Forest Commons in Boreal Sweden

Aims and Outcomes on Forest Condition and Rural Development

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Doctoral Thesis
Swedish University of Agricultural Sciences
Umeå 2009

Acta Universitatis agriculturae Sueciae
2009:96

ISSN 1652-6880
ISBN 978-91-576-7443-2

Print: Arkitektkopia 2009

Forest Commons in Boreal Sweden. Aims and Outcomes on Forest Condition and Rural Development (Doctoral Thesis)

Abstract

This thesis is based upon five studies that assess the performance and success of the Swedish forest commons (FCs), by comparing their outcomes (in the present context) with the intentions and aims expressed by relevant officials and commentators at the time of their establishment. The overall objective was to contribute to the understanding of factors that promote development of local institutions that enhance forest conditions and local well-being (rural development). A quantitative, comparative, and case study approach has been applied, in which forest commons in several regions have been compared with one another, and with other property regimes within the same regions. In the first study, the state of the forests in all 33 forest commons was assessed, using National Forest Inventory data, and they were compared to other forests within the same municipalities. Results revealed that harvesting has been relatively limited in the forest commons in Västerbotten and Norrbotten. By a case study in a single municipality: forestry production parameters, sales revenues, operating costs and investments, disposable income and local municipal tax revenues were assessed. Results indicated that shareholders' land was less intensively managed than non-shareholders' land and thus contributed less economically. In the third study biodiversity indicators were assessed in all commons and forests in the surrounding municipalities. This examination provided no unequivocal evidence that forestry has been conducted in the commons in ways that have promoted biodiversity more effectively than in forests of other ownership categories. Fourthly, dividend data were compiled to assess and compare the extent of the economic support and its availability to support rural development in three FCs. The perceived contentedness with the contribution of each FC was also assessed. Results revealed large differences between the three cases, and a positive correlation between the extent of the economic support and its availability to support rural development and contentedness. The results obtained in the fifth study indicate that the government continues to have a strong, direct influence on the management of FCs in Sweden. Taken as a whole, results clearly reveal large disparities between the Swedish FCs and points out the importance of an enabling environment for successful outcomes of the FC.

Keywords: Swedish forestry, forest resources management, community managed forests, Swedish forest commons

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Dedication

To my family.

”Om du försöker hitta hem men istället hittar en grop, kan du försöka att leta efter en grop. Då skulle du med all säkerhet inte hitta en grop, vilket skulle vara bra, för då kanske du hitter någonting du inte letar efter, vilket skulle kunna vara precis det du letar efter.”

Nalle Puh

Contents

List of Publications

This thesis is based upon the following papers, which are referred to in the text by the corresponding Roman numerals (and, for convenience, the studies described in Papers I to V are sometimes referred to as Studies I to V, respectively):

I Holmgren, E. Lidestav, G. and Kempe, G. (2004). Forest Condition and Management in Swedish Forest Commons. *Small-scale Forest Economics, Management and Policy* 3(3), 453-468.

II Holmgren, E. Holmgren, L. and Lidestav, G. (2007). Comparison of Harvesting and Business Activities of Non-shareholders and Shareholders in a Forest Common in Västerbotten, Sweden. *Scandinavian Journal of Forest Research* 22, 582-592.

III Holmgren, L. Holmgren, E. Fridman, J. and Lidestav, G. (2009). *Biological Diversity Indicators - a Comparison of Swedish Forest Commons and Other Forest Ownership Categories*. Accepted for publication in the *Scandinavian Journal of Forest Research*.

IV Holmgren, E. and Lidestav, G. *Benefit Use and Local Well-being in Three Swedish Forest Commons* (manuscript).

V Holmgren, E. Keskitalo C. and Lidestav, G. *Swedish Forest Commons- a Matter of Governance?* (submitted to *Forest Policy and Economics*).

Papers I-III are reproduced with the permission of the publishers. Paper III is a preprint of a peer-reviewed and accepted article, whose final and definitive form will be published in the *Scandinavian Journal of Forest Research*.

The contribution of Eva Holmgren to the papers included in this thesis was as follows:

I. 60 %

II. 50%

III. 40%

IV. 80%

V. 80%

Abbreviations

AC	The County of Västerbotten
BD	The County of Norrbotten
FC	Forest Common
FTR	Register of Real Estate Assessment
Ha	Hectare
M^3sk	Cubic meter standing volume (stem volume over bark from stump to tip)
NFI	Swedish National Forest Inventory
NIPF	Non-industrial private forest
SCB	Statistics Sweden
SEK	Swedish Crown (the currency used in Sweden)
SFS	Swedish Code of Statutes
TPR	Total Population Register
TSA	Tärna-Stensele allmänningsskog
W	The County of Kopparberg
X	The County of Gävleborg

1 Introduction

Sweden first became subject to a single body of law following the proclamation of the National laws (Magnus Eriksson's "Landslag") in the 14th century, and since then the state has had a legal interest in all of the Swedish forests. However, the expressions of the state's authority over (and interest in) the forests have varied over time, as have opinions regarding what the forests should produce and who should decide (Eliasson 2002, Eliasson and Nilsson 2002). The outcomes have been influenced by the interactions between the state and the local society (Appelstrand 2007), in a process whereby state control and individuals' rights of disposition have been continuously debated, negotiated and re-negotiated. For example, in the 14th century, the local society largely took decisions regarding the forests and their uses (Eliasson 2002, Kardell, 2003), but in the 16th century the Crown took formal control over the forests via proclamations issued by Gustavus Vasa (King Gustav 1). In the 17th century the Central power laid out a restrictive forest policy, but by the early 1900s the influence was back with the local society, with focus on food production on forest land. However, throughout this process the forest and its use were still subordinate to state interests, such as: accommodating demographic and regional-political aims; modernizing agriculture; boosting public finances; and (recently) addressing environmental concerns; in addition to meeting demands from the navy for construction material and ships' masts, from the mining industry for charcoal and stanchions, and from the wood-processing industries for raw materials (Törnqvist 1995, Lindgren *et al.* 2000, Eliasson and Nilsson 2002, Kardell 2003, Appelstrand 2007). The shifting policies prevailing at various times have been expressed in various rules and instruments – including Forestry Acts, management regulations, financial incentives and information instruments – that have defined who may own forest land, stipulated ownership conditions (property rights) and established institutional arrangements (property regimes).

Historically, the church and the nobility, together with the State and the peasantry, were all major owners of forest land (Törnqvist 1995, Kardell 2003). However, after the Reformation the church lost much of its forest holdings and following revisions introduced by Karl XI the nobility also lost much of their forests (Ibid). Thus, from the beginning of the 18th century the state and peasantry were the two remaining major forest owners (Ibid). At the time, the Swedish government was introducing sweeping land tenure reforms (the Great Redistribution of Land Holdings and the delimitation process), which involved fixing boundaries between Crown land (essentially state-owned land) and private land, but some areas in the interior of northern Sweden remained unallocated and 'unclaimed' (Stenman 1983). Pressures exerted by a growing population and increased international demands for timber accentuated the importance of finalizing these land tenure reforms. In the interior of northern Sweden, land was distributed with the additional intention to colonize and develop remote areas with no permanent population.

With ownership comes property rights, which according to Ostrom (2000, p 332), provide 'an enforceable authority to undertake particular actions in specific domains'. These property rights imply: rights of access, withdrawal, management, exclusion and alienation across a spectrum from minimal to full ownership rights. In principle, these rights and the resources to which they are connected can be held by single individuals, collectives or public bodies. However, Ostrom (2000) and Berge (2002) argue that the key issue is not who owns the property, but how the package of property rights is held, for example how the decision-making powers are distributed, the aims of ownership, and the procedures for exchanging the property. Thus, how the property rights are defined and protected by a society are key determinants of its economic and social development (North 1990, Berge 2003).

According to Irimie and Essman (2009) a property regime consists of "the whole structure of rights and duties characterizing the relationships between well-defined entities (individuals or communities) with regard to a precise resource" (Irimie *et al.* 2009). For sustainable use of forest resources, efficiently functioning property regimes and institutions are vital (Nilsson 2005). This requires a good match between the property regime, the institutions involved, the expected outcomes and the specific social, cultural and ecological environment in which it is established (Ostrom 1990, North 1990). At the beginning of the 19th century, the prevailing opinion was, in true liberal spirit, that private management and minimal state interference provided the best match for efficient use of the forests (Eliasson and Nilsson

2002, Pettersson 2003, Kardell 2003). However, in the mid-19th century, the state started to reconsider the decision to distribute all forestland to individual farmers, as a result of problems arising from breaking up the traditional forest commons, the privatization of Crown land and the increasing demands for raw material from the forest industry. According to Pettersson (2003), at that time the state regarded itself as the most competent forest manager and after management by the state it considered a new, regulated type of forest commons to be the best alternative. Farmers, naturally, desired the land to be distributed amongst them, but also the general opinion amongst the Swedish population was in favor for the protection of individual property rights. However, the farmers' self-interest was eventually overruled since the state perceived several advantages of establishing forest commons, and the common interest in goods[1] was regarded as more important than individual property rights (Pettersson 2003). Consequently, in the mid-19th century, during the finalization of the tenure reforms, the state began to introduce regulated commons in Northern Sweden; the Swedish forest commons (Pettersson 2003). These Forest Commons (FCs) and the associated property regimes are the foci of this thesis and the studies it is based upon.

1.1 What is a common?

First of all, it should be emphasized that a common property is a property to which access is limited to a specific group of users who hold their rights in common (McKean 2000), and thus must not be confused with the kind of open access situation described by Hardin in the influential article 'The Tragedy of the Commons'[2] in 1968. Berge (2002 p.3) states that commons are regimes or 'social institutions for managing and distributing benefits from resources held jointly or in common'. In a jointly owned common, the ownership is linked to the place and the person, so the right cannot be transferred to descendants or taken with owners who leave the community (Berge 2003). In a common owned in common, the owners hold shares in the common property, which can be transferred to descendants and also kept after the shareholder has moved away from the community (Ibid).

[1] The common good may here be understood as the greatest possible good for the greatest possible number of individuals (cf. Pettersson 2003)

[2] One of the statements in this article by Hardin was; "freedom in a common brings ruin to all." (Hardin, 1968). If a resource is held in common for use by all, then ultimately that resource will be destroyed even when it is clear that it is not in anyone's long-term interest for this to happen.

One advantage of establishing common property regimes is that they meet the need for management of a resource when open access or non-management threatens to deplete it (McKean 2000, Berge 2003). At the same time it offers a way of privatizing rights to goods without sub-dividing them, which may be advantageous in situations where parceling out a resource is impossible or undesirable, e.g. many natural resource systems are far more productive when left intact than when sub-divided (McKean 2000). Keeping ownership in the hands of a collective rather than individually is preferable, according to Berge (2003), when the desired outcome focuses on shared benefits. Similarly, the system is also useful: if there is a need to solve collective action problems and develop synergies between primary production and other rural activities; when exclusion of appropriators is necessary; or when a 'safety net' for the poor and for new generations is required (Ibid). In contrast, most economists consider individual ownership an essential aspect of economic development because it putatively provides major advantages, notably greater incentives for the individual owner than common property regimes (Ostrom 2000). Further, according to Ostrom (2000), many economists believe that collective ownership is accompanied by three sources of inefficiency, compared to individual ownership: higher transaction and enforcement costs, rent dissipation and low productivity.

1.2 What Characterizes a Successful Common-property Regime?

According to Agrawal (2001 p.1650) successful commons are usually defined as institutions "that last over time, constrain users to safeguard the resource, and produce fair outcomes". Some general characteristics of successful common-property regimes have been identified from studies of numerous cases in diverse parts of the world. In 1990 Ostrom published an influential book in which she considered the problem of collective management of shared resources. Although she has insisted that each common needs to be examined individually, she also delineated a set of eight 'general' design principles or recommendations for successful commons. The principles described in this landmark study by Ostrom have since been expanded, with contributions from other authors (cf. Baland and Platteau 1996, McKean 2000, Agrawal 2001, 2002, and Wade 1988), into a larger set of principles, and features, that are presumed to be positively correlated to "robust institutional performance" in a common (Agrawal 2002). Examples include: fairness in allocating benefits from common resources; establishment of

clearly defined boundaries; ensuring that managers are either resource users or accountable to them; and mechanisms to alter the rules and quickly resolve minor conflicts that are controlled by the users themselves. Further, common-property regimes will be more effective if the user groups are allowed to organize themselves without external interference and central government does not undermine local authority. If the management institutions are very large, they need to be hierarchical, with considerable devolution of authority to the lower levels (cf. Agrawal 2002, McKean 2000). In addition, it is believed that common-property regimes work best when established in areas where the users have a tradition of cooperating with each other, share norms, have successful experiences of commons in the past, and there is homogeneity of identities and interests with few conflicts. Overlaps between user groups' residential locations and resource locations are also believed to be beneficial (Agrawal 2002). Administrative support is also considered to be advantageous, while financial support, in contrast, appears to restrict local cooperation and is, therefore, not beneficial (McKean 2000). In addition, Olson (1965) argues that the size of the group is important and above a certain threshold, size and success are likely to be negatively correlated. Adopting these options is likely, as Agrawal (2002, p.71) states, to "spur local institutional innovation where users develop clear criteria for group membership, match harvesting rules to the regenerative capacities of the resources they own, and articulate better with state-level institutions."

For further research on commons, their dynamics, the purposes for which they are suited and the conditions they perform well under, Agrawal (2001 p.1649) recommends statistical, comparative and case study approaches rather than the frequently used "flawed and impossibly costly research task of generating lists of conditions under which circumstances commons are governed sustainably". Berge (2002) also argued that comparative analysis of a variety of commons, in a variety of settings, would be an efficient strategy for increasing our knowledge of their dynamics, efficiency and key variables affecting them. He further stressed the importance of conducting more research on commons in Western Europe, and the need to consider perspectives other than historical and legal history. In addition, it is important to study both successful and unsuccessful cases in order to identify (and elucidate the effects of) factors that promote the development of local institutions that successfully enhance forest conditions (Gibson *et al.* 2000). Thus, the Swedish forest commons that were established in Northern Sweden between 1861 and 1918 provide excellent study objects to address the issues explored in this thesis. In accordance with

the recommendations of Agrawal and Berge, the Swedish FCs have been studied using a comparative approach, searching for and examining both "successful" and "unsuccessful" commons' features.

2 Objectives, Research Design and Delimitation of the Thesis

The overall objective of the studies this thesis is based upon was to examine the outcomes of the Swedish forest commons in relation to the intentions and aims expressed by officials and commentators at the time of their establishment, interpreted in the present context, and hence contribute to the understanding of factors that foster the development of local institutions that successfully enhance forest conditions and rural development. Theoretically, the influence and outcome of the introduction of this specific property regime (Swedish forest commons) should ideally have been examined by comparing the situation before establishment with the outcome, thus by an ex-ante and ex-post comparison. However, for obvious reasons this has not been feasible, as in most cases where social phenomena are studied and policies are evaluated. Therefore, the option, between-property regime and between-region comparison, has been applied.

More specifically, the objectives and research design have been:

- To identify the aims and means of establishing the Swedish forest commons.

- To examine and compare forests under forest common and other property regimes in terms of current forestry-related variables, as a manifestation of the practical effects of the management regimes that have been applied.

- To examine if shareholders' harvesting and business activities, and their contributions to the local economy/rural development, are greater than

those of non-shareholders, and if the forest commons have served as role models for their shareholders.

- To examine and compare forests under forest common and other property regimes in terms of biodiversity, by analyzing biodiversity indicators corresponding to the interim targets for enhanced biological diversity.

- To assess the extent to which three forest commons have contributed to rural development and shareholders' contentedness**.**

- To assess the relationship between government and broader governance, by describing and analyzing the interactions between the state (via its bureaucratic bodies) and the Swedish forest commons.

- To discuss research findings in relation to the aims of the Swedish forest commons and, in a broader context, of forest common property regimes.

The following section of this text briefly reviews literature addressing the intentions and aims of the FCs, and the process whereby they were established. Then the five studies the thesis is based upon are outlined. Data pertaining to all 33 Swedish forest commons were considered in three of these studies, one was a case study focusing on the municipality of Storuman, in which all NIPF owners were included, and the other was a case study analysis of three commons, each representing one of three studied regions. As mentioned above, each of these studies has been presented in a separate paper (Papers I-V). Finally, the findings of the studies and their implications are considered in the *Discussion and Conclusions* section.

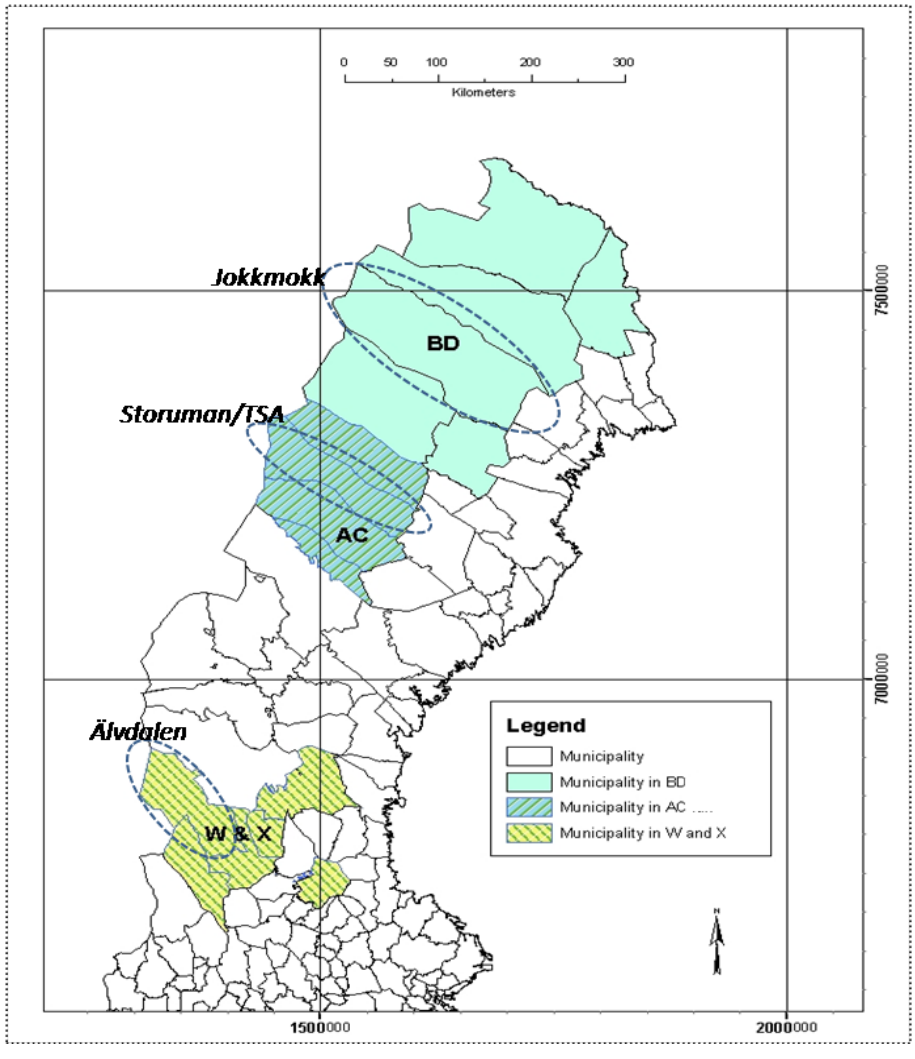

Figure 1. Map of research areas considered in Papers I - V. Papers I, III and V examined municipalities with forest commons in the counties of Norrbotten (BD), Västerbotten (AC), Dalarna (W&X), Kopparberg (W) and Gävleborg (X). The data presented in Paper II are related solely to Storuman – the municipality in Västerbotten marked with a circle. Study V was conducted in three municipalities, Älvdalen (in W&X), Storuman (in AC) and Jokkmokk (in BD), each representing one region. Each of these commons is marked with a circle.

In the first study (Paper I), 4.8 million hectares of productive forestland was considered in total (Figure 1), and forest conditions were compared between regions and between different property regimes. The second study (Paper II) was conducted using income-tax and forestry data from a single municipality – Storuman – with one of the largest forest commons in Sweden. In this study the activities and contributions of shareholders and non-shareholders were compared. Environmental considerations are central issues in contemporary forest policies. Thus, in a third study (Paper III) biological diversity indicators were compared region-wise between commons and other ownership categories. In a fourth study (Paper IV), the dividend and social aspects were assessed and compared between three selected commons, one from each region. The approach in this study was to assess the amount and local use of the dividend[3] (in Swedish, "utdelning") from each of the studied commons and, using a questionnaire, investigate the meanings and values local forest common shareholders' attribute to their forest common and how content they are with their common. Finally, in the last study (Paper V) policy mechanisms that have been used to steer the functions of forest commons were reviewed. The approach here was to identify major policy instruments relevant to forest commons from 1861-1996, and characterize regional differences in results between commons. The results help to explain the variations in results, between regions and regimes, presented in Papers I-IV. The outline of the project and the thesis is illustrated in Figure 2.

It should be noted that is not claimed that the papers present a complete assessment of all the workings of the commons, neither has variation within each region been fully examined and discussed. Furthermore, the aims of commons, and those of Swedish forestry, have been changing over time and will probably continue to change. An illustrative example is the aim for sustainable forestry. When the commons were established, sustainable forestry referred to criteria such as reliable yields of timber for sale (facilitated by bigger production units and rotation forestry), while today we might apply other or additional criteria, such as sustained or enhanced biodiversity. Thus, from history we learn that criteria might change over time, and to allow enduring sustainable use of resources we need resource management systems that are sufficiently flexible to meet changes in norms and conditions. By comparing outcomes from commons with other ownership categories we can obtain insights regarding the Swedish forest

[3] The dividend should here be understood as the part of the annual profit, (before 1976 after taxation and since 1979 before taxation) that is distributed to the shareholders or to common goods.

commons' relative resilience in this respect (cf. Papers I-IV). The objective in Study V was to identify regional differences in the ways commons have been governed, which may help to explain differences in observed results between commons, ownership categories and regions found in Studies I-IV. These and other issues raised by the studies are outlined and discussed below, following a summary of the historical background and brief review of pertinent literature.

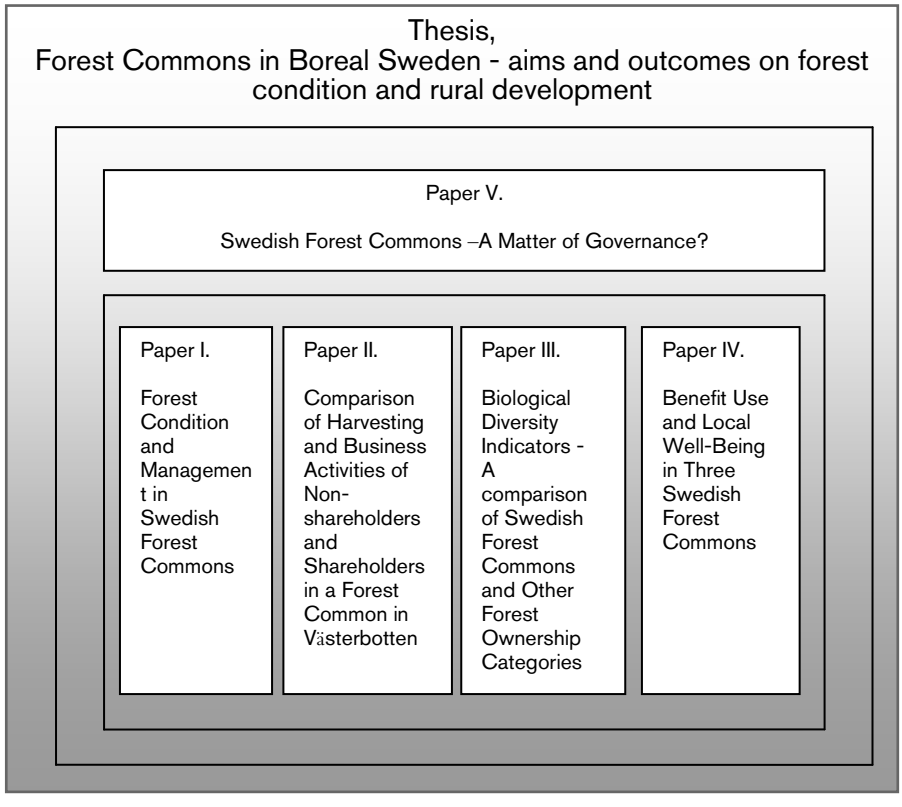

Figure 2. Outline of the project and the thesis.

3 Establishment and Features of Swedish Forest Commons

The interior of northern Sweden was considered unclaimed property until the end of the medieval period, when the Crown realized its value and claimed it. Colonization of the land was encouraged for various reasons, including: to populate the area, to increase the total area of farmland and to raise the tax revenues paid to the Crown (Stenman 1983). Thus, it was necessary to establish boundaries. Each farm in the region was allocated some forest land, and the total area awarded to each of the farmers was primarily based on the extent of their arable land and its productivity, as well as the quality of the forests in the area. Thus, by this system the larger farmers got larger pieces of forest land allocated to them than the smaller farmers. By the mid-19th century only the interior of the counties of Västerbotten, Norrbotten, Kopparberg and Gävleborg remained unallocated (Pettersson, 2003, Stenman, 1983). In connection with the finalization of the Great Redistribution of Land Holdings in the counties of Kopparberg[4] and Gävleborg, and the delimitation of land[5] in the counties of Västerbotten and Norrbotten, 33 forest commons were established by designating a proportion (25-50%) of each owner's allocated forestland to form one large unit that was to be managed jointly (SFS 1952). Thus, Swedish forest commons are owned in common and managed by shareholders who also own other forest holdings on an individual basis. The decision right is proportional to the size of the share in the common.

The establishment of the Swedish forest commons began in 1861 in the counties of Kopparberg and Gävleborg. The last common areas were established 57 years later in Västerbotten (Liljenäs 1982, Carlsson 1995).

[4] The county name was changed to Dalarna on 1st January 1997.

[5] The delimitation process was a reform in which property rights and the boundaries between Crown land (essentially state-owned land) and private land were established (Stenman 1983).

During this period, many changes occurred in the general political conditions and forest legislation. At the same time, the forest industry underwent a period of economic and industrial development, whilst the authorities increased restrictions concerning the sharing of benefits from the land tenure reform. This was particularly true for the inner parts of Västerbotten and Norrbotten, where the 1866 regulations[6] (SFS 1866) concerning the disposal of forests, and the Revised Delimitation Regulations for Lapland in Västerbotten and Norrbotten from 1873 (SFS 1873), reduced the size of the forestland allocated to the farmers and abolished the free right of disposal of the forests (Arell 1979, Enander 2003). Following this, trees could only be felled with permission from a forest official. This made the forests less attractive to sawmill owners and farmers. In contrast, the law still permitted the sale of farms or cutting rights, thus providing forest companies speculative opportunities. The sawmill companies actively bought private forestland and cutting rights in the period from the late 1880s to 1900 (Arell 1979).

The Swedish forest commons are private forest holdings owned in common and managed jointly. Thus, the owners hold shares in the commons which can be transferred to descendants or sold, but only in association with their private estates. Further, the property rights can be retained after the shareholder has moved away from the community (Berge 2002). During the years since the commons were originally formed, the number of owners has increased considerably and many owners are now non-residents. Today there are about 25 000 shareholders (Carlsson 1999) of approximately 540 000 ha of productive forestland constituting the forest commons (Table 1). The owners range from private individuals to forest companies and public institutions, although individual ownership generally dominates. In total, a significant proportion (22%) of the forest commons is owned by forest companies and 2% are owners other than individual farmers or non-industrial forest owners (NIPF owners). Of the remaining 410 000 ha belonging to NIPF owners, 46% is owned by non-residents. Thus, a minor proportion of the commons is in the hands of local individuals. However, the ownership conditions vary greatly between the different commons and counties. In the counties of Gävleborg, Kopparberg and Norrbotten, the proportion of forest commons owned by companies is 24-26%, compared to just 6% in Västerbotten. The low proportion of forest company ownership in Västerbotten is probably partly due to these commons being established after 1906, the year which saw the introduction of 'Norrländska bolagsförbudslagen' (SFS 1906a), a law preventing the

[6] This law restricting the free distribution of the forests expired in 1949 (Arell 1979).

acquisition of forestland by forest companies and economic cooperatives. The result has been that the extent of the forest companies' forest ownership has remained unchanged in Norrland since the law was introduced.

All forest commons are controlled by the same national laws and regulations, including the Swedish Forestry Act (SFS 1993), which regulates the management of Swedish forests. However, their formal organization and activities are regulated by a specific law, the Forest Commons Law (SFS 1952). Each forest common also has its own set of by-laws, authorized by the County Administration, which regulates the direct management of the common (Carlsson 1995). Management decisions are taken jointly by elected boards and executed by professional foresters. The shareholders' formal rights with respect to decision-making are, in general, proportional to the size of their share. The Forest Commons Law (SFS 1952) and some of the by-laws, however, contain provisions designed to limit the dominance of the larger landowners. Associated with ownership there are hunting and fishing rights.

From the second half of the 19th century, forest management was mainly the responsibility of the Swedish Forestry Service (Domänverket). The Forestry Service supervised the state of the forests; management practices in the state-owned forests often informed the activities of other forest owners[7] (Enander 2000). In 1934, the supervision of the management of the forests was handed over to the County Forest Boards. Gradually, the authorities' control over the commons decreased, and as a result of the Forest Commons Law (SFS 1952) they attained the independence they have today.

The most important source of income from the forest commons is from the sale of standing or harvested timber. However, some of the forest commons[8] run subsidiary companies, e.g. selling hydroelectric power or processed timber products. The forest commons also hold savings in funds (Ministry of Agriculture 1983) and some have invested in the stock market and various local industries.

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[7] Until the end of the 1940s, the most commonly used management method was 'exploitation forestry' or 'high-grading' of forests. Such management regimes often created open, low-productivity forests (Enander 2001). This management strategy changed around 1950, moving to a system involving final felling, soil scarification, planting, pre-commercial and commercial thinning, thereby transforming large areas into young even-aged forests dominated by pine and spruce. The forest policy applied by the forestry sector since the 1950s aims to ensure sustainable timber production (including environmental considerations) at a high and even volume level over a specified rotation period. Therefore, an even age- and maturity-class distribution is sought (op. cit.).

[8] Most of these are found in the counties of Kopparberg and Gävleborg.

Table 1. *The Swedish forest commons, year of establishment, size and the proportions held by forest companies, Non-industrial private forest (NIPF) owners, and others in 1995.*

			Ownership			
Forest common[a]	**Estab-lished (year)[b]**	**Total area productive forestland (ha)[c]**	**Forest company ha (%)[c]**	**NIPF owners**		**Others ha (%)[c]**
				ha (%)[c]	**Fraction Non-resident (%)[c]**	
Counties of Gävleborg and Kopparberg	*1861-1894*	*215 526*	*56 086 (26)*	*153 290 (71)*	*62*	*6 150 (3)*
Enviken	1861	2 168	542 (25)	1 474 (68)	30	43 (2)
Hamra	1879	5 038	1 108 (22)	2 066 (41)	60	856 (17)
Lima	1870	32 532	4880 (15)	24 399 (75)	20	3 253 (10)
Norra Venjan	1861, 1894	8 756	788 (9)	7 968 (91)	20	0
Orsa	1879	55 482	10 542 (19)	44 386 (80)	63	555 (1)
Svärdsjö-Svartnäs	1861	4 300	860 (20)	3 440 (80)	20	0
Särna-Idre	1879	29 417	15 003 (51)	14 414 (49)	50	0
Södra Venjan	1861, 1894	9 500	570 (6)	8 930 (94)	50	0
Transtrand	1870	19 000	7 980 (42)	10 070 (53)	20	950 (5)
Älvdalen	1885	49333	13813 (28)	35 026 (71)	50	493 (1)
County of Västerbotten	*1916-1918*	*90 736*	*5 284 (6)*	*85 370 (94)*	*44*	*82 (0)*
Dorotea övre	1916	2 736	2 134 (78)	520 (19)	5	82 (3)
Sorsele övre	1916	20 000	2 800 (14)	17 200 (86)	60	0
Tärna-Stensele	1918	33 000[d]	0 (0)	33 000 (100)	25	0
Vilhelmina övre	1918	35 000	350 (1)	34 650 (99)	50	0
County of Norrbotten	*1876-1894*	*230 384*	*54 169 (24)*	*171 009 (74)*	*32*	*5 288 (2)*
Arjeplog	1889	22 401	4 480 (20)	17 921 (80)	18	0
Arjeplog nybyggesallmänning		5 581	0	5 581 (100)	5	0
Arvidsjaur	1877	22 692	3 404 (15)	19 288 (85)	35	0
Gällivare	1883	44 748	12 529 (28)	32 219 (72)	20	0
Gällivare nybyggesallmänning		527	184 (35)	343 (65)	5	0
Jokkmokk	1889	58 000	29 000 (50)	29 000 (50)	34	0
Jokkmokks nybyggesallm.		844	0	675 (80)	35	169 (20)
Jukkasjärvi	1893	27598	276 (1)	27 322 (99)	7	0
Karesuando	1894	5 037	0	0	0	5 037 (100)
Pajala	1876	42 956	4 296 (10)	38 660 (90)	26	0
Total		**536 646**	**115 539 (22)**	**409 669 (76)**	**46**	**11 520 (2)**

[a] The number of forest commons varies between sources, depending on how they are divided up. For example, the forest common of Särna-Idre could be considered either one or two entities. However, this has no implications for this thesis. [b] Source; Liljenäs 1982. [c] Source; Carlsson 1995 p. 13. [d] This figure, used by Carlsson, differs from the area of productive forestland for Tärna-Stensele (38 234 ha) registered by the tax authorities (1994).

3.1 Aims and Means of Establishing the Swedish Forest Commons

Over the years the Swedish forest commons have been the subject of a number of studies focusing on various aspects of their history, impact and achievements. The most relevant studies to the issues considered in this thesis, by several authors, are briefly reviewed in the following section.

From the perspective of property rights and property regimes, Pettersson (2003) described the historical background and the process which led to the establishment of the modern forest commons. According to the cited author, their establishment was partly prompted by lessons learnt from the traditional type of commons known as "Häradsallmänningar"[9], which originated during the medieval period, or even earlier. The authorities and forest experts had limited confidence in the farmers' ability to manage the forests properly. Maintaining the commons seemed preferable to parceling out the land, with the proviso that the management should be supervised by the authorities and forest experts. Many politicians and officials were convinced that Swedish forests were in a precarious position, due to the increasing exposure of Swedish farmers' forests to the global market economy from the mid-19th century onwards. Therefore, it was believed that strict management restrictions had to be imposed on the owners. At that time 'good forest management' was regarded as a strategy that, with forward planning, provided high and reliable yields of timber for sale (Pettersson 2003). It was assumed that meeting these goals was likely to require the implementation of management plans and regimes drawn up and guided by experts with experience of managing larger-scale units than those being allocated to individual farmers (Pettersson 2003). Under these circumstances, the new concept of Swedish forest commons was introduced and implemented in the areas that had still not been allocated, i.e. in the counties of Kopparberg and Gävleborg, Västerbotten and Norrbotten. These 'modern' forest commons were also 'supposed to serve as an instrument for launching orderly forest management[10] by compelling the shareholders to follow the forest experts' regulations'. Further, as Pettersson states, 'good forest management involved forest management based on the principle of clear fellings and was focusing on raw material production for

[9] "Häradallmänning", an older type of Swedish forest common dating back to the medieval period. They are mostly found in the southern part of Sweden

[10] In the 19th century the regulation of forest husbandry resulted in the introduction of rotation forestry (trakthyggesbruk), as commonly practiced in Germany, based on clear fellings. The basic principles of the new forest management strategy were to regenerate the clear felled tracts and to ensure that harvesting did not exceed growth (Pettersson 2003).

sale' (Pettersson 2003, p.230). Thus, in that sense they supported the concepts of modernization[11]. The introduction of FCs was largely based on top-down decisions and a changed view of individuals' property rights, prompted by the conviction that the advantages of establishing FCs overruled the self-interest of the individual farmers (Pettersson 2003). However, through the first *Swedish Forestry Act* enacted in 1903, which included a requirement for forest regeneration, the state bureaucracy also acquired greater control of NIPF owners' individually managed land, with less tampering with individual property rights. Through these pieces of legislation, the aims of the state were to improve forestry and reshape the norms of the owners to realign their self-interest more towards serving the public good. However, Pettersson (2003) pointed out that the regulations regarding the usage of the forest resources were much stricter for the FC than for NIPF forests.

Stenman (1983) discusses the forest commons in Västerbotten in his doctoral thesis. His starting point is their delimitation. Forest commons were established to serve as examples of improved forest management. He notes that the establishment of forest commons gave the authorities an opportunity to introduce new regulations aimed at reducing the risk of deforestation (Stenman 1983). The yields from the forest commons were intended to provide enduring support for the farms, and it was assumed that speculative buying would be less likely if part of the forestland remained unallocated, so some of the forest was not distributed between the

[11] From the 17th century, the Swedish state sought to rationalize natural resource management. The strategy of rural modernization (cf. Van der Ploeg *et al.,* 2000) involved targeting maximum sustainable yield and strengthening rural services through economic growth. These ideas were later outlined in the *Swedish Forestry Acts*, the first of which was launched in 1903. They were intended to prevent future shortages of forest raw materials. The aim was to increase timber production in a lasting way by introducing regeneration regulations. A goal of the *Swedish Forestry Act* of 1923 was to protect young forests. Regulations prescribing the minimum stand age for final felling were first introduced in 1918, and extended by the *Swedish Forestry Act* of 1948 to protect so-called vigorous forest from premature final felling (Enander 2003). The revision of the *Swedish Forestry Act* in 1948 included a statute requiring an even output of timber over time and better silvicultural methods designed to increase productivity and thus raise economic returns from forest areas. Sustainability, profitability and social considerations were established as priority objectives. In the revised *Swedish Forestry Act* of 1993, production and conservation goals were given equal importance (Enander 2000, 2001). Environmental concerns are today considered to be as important as wood production and the detailed regulation of intensive forestry has been replaced by increased responsibility for the forest owners (Kjellin 2001). For a detailed account of the development of environmental concerns, from nature conservation to bio-diversity, connected with forestry see Lisberg Jensen (2002), Andersson (2007), and Appelstrand (2007).

shareholders. In a later work Stenman (2009) described the situation in Västerbotten as complicated, since there were still different views regarding who initially owned the land that was distributed in the delimitation process, and whether allocation of land to the FC was based on coercion. When the commons were established in Västerbotten the earlier delimitation rules (SFS 1873) were changed through new statutes (SFS 1906b). From that point, the official view was that the state was the owner of the land to be donated during the delimitation process (Stenman, 2009). By adopting that standpoint the state could choose to by-pass earlier delimitation rules, e.g. concerning the size of allocated forest land, and make it easier to establish commons without the landowners' consent (Ibid).

In a thesis on the forest commons in Norrbotten, Liljenäs (1977, p.21) stresses that the 'primary aim for the introduction of the Swedish forest commons was to provide a lasting support to the farming population'. Economic returns should be used first for silvicultural activities and thereafter to pay debts and taxes, for social welfare and other purposes benefiting the public. Another aim was to prevent the forest companies from acquiring the farmers' forestland. According to Liljenäs (1977) the common forests are of considerable economic importance to the interior communes of Norrbotten. In the summary of her thesis, and a later report (Liljenäs 1983), she also stresses the importance of forest commons in promoting lasting jobs within the forestry and agricultural sector in order to support the local population in the interior of Norrbotten, especially its remote areas. However, these results were not based on any comparisons with other regions or alternative property regimes. The report (Liljenäs 1983) further suggests that in the future, the distribution of revenues from the commons should be controlled by the authorities. Liljenäs (1977) also discusses the different approaches that have been adopted for the distribution of profits[12], and claims that profits going to established activities reduce the leakage of capital from the municipality. Accordingly, the switch to distribute the dividend as a general forest subsidy to all shareholders is "a

[12] The policy controlling the distribution of the dividend differs due to historical arrangements, and regional patterns can be discerned. According to the 1906 decree (SFS 1906b), the dividend in Västerbotten is paid to all shareholders as annual payments in proportion to the size of their share in the forest common (Stenman 1983). In most of the other forest commons the dividends are distributed among the shareholders as monetary subsidies for purposes benefitting agricultural development such as drainage and agricultural training, to forest development such as forest management plans and subsidies for plants or to public assistance measures such as sports arenas and road maintenance (Carlsson 1995, Liljenäs 1982), or a combination of the two systems (Liljenäs 1982, 1983).

hidden cash payment", which according to Liljenäs (1977) is inappropriate for interior Norrbotten.

In 1983, the Swedish Commission on Collectively-Owned Forestland published an official report (Ministry of Agriculture 1983), one purpose of which was to examine the Forest Commons Law (SFS 1952:167). It focused on both regional development and forestry policies. The Commission concluded that the Swedish forest commons are 'among the best managed forests in the country'. In addition, the Commission reported that annual cuttings in forest commons generally reached 100% of their approved management plans (Ministry of Agriculture 1983, p. 85)[13]. The Commissioners further supported the old focus on production, but declared that some commons had proved less successful than others; for these, they suggested, it could be a better idea to divide the land between the owners than to continue with the current regime. The commission was also supportive of changes in the *Act relating to collectively-owned forest land* (SFS 1952:167), with the idea that the economic outputs from commons should be retained locally, and for Västerbotten even within the part of the municipality where the shareholders lived. The commission proposed that the profits should be distributed as subsidies, but that shareholders like the state, the church and the municipality not should be eligible to any profit from the FC. The same should be the case for forest companies, if they were not registered within the same municipality as the FC. Further, the subsidy should be supportive of forestry, agriculture or some other local source of revenue. This indicates a shift towards a desire for stronger individual shareholders' rights. The official Committee report (Ministry of Agriculture, 1983) also noted that regulations were restricting shareholders' opportunities to manage their forests in a competitive manner (Ministry of agriculture, 1983 p.55). Examples of such regulations included bans against divestments and mortgages, and the authorities' control over the by-laws, including how the dividend should be used (Ministry of Agriculture 1983, p 55). The Committee remained supportive of the original aim of the commons, but suggested a new, revised Act. However, the proposals in the Committee report were later rejected. Thus, the Act from 1952 (SFS 1952) has only been subjected to minor changes, most recently in 2005 (SFS 2005). Carlsson has undertaken a number of studies on forest commons, examining them from an institutional perspective. In a report from 1995 he claims that

[13] Since the forest commons have been managed in accordance with the state's intentions (Ministry of Agriculture 1983, p. 58, 67-68) and the *Swedish Forestry Act* (SFS 1993), a logical interpretation of this statement is that the official point of view is that the production capacity of the forest commons, in terms of timber harvesting, has been entirely fulfilled.

the prime motives for allocating forest commons were to create larger, more productive units that could better meet the growing forest industry's demand for raw materials, and reduce the power of the forest companies. It was also considered important to strengthen individual farmers' finances and, thus, the whole community's economic status (Carlsson 1995). An additional aim, connected to this motive, was 'to secure the existence of an independent class of farmers and thus to maintain political stability' (Carlsson 1999, p.12). Additionally, he was concerned with property rights and how transaction costs for the various activities have been maintained at an acceptable level. The analysis and conclusions were based on the assumption that the forest commons are well managed, with higher yearly increments than fellings undertaken at the same time under competitive forest management regimes (cf. Carlsson 1995, Carlsson 1999)[14]. However, he remarks that despite the toughness of the timber market the commons are competitive, but the shareholders harvest much less timber than they are allowed to, which he finds 'puzzling'. He suggested that this may be explained by the 'target income hypothesis' (1999 p.18), since it could be a manifestation of a high degree of adaptability, or of the shareholders showing 'a high degree of innovation to reduce transaction costs' (Carlsson 1999, p.22). Carlsson (1995) has also considered whether the forest commons have served as models for the shareholders. The specific question he addressed was whether being a shareholder influenced forest owners' practices when managing their own private forestland. Carlsson (1995) found generally more activity among non-shareholders than shareholders in both Västerbotten and Norrbotten. In Norrbotten shareholders undertook the least activity of all. His results did not indicate that the forest common dividend promotes improved silviculture. Further, Carlsson noted that the payments from the forest commons seem to create a state of dependency with a negative effect on activity, especially if they are, as in Norrbotten, paid as subsidies.

With respect to the aims of the Swedish Forest Commons and their achievements, different authors emphasize different aspects, but they do not contradict each other. A summary of the goals for these commons, and the means of achieving them, that have been addressed by Liljenäs (1977, 1982,

[14]Carlsson refers, in this respect, to an evaluation by the Swedish Commission on Collectively-Owned Forestland (Ministry of Agriculture 1983) and to interviews he conducted, with the aim of surveying the institutional function of the Swedish forest commons. Representatives of the forest commons were interviewed, as well as staff at the National Board of Forestry, Regional Forestry Boards, District Forestry Boards, Lantmäteriet (which has overall national responsibility for the Swedish cadastre) and County Administrative Boards (Carlsson 1995).

1983), the Ministry of Agriculture (1983), Stenman (1983), Kardell (1991, 2004), Carlsson (1995, 1999, 2000, 2001), Ericsson (1997) and Pettersson (2003) is presented in Table 2. No ranking of their importance has been attempted, since the aims are closely interconnected.

Table 2. *The aims of the Swedish forest commons and advocated means for achieving them*

Aims	**Means**
To serve as an instrument for improved forest management with the focus on increased, sustained timber production. To serve as an instrument for sustainable economic support for farmers and the local economy, also to provide a solid basis for taxation and to secure the continued existence of an independent class of farmers. To support rural development and well-being	By orderly, planned, scientifically based forest management facilitated by professional foresters, larger production units and the exercise of authority. By serving as models for the farmers for management of their own forests. By providing employment. By preventing forest companies from acquiring the farmers' forestland. By providing incentives to local agriculture and forestry. By supporting local common goods

From the review, summarized in Table 2, it is apparent that the introduction of the Swedish FCs, with their multiple aims, fits into the socio-political discourses of forestry in rural development that Elands and Wiersum (2001) have identified and named the "utilitarian discourse" and the "community sustainability discourse".

In terms of a utilitarian discourse, the rural areas are viewed as places for production that should be integrated with modern markets. Thus, in terms of this discourse, rural development should, according to Elands *et al.* (2001), "aim at stimulating innovative economic activities for satisfying productive and consumptive needs" (Ibid). The rural areas are not seen in this context as being able to handle efficiently the new market opportunities offered to them. In this discourse environmental forest services should also be included among the income earning elements, and thus should also have a price. The community sustainability discourse is concerned with basic welfare issues, such as employment and income generation. Rural development here is, according to Elands *et al.* (2001), "conceived of as involving the (re)creation of a minimum set of social and economic structures, and the provision of decent living conditions and social services for the rural dwellers". Further, according to Elands *et al.* (2001) "in contrast to the perspectives underlying the utilitarian discourse, it is considered that rural development should not be left to market forces or indigenous

developments, but requires active government interventions and regulations".

In real life, however, it is hard to find such clear-cut situations as in the above described discourses. Accordingly, even if many things have changed during the more than hundred years the FCs have existed, and thus challenge this statement, especially in a contemporary context, the viewpoints in these discourses have remained dominant themes in the Swedish debate about the role of the forests/forestry for the peasantry and the local economy (cf. Törnqvist 2005, Lindgren *et al.* 2000, Appelstrand 2007). It is for instance included in the utilitarian discourse that rural development should be left to market forces or indigenous developments but this was not an option at the establishment of the Swedish forest commons. Contrary the FCs were partly established to control the effects of the market forces. In addition, via the introduction of environmental goals in the Forestry Act in 1993 (SFS 1993) and the "Sustainable Forests" environmental quality objective adopted by the Swedish Parliament, the so-called "nature conservation discourse" has also gained some (albeit limited) official acceptance. Finally, in terms of the nature conservation discourse, natural conservation and improved management from an ecological perspective are the ultimate objectives rather than rural development (Ibid).

4 Summary of the Papers

In this section each paper I briefly summarized, and the methods used and main results are presented. For details, turn to the specific papers.

4.1 Forest Condition and Management in Swedish Forest Commons (paper I)

4.1.1 Introduction

Since one of the major aims driving the introduction of the forest commons (FCs) was to improve forest management, especially with respect to sustainable timber production, present forest conditions were studied, to obtain indications of the success of this management regime. By assessing and comparing the forest conditions in the FCs with the conditions in forests under other types of property regime in the same regions, the relative impact of introducing this specific regime could be analyzed.

4.1.2 Material and Methods

Any assessment of the outcome in terms of forest conditions should be based on objectively collected data. Therefore, primary data from the Swedish National Forest Inventory from the years 1998-2002 were used in this study. The quality of data allowed comparisons with sub-divisions down to a regional level, focusing on the forests comprising the Swedish forest commons and surrounding forests. Data on forests in forest commons were assessed and compared to corresponding data for forests owned by non-industrial private forest (NIPF) owners, company forests (those owned by joint-stock companies, either private or public), and forests owned by public bodies (including State-owned forests and forests owned by public institutions such as churches, municipalities and public foundations). Site productivity, age class distribution, degree of maturity of the stands and

standing volumes by age class, were compared between the four owner categories as well as between and within the three counties and regions considered. Additional data on harvesting ratios (annual harvest/annual increment ratios) were also compiled.

4.1.3 Results and discussion

Generally, the mean site productivities were similar in the counties of Norrbotten and Västerbotten for all types of property regimes studied. In the counties of Kopparberg and Gävleborg productivities were significantly higher. The lowest values were found in forest commons of Västerbotten, and both public forests and NIPF forests in Norrbotten.

In the three regions studied, the age distribution among the forests under the different types of property regime was most even in Norrbotten, and the Norrbotten forest commons exhibited the most even age distribution of the examined forest commons. A lack of medium-aged forest was apparent, particularly in Västerbotten, and its forest commons included a very small proportion of young forests. This implies that the Västerbotten forest commons have a very high proportion of old forests. The distribution of maturity classes provides more specific information on the potential for final felling, thinning and other silvicultural activities. As shown in Table 3, there are large differences in this distribution between property regimes in Norrbotten and Västerbotten, but smaller differences between the counties of Kopparberg and Gävleborg. Three-quarters of the forestland in the Västerbotten forest commons is estimated to be sufficiently mature for final felling, compared to 29% of the forestland belonging to forest companies in Västerbotten.

Table 3. *Fractions of forestland area (percent) with forest sufficiently mature for final felling, according to property regime and region, 1998-2002 (and 95% confidence interval)*

Property regime	Norrbotten	Västerbotten	Kopparberg and Gävleborg
Forest commons	38 ± 9	75 ± 11	42 ± 5
Public forests	51 ± 8	63 ± 11	33 ± 4
Company forests	27 ± 4	29 ± 7	34 ± 3
NIPF	34 ± 5	51 ± 7	39 ± 4

Source; National forest inventory

Standing volumes within each age class provide a better picture of forest conditions and management practices than the overall mean standing volumes. In Västerbotten, forest commons have, with minor exceptions, lower standing volumes for each age class than forests under the other property regimes. Harvesting ratios for the period 1998-2000 indicate that considerably less than the annual increment was harvested in both Västerbotten and Norrbotten forest commons – even less than the ratios in 1975-80 and 1980-1993 presented by Carlsson (1995).

The study reveals conclusively that the forests in the Västerbotten forest commons differ in management status not only from the surrounding forests in Västerbotten, but also from forests in the other forest commons. Although the geographical conditions (site productivity, altitude, and proximity to high mountains) are somewhat less favorable for the forest commons in this area, these factors are not considered to significantly affect the outcome. This interpretation is based on the comparison with Norrbotten public forests and Norrbotten NIPF forests, which also have low mean site productivities, and in the case of the Norrbotten public forests large areas in close proximity to high mountains. However, forests in these areas have a more even age structure than those in the Västerbotten forest commons. Similarly, the proportions of forests that are sufficiently mature for final felling in Norrbotten, and their harvesting ratios, are closer to the standard.

4.2 Comparison of Harvesting and Business Activities of Non-shareholders and Shareholders in a Forest Common in Västerbotten, Sweden (paper II)

4.2.1 Introduction

The Swedish forest commons are intended to promote local agriculture and forestry, and to serve as models for forestry activities. On this basis, the hypotheses examined in this study were that the shareholders' harvesting and business activities, as well as their contributions to the local economy, are greater than those of non-shareholders. The contributions were assessed and discussed in terms of operating costs, investments, disposable income and direct tax revenue.

In order to address the hypotheses, a comparative study was conducted of the activities of NIPF owners in the municipality of Storuman, where one of the largest forest commons is situated. Storuman was chosen for various reasons, including: the size of the forest common, the fairly balanced distribution of forestland between shareholders and non-shareholders within

the municipality, and the fact that only NIPF owners have shares in the forest common (while in most other Swedish forest commons a significant proportion is held by other types of shareholders).

4.2.2 Material and Methods

The study involved a total of 1583 individuals, defined as NIPFs: 871 residents within the municipality of Storuman and 712 non-residents. Of the total, 901 were shareholders in the Tärna-Stensele FC (TSA). NIPF owners included in the study were selected by using the same data and methods employed by Holmgren *et al.* (2005). Secondary data from Statistics Sweden (SCB) for 2000 were used, including the Total Population Register (TPR), the Register of Real Estate Assessment (FTR), annual income tax returns and excerpts of accounting items from SCB business statistics (SCB 2003). With assistance from SCB, the TPR and the FTR were used to identify each individual who owned agricultural property with productive forestland within the municipality. Forest data were supplied by the District Forestry Board of Storuman (2005a-c)[15] and the Regional Forestry Board of Västerbotten (2000). Shareholders and non-shareholders of the TSA were assessed and compared using the following information from the data sources: forestry production data, sales revenues, operating costs and investments, disposable income and local municipal tax revenues.

4.2.3 Results and Discussion

Based on the criteria applied in the sample selection, the shareholders and non-shareholders should have similar potential to practice sustainable forestry across the municipality. Nevertheless, the shareholders displayed lower activity with respect to annual felling. In fact, the harvested volume per hectare was more than three times greater on non-shareholders' individually managed land than on shareholders' individually managed forestland. The harvested levels on shareholders' land were even below the minimum level that could be expected from land classified as productive forestland, i.e. forested land with the potential to produce more than 1 m^3 wood per hectare per year. This was unexpected, since only minor differences in average mean site productivities, to the disadvantage of the

[15] 2005a; District Forestry Board of Storuman. Virkesförråd och bonitet för ö.s.i områden inom Storumans kommun uppdelat på ovan och nedan odlingsgränsen. Unpublished. In Swedish. 2005b; District Forestry Board of Storuman. Personal communication. 2005c; District Forestry Board of Storuman. Excerpt from 'KOTTEN' for the years 1998-2002. Unpublished. In Swedish.

shareholders, were found. The differences in timber extraction between shareholders and non-shareholders were also verified by accounted sales revenues.

Table 4. *Standing volume and harvested volume on non-industrial private forest (NIPF) owners' land, including shareholders and non-shareholders in the municipality of Storuman in 2000.*

Forest category	Mean site productivity (m^3sk/ha/y)	Average standing volume (m^3sk/ha)	Productive forestland (ha)	Harvested volume total (m^3sk)	Harvested volume per hectare (m^3sk/ha)
NIPF non-shareholders	2.7[a]	66[a]	65 000[b]	118 603[c]	1.83
NIPF shareholders	2.5[a]	67[a]	41 600[b]	22 088[c]	0.53
TSA forest common[d]	2.5	58	38 400	21 000	0.55

[a] Source: District Forestry Board of Storuman (Average standing volume and mean site productivity for ö.s.i ("översiktlig skogsinventering") areas) within Storuman Municipality, divided into the parts east and west of the so-called cultivation limit, unpublished, 2005).

[b] In total, NIPF owners individually managed 106,600 ha (source: Regional Forestry Board of Västerbotten, 2000).

[c] Source: Estimates based on final felling area in the year 2000 given by the District Forestry Board of Storuman (excerpt for "KOTTEN" for the years 1998-2002, unpublished, 2005), assuming average yields of 120 m^3 sk ha^{-1} for final fellings and thinnings, given that final fellings account for about 88.5% of the total harvested volume (Regional Forestry Board of Västerbotten, 2000)

[d] Source: S.son-Wigren (2001) and the TSA management report for the year 2000

The method does not allow a separation of income from the two different property types, i.e. individual and jointly managed land. However, the dividend from the forest common was relatively small in comparison to the total sales revenues, thus its influence was considered small. Relating declared timber sales revenues to the area productive forestland, shareholders present less than half of the sales values of the non-shareholders. The expectation was that the forest commons would have a stimulating effect on activities in the shareholders' individually owned and managed forest properties. In addition, the local economy and rural development should have been promoted. Since less activity was found among shareholders, thus generating less tax revenue, these expectations were not fulfilled. In terms of its impact as a role model, there does seem to be more similarities in levels of management activities between forests in TSA and forests individually owned by its shareholders than in forests owned by non-shareholders. Then the remaining question is who have been the role model for whom; TSA for the shareholders or the shareholders for the TSA? Considering that the

shareholders in TSA since 1952 have been relatively free to influence the management of the FC it seems more likely that the shareholders have had a significant influence on the management of the TSA forest common than vice versa.

4.3 Biological diversity indicators - a comparison of Swedish forest commons and other forest ownership categories (paper III)

4.3.1 Introduction

At the time of the establishment of the Swedish forest commons, timber production was considered the primary goal. Since 1993, production and environmental goals have been given equal priority. It has been claimed by some common researchers that property regimes similar to traditional commons could favor environmentally desirable outcomes. Thus, given claimed environmental concern among those involved in managing forest commons, and the observations of relatively high proportions of old forest in them (cf. Paper I), it was hypothesized that the Swedish forest commons could also be environmentally favorable. This hypothesis was tested by analyzing biodiversity indicators corresponding to the interim targets for enhanced biological diversity.

4.3.2 Material and Methods

Swedish National Forest Inventory (NFI) data related to the interim targets for enhanced biological diversity for the period 2003-2006 were used for analyzing differences between forest commons and other property regime categories regarding: the proportion of forestland with a large deciduous element; the proportion of forest >80 years old with a large (>25%) deciduous element; the volume of dead wood; and the proportion of forest older than 140 years. NFI provides national monitoring data related to progress towards the environmental quality objective Sustainable Forests. The following parameters were also considered to facilitate the interpretation: mean site productivity, standing volume in old forests (> 140 years old), and proportion of 'forest sufficiently mature for final felling', i.e. older than the lowest age for final felling permitted by the legal regulations.

The research area included all productive forestland within each municipality with a forest common, a total land area of 4.78 million ha divided roughly between three counties and regions as follows: the inner parts of the County of Norrbotten (BD; 2.24 M ha), the inner part of the County of Västerbotten (AC; 1.01 M ha) and part of the County of Dalarna

including a minor part situated in the County of Gävleborg (W & X; 1.53 M ha). The following owner categories were analyzed in this study: (i) forest commons, (ii) forests owned by NIPF owners, (iii) company forests, and (iv) state forests.

4.3.3 Results and Discussion

In BD there was a significantly higher "proportion of forest land with a large deciduous element" in the forest commons than in company and state-owned forests. In both AC and W&X there were no significant differences in this variable between the forest commons and any other categories.

The proportion of forest older than 80 years with a large (>25%) deciduous element appeared to be lower, but not significantly lower, in the commons than in all other categories in both BD and AC. In W&X, however, significant differences in this respect were found between the forest commons and forests owned by both forest companies and the state.

With respect to the volume of dead wood no significant differences between regions were found. However, in both BD and AC the volume of dead wood per hectare was higher in forest commons than in forests owned by NIPFs and companies, but higher still in State-owned forests. In contrast, forest commons in W&X had the lowest volume per hectare of dead wood.

The only significant between-property regime difference in the proportion of forest older than 140 years was found in the AC region, in which it was significantly higher in the forest commons than in forests owned by forest companies.

Examining the status of biodiversity indicators provides no unequivocal results signifying that forestry in the Swedish forest commons has been conducted in ways that have promoted biodiversity more effectively than in forests of other property regimes.

4.4 Benefit use and local well-being from three Swedish forest commons (paper IV)

4.4.1 Introduction

One objective of establishing the Swedish FC was, by forest-related activities, to strengthen the quality of life in the local communities in which they were established. According to Elands and Wiersum (2001), rural development can be characterized as "the process of reaching the desired futures of the countryside" and "to strengthen the livability in rural areas". The aims of this study were to assess how three forest commons have contributed to the rural development in the municipalities in which they

were established, and to assess the contentedness with the forest commons among local shareholders.

4.4.2 Material and Methods

The case study included three selected forest commons: Älvdalen FC in Dalarna, Jokkmokk FC in Norrbotten and Tärna-Stensele FC in Västerbotten. The selection was based on their relative similarities in size and geographical positions within their regions, and variations in their time of establishment, system used for dividend distribution, and mixture of owners (i.e. proportions of forest owned by NIPF, Forest companies etc.).

For the assessment of the extent and use of the dividend FC management plans and reports from each FC for the period 1958-2007 were used. When appropriate, figures were organized into groups according to the purpose they were used for. The figures for the annual dividend have been converted into 2006 values.

Another issue addressed was the contentedness of the resident shareholders in the three FCs. For this, a mail questionnaire aimed to capture the local shareholders' perceptions regarding what the forest commons contribute to them, to the local community, to economic welfare, to the landscape identity and to the environment and nature quality, was sent to local shareholders in the three commons. Only resident shareholders were included in the study in order to maintain the local perspective and to limit the size of the study. In total, about 870 questionnaires were sent out with a return rate of 50 %. Only some of the results from the questionnaire were presented in this paper. The study also included data from Statistics Sweden (SCB) to describe demographic variations during the same period within the municipalities of the three studied FCs.

4.4.3 Results and Discussion

The three studied FCs had developed in three different directions; there were differences in both the size and use of the dividend, as well as in contentedness with the FC. Älvdalen FC yielded the largest economic returns to the local shareholders, made the highest contribution to common goods, and had the highest proportion of contented local shareholders. In contrast, the economic contribution was lowest and the shareholders were least contented with the TSA FC. Thus, there seems to be a positive correlation between the value of the economic output to shareholders and contentedness. The amount of the dividend that is distributed to common goods also seems to be correlated with contentedness.

Table 5. *Dividend (million SEK), extent and use in Älvdalen, Jokkmokk and Tärna-Stensele forest commons (TSA), 1958-2007*[a]

	1958-1967	1968-1977	1978-1987	1988-1997	1998-2007	*1958-2007*
Älvdalen FC						
Common good	70.1	88.0	57.6	43.0	93.5	*352.1*
Agriculture	14.2	9.7	11.3	16.5	20.8	*72.6*
Forestry	4.2	4.6	21.4	48.3	111.8	*190.3*
Total	*88.5*	*102.3*	*90.3*	*107.8*	*226.1*	*615.0*
Jokkmokk FC						
Cash payment	0.0	23.5	23.2	5.9	23.7	*76.3*
Other	3.1	9.2	9.0	4.3	3.4	*29.0*
Agriculture	18.9	6.1	7.6	3.8	1.7	*38.1*
Forestry	11.2	13.9	26.5	19.2	14.0	*84.8*
Total	*33.2*	*52.7*	*66.3*	*33.2*	*42.8*	*228.2*
Tärna-Stensele FC (TSA)						
Cash payment	22.0	28.0	31.5	23.5	13.2	*118.2*
Total	*22.0*	*28.0*	*31.5*	*23.5*	*13.2*	*118.2*

[a] Sources: Forest management report and annual reports provided by each FC for the period 1958-2007 except for Jokkmokk, in the period 1958-1967, for which the source was Liljenäs (1977)

The high profits in Älvdalen are partly due to additional sources of income, besides those from forestry, mainly from hydroelectric power stations and capital investments. In addition, as previously described (Holmgren *et al.*, 2004, paper I), the FCs in Dalarna generally have higher mean site productivity and forestry has been more actively practiced. The higher successfulness in Älvdalen than in the other two FCs may also be related to the settings in which the FCs were established. Älvdalen is in an old cultural setting in which people have a long tradition of cooperating with each other, while TSA on the other hand, was established under coercion and with inherent conflicts between groups of owners.

The distributing systems are also important for rural development. The distribution system of Älvdalen FC is such that the entire dividend stays within the municipality, either for common goods or to subsidize expenses incurred on the shareholders' estates. In contrast, in TSA the cash payments result in the highest proportion of leakage out of the municipality. Thus, it is highly likely that the system used in Älvdalen has promoted rural development more effectively than the system applied in TSA, and for the same reasons, that Jokkmokk is intermediate in this respect. The high

proportion of the dividend allocated to common goods in Älvdalen also shows that Älvdalen has succeeded in preserving the old tradition to collaborate.

4.5 Swedish forest commons – a matter of governance? (paper V)

4.5.1 Introduction

The Forest Commons may be regarded as a means for the state to control the production and returns from the forests belonging to small and less affluent forest owners. Further, an attempt has been made to use the forests as a tool to realign the self-interest of this group of forest owners more closely to the public good. Forest Commons thus have a contested status, as private lands under public control. This paper examines the extent to which forest commons are currently managed directly by the government, comparing this with the general trend in forest policy towards less prescriptive governance and measures, which often take account of market and participative goals. Building upon a framework presented by Appelstrand (2007), this paper describes the major policy instruments relevant to forest commons from 1861-1996.

4.5.2 Material and Methods

Methodologically, the study is mainly based on evaluating published peer-reviewed literature and published sources of empirical data, such as FC yearbooks, forest management reports and secondary sources. The study draws upon these sources with a focus on major institutional and legal changes, particularly for the period of institutionalization of the first common forests in 1861, up to and including the suggested revision of the law pertaining to the FCs in 1996. In particular, state investigations and codes of statutes are used. Selection within the material centered on identifying common forest-specific policy instruments, in accordance with the categories of instrument described by Appelstrand (2007).

4.5.3 Results and Discussion

Government steering and regulation has been dominant from the establishment of forest commons up to the end of the 1996 study period. Even if the now partly deregulated Forestry Act (1993) controls all FC, they are still subject to the FC law and by-laws regulating their every day activities. In addition, formal control is still exerted by the official County Administration and management is performed jointly through elected boards

and executed by professional foresters. The shareholders' formal rights with respect to decision-making are, in general, proportional to the size of their share, but their influence in practice is restricted to the election of the board (cf. Stenman 2009), and the *Act Relating to Collectively Managed Land (*SFS 1952) is still in place.

While a number of provisions of the Forestry Act have been totally or partly abolished, the management of the FC is still regulated according to provisions in the *Act Relating to Collectively Managed Land* and by-laws. Such rules include obligations to follow forest management plans (by-laws), to have a professional forester in charge of the management (by-laws) and regulations regarding how the economic returns are to be used (*cf.* § 18 in the *Act Relating to Collectively Managed Land*). Claims by the public on FCs can also be seen as stronger than those on private lands.

There are similarities between the current aims of governance and the aims of government policy behind the establishment of the commons. In both cases there is a focus on reducing self-interest in favor of increasing the public good, and on creating higher participation and involvement by owners in good forest management. However, while according to Lebel *et al.* (2006 p.3) "Good governance" has been associated with participation, representation, deliberation, accountability, empowerment, social justice and organizational features such as multilayered and polycentric; arrangements, these features have not been notable traits in the management of FCs. In addition, the designation of the commons, for instance as being owned in common (opposed to jointly), may have added to alienation of the commons' owners, as indicated by the discussions on decision-making rights for the commons. In addition, FC shareholders in Dalarna and Norrbotten have acknowledged the legitimacy of the state-induced common framework to a greater extent than their counterparts in Västerbotten.

The results show that during their history the Swedish FCs have been closely associated with state regulatory instruments, policy tools and concepts, but to varying extents in different regions. The variation between different regions may be explained by such as differences in the historical and social contexts in the regions, as well as diverging motivations for common forests' owners. These motivations are affected by a potentially very complex institutional environment, local perceptions of commons, owners' capability and knowledge, as well as broader individual motivations.

We conclude that direct government management remains a dominant influence, with the major legislation pertaining to forest commons dating back to the 1950s. The study identifies regional differences in the ways the commons have been governed; this may help to explain differences in

results between commons. However, the outcome of a policy program is also influenced by its actual implementation, in which institutional factors are important. The results suggest the need for further studies of the influence of these factors on policy outcomes.

5. Final Discussion and Conclusions

In this thesis, the influence of the Swedish forest commons are assessed regarding forest condition (including biodiversity), management, the local economy, and local contentedness. There are various ways to do this. Here, I have followed the recommendations of Agrawal (2001) and Berge (2002) to use a comparative approach considering both successful and unsuccessful common's features. With focus on the outcome of activities in relation to the stated aims, forest commons have been compared with other property regimes. This approach has proved constructive as the heterogeneity among the Swedish forest commons was exposed and our general understanding of enabling features for forest commons amplified.

The use of NFI data for the assessment of the forest condition (inclusive the biodiversity), which allows sub-division down to the regional level, has many advantages: the data collection and handling procedures used by the NFI are established, scientific and standardized, providing objective data that have been collected in the same way for the entire researched area. Furthermore, they allow statistical methods to be used. Thus, the observed differences appear to be well established. Yet, regional differences in forest preconditions such as the composition of species in the forests may still be part of the explanation. An alternative method, however hardly feasible to execute due to the large number of plans needed, would have been to collect forest management plans from all forest owners in the study area. Further, even if these plans are more detailed, the reliability of the data is considered to be lower than for NFI data. The biodiversity was assessed by using the generally accepted 'sustainability indicators', also collected by the NFI. We may of course question how well these indicators mirror the actual biodiversity in the forests, but then again, they are at present the generally accepted indicators. The alternative of using NFI data would have been to

make our own field studies in the forests, something that was beyond the possibilities for this thesis.

The second study was made in Storuman. This municipality was selected as it was the only one, (except maybe Sorsele, also in Västerbotten) where we find both shareholders and non-shareholders among NIPF owners. This study included the whole population of NIPF owners within the municipality, and relied on data from two sources: official forestry data and data from annual income tax returns. The forestry data (District Forestry Board) from this study could be considered less objective than the NFI forestry data in the first study. However, the results from the two different sources suggest the same patterns, thus supporting the conclusions. Furthermore, they are consistent with the findings of Carlsson (1995), who also identified higher levels of activity among non-shareholders than shareholders in both Västerbotten and Norrbotten.

The fourth study included the local population of NIPF owners in three forest commons. Only resident shareholders were included in the study, in order to maintain the local perspective. These forest commons were selected based on their relative similarities in size and geographical positions, one from each region. As earlier results have shown dissimilarities between the regions, such as time of establishment, system used for distribution of dividend, mixture of owners (i.e. of NIPF, Forest Company etc.) we may also say that they were chosen to represent such dissimilarities. However, the choices made could of course have been made differently. Would the results have been the same if we had chosen other commons? This we can not say as the FCs studied are individual cases, but based on similarities in such as method of distributing dividend, forest condition, robustness it is possible that we would be able to see similar differences between for instance FCs in Västerbotten and Dalarna. The study included a questionnaire to local shareholders with a respondent return rate of 50 percent. One likely explanation to the low return rate was that the address-list was not up to date.

When it comes to the methods used I find that the results will be useful for future studies of the commons. Earlier analysis made of the Swedish forest commons were based on the assumption that they were among the best managed forests with a high standing volume. This was proved not to be true, at least not for Norrbotten and particularly not for Västerbotten. Thus, I find that with this information some of the earlier studies could have been analyzed differently and have been found less "puzzling".

A key issue raised by the results is why there is such variation between the Swedish forest commons in how they meet their aims? The results show that during their history the Swedish FCs have been closely associated with state regulatory instruments, policy tools and concepts, but to varying extents in different regions. We may here fall back to the theories of Ostrom (1990) and Agrawal (2001) on enabling conditions for robustness. From the studies we find variation between the regions in critical enabling conditions. Most positive results were found in the commons in Dalarna; their forest production was comparable with the other forest owners' production in surrounding forests, environmental indicators showed the same pattern. From the studied case in Dalarna (Älvdalen) we further revealed large contributions from the FC to maintenance of both the social and economic infrastructure and a high contentedness with doing so among the local shareholders. In Älvdalen FC we also found enabling conditions in a higher extent than in for instance the case studied in Västerbotten, the TSA FC. Examples of enabling conditions that is believed to have been important for the results in Älvdalen was that it is established in an area where; the users are already used to cooperating with each other, share norms, in the past have had successful experiences from commons further where there are homogeneity of identities and interests and few conflicts (Holmbäck 1934, Levander 1953, Veirulf 1937). It is additionally believed beneficial with overlap between user group residential location and resource location, that the FCs are allowed to organize themselves without external interference and if central government not is undermining local authority. If we compare TSA with Älvdalen, we also find that these conditions in a higher extent apply to Älvdalen then to TSA (c.f. Stenman 2009).

An additional complicatedness in the case of Swedish forest commons could be that, in contrast to many commons worldwide, they are owned in common and not jointly. This means that the number of owners tends to grow proportionally to the growth of the population, as long as the properties are inherited by all of the children of each generation of owners; a factor that according to Olson (1965) adversely affects their success. Further, that the proportion of non-resident owners tends to keep pace with migration from these rural areas, another factor that potentially could have a negative impact, at least from the local perspective. From our results this does not seem to be an issue with a system like the one used in Älvdalen, but have an impact in Västerbotten.

Why did the state choose to apply such strict governing of the FCs in Västerbotten? From our assessments of the Swedish FCs, the FCs in Västerbotten generally proved comparatively unsuccessful. Neither good resource use is reached nor perceived well-being and contentedness. At the time of establishing the FC in Västerbotten, the state had already imposed strict regulations on the forests. These were for example the Act *concerning the disposal of forests in Lapland of Västerbotten, Norrbotten and parts of the county of Kopparberg* (SFS, 1866); the *Forestry Act* (SFS 1903); the *Act Relating to Regulation Against the Acquisition of Forestland by Forest Companies and Cooperative Economic Associations* (SFS 1906 a) and the *Revised Act Relating to Delimitation of Land for Lapland in Västerbotten and Norrbotten* (SFS 1906 b). Further, shortly after the establishment of the last commons, the regulations concerning the disposal of the dividend in Västerbotten was changed, now allowing cash payments to the shareholders. The revised delimitation regulations (SFS 1906 b), reduced the farmers benefits both with respect to the size of the allocated forestland and a larger fraction was kept as a FC. By these changes the motive behind the establishment of the FC (summoned in Table 2), were heavily undermined, especially for Västerbotten. In 1983, the Swedish commission on collectively-owned forestland proposed changes in the *Act Relating to Collectively-Owned Forest Lands* (SFS 1952). One proposed change was that the profits should be distributed as subsidies, but that shareholders like the state, the church and the municipality not should be eligible to any profit from the FC. The same should be the case for forest companies, if they were not registered within the same municipality as the FC. This proposal supports the original aim for the commons as a means for rural development. Another proposal was that the less successful commons should be divided between the owners. The proposal was turned down and since then little, if any changes have been made in the *"Act relating to collectively-owned forest lands"* (SFS 1952) on the management of the FC. A central question for the future of these less successful FCs is thus, how to let go of the past and find ways to a more efficient management of the resources in the future? How to, in the context of rural development, find ways to enhance incentives for the FCs to develop innovative processes, to (re)invent the organization at the same time as they consider production, environmental issues but also social issues.

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Acknowledgements

The work underlying this thesis was financially supported by the Kempe Foundation, the research program The Utilization of the Boreal Forest, partly financed by EU Structural Funds and Brattås stiftelsen. The author is gratefully acknowledging this support.