access to the commons. Moreover, an increased number of shares are owned by forest companies (in 1995 18% of the shares are held by companies). This jeopardizes the intentions of the founders of the commons.¹⁵ In the last ten years, about 3,000 new shareholders have been added. This tells us that there has been a widening of the access to the commons. What means and methods to solve these problems have been used?

¹⁵ The main argument for creating the Swedish common forests was to circumvent the influence of forest companies. Another way to reduce their influence was the creation of a special law (1903) which forbid companies to buy farms from private persons. The present situation in the Swedish common forests raises some interesting questions: when is a common no longer a common? Can commons be more or less "common-like"?

When it comes to the adding of new private owners this is mainly an effect of inheritance. Under current juridical system, this is hard to do anything about. In general, the commons have adopted the principle that every farm owned by more than two persons must appoint a deputy. This person votes on behalf of the others at the assembly meetings. He is also the recipient of the annual cash amounts or other types of support from the common to the single farm. This principle is based on law that is aimed at facilitating the relation between the state authorities and the farmers, *not* between the commons and their members. The commons have simply decided that the law also is convenient for their purposes.¹⁶

The companies that have bought into the commons have a different situation. With the power of their shares—in six of the commons companies possess more than 40% of the shares—they have the legal rights to appropriate a significant part of the yield. In none of the commons, however, do companies execute their rights in proportion to their holding of shares. In Jokkmokk, for example, one single company holds 50% of the shares, but only about 25% of these are actually used.¹⁷ Generally in commons where distribution of cash amounts is practiced, the assembly of shareholders have made decisions to leave the companies without such endowments. It is also a common course not to elect representatives from companies for the boards, despite the fact that companies eventually could succeed in doing so if they utilized all their shares. Even when companies have representatives in the board of a common, they never push their case, and generally they hold a very low profile. How can this be explained?

Representatives from these companies explain this behavior by referring to costs (in reality the problem of transaction costs). What they are verifying is that they must retain good relations with local people. Otherwise they will have problems with the purchasing of timber from the private forest owners, using private lorry roads, and so on. Their “voluntary” abandoning of revenue from the commons is the price they are willing to pay for good relations and therefore also for the smoothening of future activities in the area. Accordingly, it is not possible to conclude that influence is directly correlated with the amount of shares a company possesses. Consequently, we cannot be concluded that a common is privatized just by looking at the number of shares possessed by corporate owners such as forest companies.

¹⁶ This interpretation of the law has caused some turbulence, and the legal interpretation has been challenged by single shareholders. Decisions taken so far seem to support the behavior of the commons.

¹⁷ Local rules stipulate an upper limit for subsidies. Because of this rule the company receives less money than it could have claimed if a proportional system had been used.

4.1.2 Staying current with rules and regulations

The commons have different ways to remain current with rules and regulations connected to their forestry activities.

a) Some rules are regarded as obsolete; i.e., the commons simply do not use them. The law regulating the common forests has not been changed since the 1950s. For example, the commons still are required to inform and send papers to the County Board regarding harvesting, economy, etc. Some of the commons are in fact formally required to deliver their income to the county board and then to apply for the amount of money they want to distribute or reinvest. Even though the law stipulates this, it is not practiced any longer. Other rules they simply escape from. For example, some of the commons are not allowed to endow their individual shareholders with cash amounts but by renaming a cash amount a "general subsidy for forestry purposes," the rule is circumvented.

b) Significant information costs are connected to the fulfillment of the demands codified in the Natural Conservation Act and the National Silvicultural Act.¹⁸ The common forests have tackled this problem by building alliances with the authorities which are supposed to enforce the laws. Regularly they purchase service from the authorities for assessing (cruising) before cutting. They also buy inventories and even control of their own shareholders from the forest authorities. The latter requires an explanation.

About 74% of the commons distribute their residual for communal purposes, or as direct "subsidizes" to individual shareholders, for operations on their own private land. For example, the single farmer can be subsidized per number of cows he possesses, per hectares of land drained, for planting, and so forth. Since all shareholders have an incentive to cheat or at least to over-consume, the system must be controlled. The commons have developed different methods for controlling this. When it comes to the subsidizing for forestry, the most common solution is to utilize the bureaucracy already built up for the control of state subsidises. State employed and locally stationed extension rangers are responsible for all the control related to forestry, even for the control of the former numerous state subsidies.¹⁹ Since the authorities already have procedures for the control of regeneration, for example, they easily can also check whether a single shareholder has

¹⁸ SFS 1993:53, Skogsvårdslagen (*The National Silvicultural Act*)

¹⁹ At the beginning of the 1990 virtually all subsidizes were removed by the right wing government. The present social democratic government which, after the 1994 election came back to power, has not changed this policy.

actually planted the number of pine trees he is subsidized for, by the common. In practice, no money is paid until the shareholder can provide a signed form from the local extension ranger.

The common forests simply pay the authorities for this service. Accordingly, they do not have to bear the costs for maintaining their own control system—to control forestry activities requires a significant skill in forestry. This “co-management” suits the state authorities fine, because in the present era of making the public sector more “profitable” the forest authorities are more commercial and market oriented.²⁰ In this way the commons also protect themselves from future disputes with the authorities regarding demands for biodiversity, the preservation of protected biotopes, etc. Moreover, the commons externalize the costs for keeping up with rules and regulations related to these matters.

4.1.3 Keeping up with technology:

When forestry was a manual enterprise, all commons had their own staff of cutters. Today there are virtually no manual cutters left in Swedish forestry. The commons have faced a significant pressure to adjust to these changes. Only some of the biggest commons have their own machinery operated by their own personnel. The largest common has 45 employees.²¹

One method of dealing with technological change is to externalize the costs for its renewal. Thus, most commons practice stumpage sale; ten years ago timber auctions dominated.²² By using this practice, the buyer has to defray the cost for the technology, and for its development, improvement, and renewal.

Where no market for stumpage sales exists, delivery agreement and renewable felling contracts are common (for instance in the county of Dalarna where a formal buying cartel exists). These agreements can be based on harvesting with the commons' own machinery, but generally most commons have reduced their machinery inventories and externalized the costs to companies. If we compare the three biggest commons in the county of Dalarna—where stumpage sale is not practiced—it is evident that commons doing all their harvesting with their own machinery and personnel

²⁰ Note, however, the perverse situation this creates when the monitor is controlling it self. If a common buys the service of “planting new trees” on an area, from the authorities, even this area is submitted for control. However, if the regeneration fails, or in other ways deviates from rules and regulation, the authorities hardly can criticize the commons—since they did the work themselves!

²¹ The second biggest common, however, has no machinery and less than 10 employees.

²² Both regarding stumpage sale and auctions buyers bid on standing timber. The main difference is that stumpage sale is a closed procedure. In a closed session the board of the common accept or reject the bids. The board can also decide that none of the bids are acceptable. The commons stopped using auctions when they got indications of the existence of cartels among buyers.

have developed a quite different policy regarding the distribution of revenue. Diagram 1 illustrates the relation between money ("profit") distributed among the shareholders and the price of timber.²³ The lines represent three separate commons, Älvdalen, Orsa and Lima. Each line captures the observations as a simple curve fit.²⁴

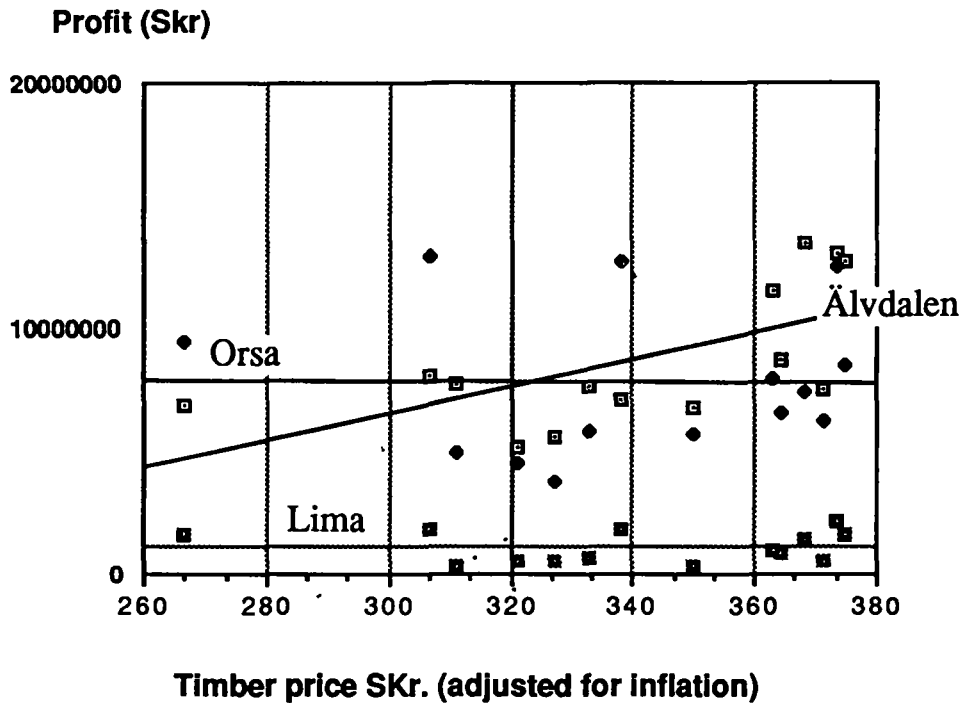


Diagram 1. Relation between revenue distributed among shareholders and timber price in three common forests.

In Älvdalen Common Forest, which lacks its own machinery, it is a clear relation between the market price on timber and money paid to the shareholders. In the two others, which do all their harvesting with their own machinery, no correlation exist between timber price and cash amounts. This can be interpreted in two ways. Holding machinery and personnel is inefficient. Because the maintenance of machinery is so expensive, they cannot pay the shareholders more, even if the prices increase. The other interpretation, supported by interviews made in the commons, is that this behavior reflects a conscious policy to support and develop the local area. This is primarily done by reinvesting in the commons and thereby

²³ The diagram also includes economic support for general puposes in the district such as roads.

²⁴ Älvdalen, $R^2 = 0.63$; Orsa, $R^2 = 0.01$; Lima, $R^2 = 0.02$

contributing to the local economy. They do not “have” to pay for holding machinery and personnel, they have chosen it!

4.1.4 Conflicting claims on the rights of using the forests—the Sami population

The majority of all common forests are located in areas with reindeer herding. The Silviculture Act, §20 stipulates that consultations must be held with the Sami population before any logging can be performed on lands they use as all-the-year-round areas.²⁵ The commons have solved the problem by negotiating with the Sami people before cutting, construction roads, etc. Since different groups of Sami have different historical locations, and patterns of moving their herds, one basic problem for the commons is to decide which groups they would regard as “concerned parties.” The commons have solved this problem by letting the Sami people themselves decide which group they regard as concerned by a particular logging operation.

This “co-management” with the commons seems to function quite well. Since 1971 there has been only one appeal against a logging decision made by a common.²⁶ Another indicator of the relative harmony between the reindeer herders and the common forests is how the Sami population treat the commons. The Sami population can quite legally, and independently of who owns the land, use the amount of wood they regard as necessary to build fences, shelters, etc. This right, however, is hardly used at all on common forest land; it is mainly exercised on state owned land. Finally, it has not been observed that those Sami families who are shareholders in commons have adopted any special attitude regarding the forest management.²⁷ It is evident that the Sami population make a clear distinction between the privately owned land (companies and commons included) and state owned land, which they in different forums lay historical claims on (Bengtsson, 1994). To summarize, since the commons adjust their activities to the reindeer herding, the relation with the Sami is remarkably free from conflicts.

²⁵ Moreover, permission from the forest authorities is always required for any logging on lands close to the high mountain area.

²⁶ A more intensive investigation with regard to the county of Norrbotten, which has the highest number of Sami, verifies the relative harmony between the common forests and the Sami population. Out of 72 appeals against decisions made by commons between 1976 and 1994, none were brought by the Sami.

²⁷ Carlsson, 1995:50–53.

4.1.5 Hunting and fishing as an access problem:

One of the effects of industrialization is urbanization. This has also affected the Swedish Common forests. When people move into cities, the commons gradually lose their base of local people. This is quite different from many other commons round the world, where the population rather increases, and as a consequence causes pressure on the commons. Paradoxically, however, even along with a decreasing number of farmers, the Swedish common forests are faced with an increased pressure, because even if younger generations more often live and seek their living in the cities, they tend to keep some type of ownership in the share holding farms. This can be done in different ways such as splitting the farms and joint ownership.²⁸

The purpose of joint ownership is twofold. The main reason is to maintain the rights to hunting and fishing that are connected to the share holding. A second but probably almost as important reason is desire to keep the social connection to the native districts (Blix, 1986). Consequently, the commons have to regulate the numbers of hunters; fishing is a minor problem. With reference to the matrix, figure 3, the access to the resource is widening. At the same time the appropriation is regulated by the state; moose hunting is licensed by the County Administrative Board. Accordingly, the problem is not a question of over-consumption, it is rather a question of who shall be allowed to obtain access to the system.

The commons have tried to solve this problem by creating rules to regulate the hunting. These rules always reflect local circumstances. For example, there are commons where only local citizens and their children are allowed to hunt, while other commons have developed more generous rules. Some observers have found it peculiar that the shareholders can spend significant time and mental energy discussing access to hunting, while the same people do not engage themselves in budget issues, representing millions of dollars. If one appreciates that the access to the commons—and by this also access to one's native district and to the hunting—represents significant, non-monetary value, this behavior is quite logical.

The situation in regard to the hunting represents an “unstable” square in figure 3. By crafting clear and reasonable rules, the commons try to stabilize the situation, and by this they eventually circumvent future costs connected the question who is eligible to hunt and who is not.

In this and in the previous four section five types of problems have been discussed. It has been demonstrated how the commons have tried to solve these problems, but is their way of solving the problems good, efficient,

²⁸ Twelve different methods of jeopardizing the old share holding system—all legal—have been identified. As a consequence, there are single farms owned by about 50 individuals. (Carlsson, 1995:6)

etc.? Have they succeeded in their efforts? These questions boils down to a more general problem. How can the performance of an institutional arrangement such as the Swedish common forests be evaluated? This is the topic for next section.

5. CRITERIA OF PERFORMANCE

In this section the performance of the Swedish common forests will be evaluated, but for this purpose some criteria are needed. In accordance with the analysis of institutional arrangements conducted by Ostrom, Schroeder and Wynne (1993), five different criteria will be applied; *economic efficiency*, *fiscal equivalence*, *redistribution*, *accountability*, and *adaptability*.

A rough estimate of *economic efficiency* of the common forests can be made by answering two questions: Are the forest resources managed in a sustainable manner, and does the economic output of the forestry exceed the resources that are spent to run the commons? The answer of both questions is yes. The commons do generate a "residual" which is used for different purposes, but this is not paid by decreasing the biomass of the forests—only 70% of the annual increment is harvested.²⁹

Fiscal equivalence is the idea that those who benefit from an institutional arrangement also ought to bear a proportional burden of its maintenance. This is not the case with the Swedish common forests. There is no direct flow of resources from the single shareholders to the commons. The shareholders have all the benefits of being members of the system, but they make no direct contributions to the commons. The only way they contribute is indirect; i.e., the costs for the maintenance of the commons is already deducted when the shareholders receive their endowments. Since the share holding companies do not receive economic resources in accordance to their amount of shares, it can be argued that they have to contribute proportionally more than they gain. Taken these observations together, the fiscal equivalence can be regarded as fairly low.

The same goes for *redistribution*. There is no policy adopted to redistribute resources among the shareholders; every one is supposed to be endowed with cash amounts in proportion to his share holding. The fact that the companies do not receive economic resources proportionate to their shares might indicate a policy of conscious redistribution from rich to poor, but this is an over hasty conclusion. This behavior only has the effect that the collective of private shareholders has a bigger amount of money to distribute among themselves; both "rich" and "poor" shareholders benefit from this.

²⁹ The figure 70% is the average for the period 1975–1993. The figure is obtained by dividing the annual harvesting with the forests own production of biomass. See Carlsson, 1995:13.

Since shareholders are subsidized, for planting, draining, etc. (i.e., activities performed on their own private lands) resources are allocated to the active farmers. This, however, is not primarily a redistribution policy; it is rather a reflection of a local economic policy to strengthen the district, which prevailed when the commons were created. In general, it can not be argued that the Swedish common forests have adopted a conscious strategy of redistribution.

The degree of *accountability* depends on the quality of the connections between those who are making decisions and the members of the commons, i.e. the shareholders. Thus, depending on local circumstances, accountability varies between different settings.³⁰ Generally the assembly of the shareholders elects the board of the common, including the chairman. The members of these boards and the employed forest rangers are held responsible for all activities related to the management of the commons. Moreover, each member has the right to appeal against any decision that he regards as unlawful.

One indicator of accountability might be to what extent individuals are engaged in matters related to the commons. High levels of activity presumably promote accountability. For example, do shareholders attend the meetings, or do they try in other ways to influence the decisions made? The logic would be that such a behavior gives witness of an active community, where people try to hold representatives accountable. This can be compared to settings where no one cares, and where representatives presumably can run their own show.

It should be noted, however, that some commons have a significant number of elderly people, who rarely attend the assembly meetings. In these commons it can be problematic to form groups competent to make decisions. In others, however, the situation is reversed; i.e. active shareholders frequently attend the meetings, and a significant number of people are willing to hold seats in the assembly boards.³¹

In discussing accountability it must also be added that there are many local variations of the organization of the commons. Two of the commons practice an administrative system retained from first part of the seventeenth century. In these commons the geographical area is divided into "rotar" with a responsible farmer in each one of them.³² This person is elected by the

30 In two of the commons there have been open conflicts (appeals, discussion in media, etc.) between groups of shareholders and the boards. Whether these conflicts reflect a major lack of "democracy" within these commons is unclear.

31 Älvdalen Common Forest in the county of Dalarna and Sorsele Common Forest i Norrbotten are examples of these opposits.

32 Originally the farmers in each rote were responsible fo equipping and maintaining one soldier in readiness for the national forces. Each *rote* was named and the soldier wore the same name, for example "Brave," "Battle" and "Steelneck."

farmers. On behalf of the commons he keeps track of all the changes in ownership and share holding in his "rote." He also distributes the cash amounts in his area. As a consequence, these commons have very good records of their owners, which indeed not is the case in other commons in the same district.³³

Moreover, one of the commons in the high mountain area does not have assembly meetings at all. The villages elect representatives who form a mini assembly which in turn elect the board. The representatives are held responsible at local village meetings. Finally, the northern-most common forest is collectively owned by "all the people in the community." Today this is interpreted as the "municipality." Thus, this common is regarded as a branch of the municipal affairs, comparable to the public bus company.³⁴

In summary; the commons generally are organized to provide a high degree of accountability: two assembly meetings per year, open elections, free access to records of the meetings, open records over the economy³⁵ and legal rights to appeal.

When the common forests were created, Sweden was an agriculture nation.³⁶ Therefore, the income from the commons was designated to support agriculture. Soon the commons began to support a general mechanization of the farms, the establishing of dairies and insemination stations, renewal of farm buildings, and so forth. The fact that the commons still exist as vital producers of timber is an indicator of their capacity to adapt to changes in the environment. This *adaptability* is also verified by historical research.³⁷ The main change that can be observed is a gradual shift from policies supporting agriculture to policies which support forestry. Today the main part of all subsidies are designated to forestry.

Another example of the commons' adaptability is the modernization of their forestry. This is primarily reflected in mechanization, and reduction of personal. According to experts, their harvesting techniques are as good as techniques used by other forest owners who possess comparable amounts of

33 During the past five years, Älvdalen Common Forest in the same County, has spent about \$300,000 US to figure out who is the legal owner of what and how many shares these people are eligible to possess.

34 As a consequence, this common has a board appointed by the municipal council. When the political majority in the council changes, so does also the board of the common forest.

35 Like private companies, the commons also keep some information secret, for example, bids on standing timber and felling contracts. However, the substance of these agreements are possible to control by reading the annual financial report.

36 The number of commons are the same as when they were created, and only marginal changes of their areas have been made.

37 See Boetius, 1950, or Liljenäs, 1977. Boetius deals with the the history of the municipality of Orsa, while Ingrid Liljenäs focuses on the common forests in the county of Norrbotten. Also Liljenäs, 1982, and Östlund, 1993 provide relevant information.

land.³⁸ The larger commons also utilize digitized maps, computerized accounting systems, and so on. The commons have adjusted to different demands emanating from different policies regarding natural conservation and other environmental concerns.³⁹ The same goes for the adaptation to certain types of formal rules related to taxation, accounting, labor welfare, social service, and so on.

Finally, as the earlier description illustrates, the commons have utilized the formal rules that regulate them with significant discretion. It has also been shown that the commons have voluntarily adopted state regulations which were not primarily designed to be applied to the commons. In short, the commons have managed to use some formal rules to their advantage, while at the same time they have treated others as obsolete or improper. In sum, the history of the commons as well as their ongoing actions, manifest a high degree of adaptability.

6. CONCLUSION

The Swedish common forests face virtually all the problems and costs that private forest companies operating in the timber market, do. They do have to keep up with forestry technology, and they must acquire relevant information concerning competitors, prices, and financing. They also have to reduce contracting costs, and so on. In addition, in their role as providers of public goods, the commons face a quite different set of transaction costs, compared to a private forest company or any other private forest owner.

Their main problems is to defend property rights, to regulate the access to the resource, and to control the appropriation of resource units. It has been shown that the commons have developed a variety of solutions to regulate access to their forest resources. It has also been demonstrated that the private forest companies, which have bought into the commons, do not exercise their property rights; i.e., they do not collect revenue in proportion to their amount of shares. The explanation is that the companies are submitting to local circumstances; they prize good relations with local actors higher than a short-sighted claim on economic compensation. Using the same logic, the commons also practice this strategy, for example vis-à-vis the Sami population.

These examples demonstrate that possible or convenient ways of exercising "rights," are not primarily dictated by the rights themselves but rather are circumscribed by local, norms and rules.

³⁸ This is verified in interviews with the extension rangers in all districts where commons are located (Carlsson, 1995).

³⁹ Even this is verified by the extension rangers who are responsible for the control of the local fulfillment of these rules and regulations (Carlsson, 1995).

- Puzzles and paradoxes:

Changes in the Swedish commons forests contain two paradoxes. The first has to do with the fact that, in the areas where the commons are located, the number of active farmers constantly have been reduced. As a consequence, the original base of local farmers has gradually disappeared. Since the population has decreased, this should logically lead to a reduced pressure on the commons and their resources. On the contrary, this development has created an increased pressure on the commons: 3000 new shareholders, with more claims on the resources have been added.⁴⁰ Thus, the Swedish common forests have kept their original organizational concept, but the basis of the commons—the private farmers—has gradually been replaced. This rises an interesting question: *when does a common cease to be a common?* This question is not elaborated on in the literature.

The second paradox has to do with the relationship to the state and its ambition to regulate the commons by the use of a separate law—a law the government has refused to change. Originally, one of the main objects of this law was to “defend” the farmers from the invasive behavior of the forest companies. With the help of *the same law*, however, a number of forest companies have now become solidly entrenched within the commons. This paradox illustrates the problems any authority encounters if it has ambitions to regulate a multitude of institutional arrangements—located in different places—with the same juridical framework.

Even though the commons formally are regulated in a great number of ways, locally, they seem to exercise significant discretion. Sometimes they regard the formal rules are as suitable for their purposes, but on other occasions they simply try to bypass them.⁴¹ A hypothetical but fruitless question is whether the commons would still have existed without the regulation of the state. It can also be asked whether the sustainable utilization of their forest resources would have been the case if they, in fact, had been allowed to harvest without supervision from state authorities?⁴²

- Commons in industrialized society:

The Swedish common forests provide a good illustration of the mixed or negotiated economy with floating borders between different sectors (Nielsen and Pedersen, 1989). To some extent the commons are formally regulated by

⁴⁰ This “pull” and “push” situation might be typical for a great number of commons in industrialized countries. The original commoners gradually disappear and are replaced by new actors who have quite different demands of the resource. This is illustrated in Edwards, 1995.

⁴¹ This is discussed more in detail in Carlsson, 1995.

⁴² The fact that the commons harvest far less than is allowed indicates that they have internal rules in use which are stricter than the official ones.

the state (the laws); on the other hand, they have a significant autonomy to make independent decisions. At the same time, they fraternize closely with the forest authorities, as well as actors in the timber market. Sophisticated systems of co-management are developed. This raises an important question: *how much co-management can local commons in industrialized society pursue before they lose their specific "time and place knowledge"?*⁴³

This has been discussed in regard to so called folk management of fisheries. Evelyn Pinkerton asks: "Under what conditions does an accommodation of systems to the state and the market take place without destroying the benefits of folk management?" (Pinkerton, 1994:321). She continues by assuming that too close co-management with state authorities will "strip [the folk system] of political power," while co-opting by the market may lead to the "shedding [the] obligations to be accountable to sound resource management and equity within the folk community" (p. 321).

This problem has also been discussed by Berkes, George, and Preston (1991). Like Pinkerton, they stress the fact that co-management has to be looked upon as a continuum from a simple exchange of information to formal control or partnership.⁴⁴ Where on this scale the "optimum" is located is hard to decide. Generally, the judgment of this depends on how one considers the trade-off between different criteria for success. It is, for instance, likely that high economic efficiency in the Swedish common forests, has been achieved at the cost of redistribution and equalization, among shareholders (see also Ostrom, Schroeder and Wynne, 1993:116 ff.).

Pinkerton (1994:322 ff.) utilizes two different scales to conceptualize co-management between the local fisheries and the state. A "horizontal continuum from nearly total self-management to nearly total state management [and a] top-down, vertical 'contracting out' model of state management" (Pinkerton, 1994:322–25, emphasis added).⁴⁵ Applied to the Swedish common forests, the first model would describe co-management only as a matter of cooperation. The commons cooperate with the forest authorities which receive income while the commons get adequate services.

According to the second model, in which the state is supposed to hold the legal and moral authority, rights are given away to the commons. The state authorities decide how all forests should be handled—for the commons even a special law has been created—while the commons are given the right to act in order to achieve some desirable results.

The case of the Swedish common forests, however, demonstrates that these tools ("scales") for discussing, and assessing the level of co-

43 See, Hayek, 1945. For an application of the concept see, Ostrom, Schroeder and Wynne, 1993:49 ff.

44 They utilize Arnstein's "Ladder of Citizen Participation" (Arnstein, 1969).

45 Here it is assumed that the same logic can be used to analyze co-management between commons, private companies, or other types of actors.

management between the commons, the state and private companies, are too simple. First, the state can hardly be conceptualized as an unity (Ostrom, 1985:14; 1991:41). In its relations to the commons, *different* units of “the state” have established commercial and political as well as juridical relations with the commons. State forest boards sell their services to the commons, “the state” provides the juridical framework, control the commons, and use them as tools to promote local economic policies.⁴⁶ Second, the Swedish common forests are neither completely managed by local people, nor are they composed solely by individual shareholders. From the very creation of the commons in the second half of the nineteenth century, the state supervised and partly decided the degrees of freedom for them. Third, as providers of private goods, the commons also (and simultaneously) have, developed close relations—felling contracts, stumpage sale, etc.—with private companies. Fourth, as providers of public goods, the commons also have developed systems of co-management with local public actors—schools, non-profit organizations, etc.

Obviously, the “life” of the commons are closely interwoven in the logic of industrialized society. A final conclusion drawn from the Swedish example might be that the commons have survived as prosperous timber producers and providers of public goods, not only because of their conscious reduction of transaction costs but also because this reduction has been made possible by a general fragmentation of the centralized state acting as a sovereign and a commercial actor at the same time. This fragmentation has provided a local “opportunity structure”⁴⁷ which the commons have utilized. Utilization of these opportunities has been possible because the commons, their forest managers, boards and assemblies of shareholders still possess a sufficient “time and place” knowledge to be able to adjust the commons to the industrialized society. The main lesson to be learned from the Swedish common forests, might be their successful integration rather than their separation from the logic of the negotiated economy and the industrialized society.

⁴⁶ See Carlsson, 1995:30 ff.

⁴⁷ The expression is influenced by Kitschelt, 1986 who uses the expression “political opportunity structure”.

References

- ACIR [Ronald J. Oakerson], (1987) *The Organization of Local Public Economies*. Washington, D.C.: Advisory Commission of Intergovernmental Relations.
- Ascher, William, (1995) *Communities and Sustainable Forestry in Developing Countries*. San Francisco: ICS Press.
- Beckett, J. V. (1989) *A History of Laxton : England's Last Open-Field Village*. New York: Blackwell.
- Bengtsson, B., (1994) "The Legal Status to Resources in Swedish Lapland," in Berge, Erling, et al, *Law and the Management of Divisible and Non-Excludable Renewable Resources*. Department of Land Use and Landscape Planning, Aas, Norway.
- Berge, E., et al, (1994) *Law and the management of divisible and non-excludable renewable resources*. Department of Land Use and Landscape Planning, Aas, Norway.
- Berkes, Fikret, Peter George and Richard Preston, (1991) "Co-Management: The Evolution of the Theory and Practice of Joint Administration of Living Resources." *Alternatives*, 18(2), pp. 12-18.
- Blixt, H., (1986) *Utbors motiv för och attityder till skogsägande*. Examensarbete nr. 221, Institutionen för fastighetsekonomi, Tekniska Högskolan i Stockholm.
- Blomquist, William, (1992) *Dividing the Waters: Governing Groundwater in Southern California*. San Francisco: ICS Press.
- Boetius, J., red. (1950) *Orsa en sockenbeskrivning*. Orsa: Orsa Jordägande Sockenmän
- Bromley, D., red. (1992) *Making the Commons Work*. San Francisco: ICS Press.
- Buck, Susan J. [Cox], (1988) "Interjurisdictional Management in Chesapeake Bay Fisheries." *Coastal Management*, 16, pp. 151-166.
- Carlsson, L., (1995) *Skogsallmänningarna i Sverige. (Common Forests in Sweden.)* Research Report, TULEA 1995:22, Luleå University, Sweden.
- Dyer, Cristopher L. and James R. McGoodwin, eds., (1994) *Folk Management in the World's Fisheries: Lessons for Modern Fisheries Management*, Niwot Co: University Press of Colorado.
- Edwards, Victoria, (1995) "The New Forest Commons, Hampshire: Horse-Riders, Mountain-Bike Riders, Free-Riders." Paper presented at the International Association for the Study of Common Property conference, Bodø, Norway, may 25-29.

- Hanf, Kenneth and Theo A.J. Toonen, eds., (1985) *Policy Implementation in Federal and Unitary Systems. Questions of Analysis and Design*. Dordrecht: Martinus Nijhoff Publishers.
- Hayek, F. A., (1945) "The Use of Knowledge in Society." *American Economic Review* 35 (Sept.), pp. 519–530.
- Hardin, Garrett, (1968) "The Tragedy of the Commons." *Science*, Vol. 162, pp. 1243–1248.
- Kitschelt, H. P., (1986) "Political Opportunity Structure and Political Protest: Anti-Nuclear Movements in four Democracies." *British Journal of Political Science*, 16, pp. 57–85.
- Liljenäs, I., (1977) *Allmänningsskogarna i Norrbottens län (The Common Forests in Norrbotten County)* Umeå: Kungliga Skytteanska samfundets handlingar, No. 16. 1977.
- Liljenäs, I., (1982) *Besparingsskogarna i Kopparbergs och Gävleborgs län samt allmänningsskogarna i Norrbottens och Västerbottens län*. Rapport A:34, GERUM, Umeå Universitet.
- Martin, Fenton, (1989) *Common Pool Resources and Collective Action: A Bibliography*. Bloomington: Workshop In Political Theory and Policy Analysis, Indiana University.
- Martin, Fenton, (1992) *Common Pool Resources and Collective Action: A Bibliography*. Bloomington: Workshop In Political Theory and Policy Analysis, Indiana University, Volume, 2.
- McKean, Margaret A., (1992) "Management of Traditional Common Lands (*Iriaichi*) in Japan," in Bromley, Daniel W., ed. *Making the Commons Work*, pp. 63–98.
- Merlo, M. (1995) "Common Property Forest Management in Northern Italy: A Historical and Socio-Economic Profile." *Unasylva*, Vol. 46, pp. 58–63.
- Munro, John F., (1993) "California Water Politics: Explaining Policy Change in a Cognitively Polarized Subsystem," in Sabatier, Paul A. and Hank C. Jenkins, eds. *Policy change and learning. An Advocacy Coalition Approach*, Bolder: Westview Press, pp. 105–127.
- Netting, Robert McC., (1981) *Balancing on an Alp: Ecological Change and Continuity in an Swiss Mountain Community*. New York: Cambridge University Press.
- Ostrom, E., (1990) *Governing the Commons*. New York: Cambridge University Press.
- Ostrom, E. and Margaret McKean (1995) "Common Property Regimes in the Forest: Just a Relic From the Past?" *Unasylva*, Vol. 46, pp. 3–15.
- Ostrom, Elinor, Larry Schroeder and Susan Wynne, (1993) *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*. Boulder: Westview Press.

- Ostrom, Vincent, Charles M. Tiebout and Robert Warren, (1961) "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry." *American Political Science Review*, 55 (Dec.), pp. 831–842.
- Ostrom, Vincent, (1985) "Multiorganizational Arrangements in the Governance of Unitary and Federal Political Systems," in Hanf, Kenneth and Theo A.J. Toonen, eds. *Policy Implementation in Federal and Unitary Systems. Questions of Analysis and Design*. Dordrecht: Martinus Nijhoff Publishers.
- Ostrom, Vincent (1991) *The Meaning of American Federalism*. San Francisco: ICS Press.
- Pettersson, (1987) "Tragedin på allmänningen," in *Från Vida Fält: Festskrift till Rolf Adamsson*, 25.10 1987," Stockholm.
- Pinkerton, Evelyn, (1994a) "Economic and Management Benefits from the Coordination of Capture and Culture." *North American Journal of Fisheries Management*, 14(2), pp. 262–277.
- Pinkerton, Evelyn, (1994b) "Summary and Conclusions," in Dyer, Cristopher L. and James R. McGoodwin, eds., *Folk Management in the World's Fisheries: Lessons for Modern Fisheries Management*, Niwot Co: University Press of Colorado.
- Roe, Emery (1994) *Narrative Policy Analysis*. Durham: Duke University Press, pp. 86–107.
- Sabatier, Paul A. and Hank C. Jenkins, eds., (1993) *Policy change and learning. An Advocacy Coalition Approach*. Bolder: Westview Press
- Sandberg, Audun, (1994) "Community Fish or Fishing Communities." Paper presented at the EU/AIR Programme Workshop: Social Issues and the Socio-Economic paradigm in Fisheries Management, Brussels May 5–6.
- Schlager, Edella, (1995) "State-Centered Management and Local Level Revolt: The Case of Arizona Groundwater Management." Paper presented At the International Association for the Study of Common Property conference, Bodø, Norway, may 25–29.
- Wilson, James, (1993) "Self-Governance in the Maine Lobster Fishery." Paper prepared for the. Word Wildlife Fund, University of Maine.
- Workshop In Political Theory and Policy Analysis, (1989) *Common Pool Resources and Collective Action: CPR Projects Abstracts: Fisheries*. Bloomington: Workshop In Political theory and Policy Analysis, Indiana University.
- Lag om allmänningskogar i Norrland och Dalarna*. SFS 1952:167. (Act Relating to Collectively-Owned Forest Lands) Swedish Code of Statutes, SFS 1952:167.
- Skogsallmänningar* Ds Jo 1984:15. (Common Forests) The Swedish Commission on Collectively-Owned Forest Lands Ds Jo 1984:15.

- Zimmermann, Robert C., (1995) *The Common-Property Forests of Canton Ticino, Southern Switzerland: Relations Between a Traditional Institution and the Modern State*¹⁸⁰⁵⁻¹⁸⁴⁴. Unpublished manuscript
- Östlund, L., (1993) *Exploitation and structural changes in the north Swedish boreal forest 1800-1992*. Dissertations in Forest Vegetation Ecology 4, Sveriges Lantbruksuniversitet, Umeå.