

Forestry and reindeer husbandry in Sweden – the development of a land use conflict

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Abstract: Both the forestry sector and reindeer herders in Sweden use the forest resources, albeit for different purposes, and have adverse effects on each other. To reduce conflicts between them negotiations take place in so-called “consultations”, but the institutional arrangement does not seem to be working well; the conflicts have not been resolved, and the reindeer herders are generally more dissatisfied with the outcome than the forest companies. This paper provides an overview of the parallel development of forestry and reindeer herding in the region. In addition several issues that complicate the consultations and need to be resolved in order to secure the continued co-existence of the two activities are identified, based on an analysis of physical, societal and judicial aspects of the relationship between them.

Key words: consultations, forest sector, institutional analysis and development (IAD), judicial factors, physical factors, *Rangifer tarandus tarandus*, reindeer herding sector, Sami, societal factors.

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Introduction

A common pool resource (CPR) is, by definition, “a natural or manmade resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use” (Ostrom, 1990, p. 30). Characteristically, it is difficult for one individual, group or company to prevent others from using the resource, but parts of the resource used by one individual cannot be used by another (Ostrom *et al.*, 1997). According to Hardin (1968), users of a common pool resource are often trapped in an inexorable process that slowly leads to overuse and degradation of the resource since it is too costly for participants to conserve it in joint efforts. However, institutional arrangements which give local users rights to control the resource and to co-manage it can provide solutions to avoid this “tragedy of the

commons” (Berkes, 1989; Pinkerton, 1989; Ostrom, 1990).

The forest resources, which cover 48% of the total land area in northern Sweden, collectively provide an example of a common pool resource in which many different users, simultaneously or in parallel to each other, are using the land for different purposes in such ways that might lead to conflicts. In this paper, the focus is on two conflicting sets of land use actors: the forestry corporations and the reindeer (*Rangifer tarandus tarandus*) herders.

Reindeer herding is an exclusive right of the indigenous people – the Sami – and the activity is important both economically and culturally to them. The forest companies, which mainly produce pulpwood and saw timber, are the main owners of forest

land but the reindeer herders have usufructuary rights to the land. The overlapping property and land use regimes lead to conflicts since both sectors have adverse effects on the other; forestry by applying logging and soil scarification methods that damage the lichens the reindeer graze on, and reindeer by trampling seedlings, rubbing their antlers on branches and breaking shoots or branches when digging in the snow to find lichens (Roturier & Bergsten, 2006).

There is abundant historical evidence that conflicts have arisen between the two sectors for a long time (e.g., Hahn, 2000). In an attempt to resolve these conflicts the government introduced procedures for consultations between representatives of the two sectors, regulated by the Swedish Forestry Act (1979:429). These consultation procedures were subsequently extended by the Forest Stewardship Council (FSC), and can be regarded as an arena in which the forestry and reindeer herding sectors can meet, at the initiative of the forestry representatives, to discuss forestry activities. Such consultations are mandatory for activities that will affect year-round grazing areas, but they are voluntary for activities that will only affect winter grazing areas according to the FSC (Swedish Forestry Act, 1979:429, www.fsc-sverige.se). However, evaluations have shown that the consultations do not seem to work as intended. Conflicts still occur and the reindeer herding sector, especially, is dissatisfied with their outcome (National Board of Forestry, 2001).

Contextual factors determine the benefits (e.g., products and services) a resource system is physically, socially and legally capable of supplying. According to CPR-theory it is thus vital to identify contextual factors since they affect the users, the ways in which they use the resource and the institutional arrangements (in this case the consultation procedures) governing the use and management of the resource (Ostrom *et al.*, 1997; Edwards & Steins, 1999; Imperial, 1999). The purpose of this study is thus to examine the contextual factors, i.e., physical, societal, and judicial factors affecting use of the forest resources in northern Sweden to obtain a deeper understanding of the co-existence problem, the effects of these factors on the action arena and key aspects that need to be changed to improve co-operation.

CPR-theory as a tool to understand the conflict

CPR-theorists have often suggested that co-management of resources may help to promote co-existence and resolve conflicts (Berkes, 1989; Pinkerton, 1989; Campbell, 1996; Jentoft, 1998; Kooiman, 2003). Further, in a truly co-management arrangement decisions are taken cooperatively by both (or all) of

the principal actors. Thus, there are more extensive interactions and communication between the stakeholders than in centralised regimes, and legitimacy is (or theoretically should be) enhanced (Osherenko, 1988; Berkes, 1989; Pinkerton, 1989; Ostrom, 1990). Berkes *et al.*, (1991) have shown that stakeholders involved in a co-management process become more sensitive to the needs and concerns of other users, change their perceptions and understanding of other stakeholders and develop new relationships with them. Since the consultation procedure does not seem to work in the case examined here, the advantages normally associated with co-management arrangements seem to be absent. Earlier research indicates that a complex web of factors underlie the problem of establishing sustainable use of the forest resource (Mattsson, 1981; Hahn, 2000). Here, previously published literature and data regarding the physical, societal and judicial factors affecting the relationship between forestry and reindeer herding are assessed to elucidate the effects of these factors in the context of the present institutional arrangements, and to identify ways in which the arrangements could be improved.

The institutional and development (IAD) framework

In this study, the IAD framework is used to analyse the development of conflicts between the forestry and reindeer herding sectors from the 16th century to date. The framework focuses on institutional arrangements and the contextual factors affecting design and performance of action arenas (Ostrom, 1990; Ostrom *et al.*, 1997; Imperial, 1999). According to the IAD framework, at least five groups of factors can be identified affecting the action arena; physical, societal, judicial, patterns of interaction, and evaluation of criteria (Ostrom *et al.*, 1997; Imperial, 1999). However, in this study, emphasis is laid on the first three groups of factors.

The first set of factors influencing the action arena is the nature of the resource, since conflicts are often rooted in its (bio)physical characteristics (Ostrom *et al.*, 1997; Imperial, 1999). The first issue to address is whether there are sufficient resources to extract from the system to make organising arrangements for its use worthwhile, or if the amounts of the resource are so limited that attempts to do so would be pointless. It is also important to ascertain if there are any reliable and valid indicators of the condition of the resource (Ostrom, 2005).

The second set of factors affecting the action arena is the attributes of the community. The most important issue to consider in this context is whether the users are dependent on the resource system for a major proportion of their livelihood, which is the

case here. Another important factor to consider is the community's attitudes to the use of the resources, and to the stakeholders (Ostrom *et al.*, 1997; Imperial, 1999). Since land use in northern Sweden has shifted during the centuries, attitudes to both stakeholders and land use have shifted too. The question is how have these shifts affected the two sectors and the relationship between them?

The third and last group of factors affecting the consultation procedures is the judicial attributes. By definition a rule is contextual, prescriptive and possible to follow (Ostrom *et al.*, 1997). Rules can apply in different contexts and at various levels. At the constitutional level, in this case the parliament and government, laws and regulations (i.e., the consultation procedures) have been established that regulate the relationship between the two stakeholders. More specifically, these rules can be regulated at the collective-choice level by, for instance, the National Board of Forestry, as well as by voluntary organisations, e.g. the Forest Stewardship Council (FSC). Final agreements are reached at the operational level, i.e. the detailed level affecting day-to-day decisions made by the stakeholders. These three levels are inter-connected and thus affect the design of the 'rules' at every other level (Ostrom, 1990; Ostrom *et al.*, 1997). Since rules regulate access to the resource, its use and sanctions for non-compliance, it is important to recognize the framework of rules, at each of the levels. In this study, the focus is on constitutional rules and collective-choice rules. The key issue is the extent to which these rules are appropriate means to regulate the relationship between the two stakeholders and thus to avoid land use conflicts.

The stakeholders – forestry and reindeer herding

In the year 2000, there were 61 000 forest owners in total in northern Sweden, consisting of a mixture of large corporations, small-scale businesses, the government and non-industrial private forest owners. Forest companies own most of the forest land area in this region, while a third of the forest land is owned by non-industrial private forest owners (Table 1). The ownership structure has changed during the last 50 years; from 1945 to 1998, industrialised companies increased their ownership substantially while governmental ownership decreased. However, the proportion owned by non-industrial private forest owners remained relatively constant (Statistical Yearbook of Forestry, 1951; 2004).

Reindeer herding is an exclusive right of the Sami people and is allowed in an area of northern Sweden from Idre parish in the south to the national borders in the north and about 4700 people own reindeer

Table 1. Ownership structure of forest land in 1945 and 1998

Ownership structure	1945 %	1998 %
Forest companies	24	50
Non-industrial private forest owners	37	38
State	33	6
Other ¹	6	7

(Statistical Yearbook of Forestry, 2004; 1951).

¹ The category 'other' includes churches, municipalities, companies that are not typical of the forest industry (e.g. banks and insurance companies) and common forests.

Table 2. Numbers of reindeer owners the three counties in 1921 and 1998.

No. of reindeer owners	1921	1998
Norrbotten	2118	3995
Västerbotten	362	376
Jämtland	295	283
Total	2775	4654

(SOU 1923:51; Statistics Sweden, 1999).

(Statistics Sweden, 1999). The number of reindeer owners almost doubled from 1921 to 1998 (Table 2), while the number of reindeer changed relatively little (cf. Fig. 3), so fewer animals are held per owner now than in 1921.

Reindeer husbandry is dependent on land extending from mountain areas to coastal areas, although its usage varies throughout the year due to the reindeers' natural seasonal migrations and variations in practices between the three types of Reindeer Herding Community (RHCs). There are 33 'mountain' RHCs, 11 'forest' RHCs and eight 'concession' RHCs situated in mountainous regions relatively far from the coast, lowland forest areas and 'concessionary areas' outside the main Sami pasture areas, respectively, and the land they use is divided into two seasonal areas: winter grazing areas relatively close to the coast and year-round grazing lands (Swedish Reindeer Husbandry Act 1971:437). The total number of reindeer allowed in each RHC is set by the County Administrative Board based on historical numbers of reindeer and inventories of the pasture situation (Swedish Parliament Prop 90/91:3; Swedish Parliament Prop 95/96:226; Moen & Danell, 2003).

A Land Use Plan for Reindeer Husbandry (LUP) has been developed to provide information *inter alia* on the condition of grazing areas and forest variables

in core areas and strategic locations for reindeer herding (National Board of Forestry, 2003; Sandström *et al.*, 2003). However, only six RHCs are currently using it.

The physical attributes

The forest resources

The forest resources include trees (mainly logging resources) and ground vegetation (grazing resources), consisting of lichens (*Cladina* spp.), mosses, herbs, grasses, heather and mushrooms. During the summer and autumn seasons, reindeer graze mainly grasses and herbs. During the winter, green vegetation and lichens (both ground and arboreal lichens, notably *Alectoria* spp. and *Bryoria* spp.) are the primary forage (Statistics Sweden, 1999; Bostedt *et al.*, 2003).

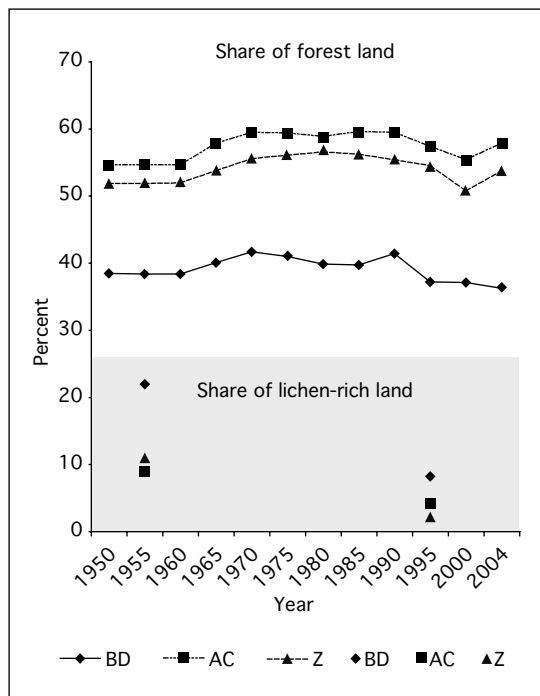


Fig. 1. Changes in proportions of forest land and changes in proportions of lichen-rich land in per cent of total forest land in the three counties Norrbotten (BD), Västerbotten (AC) and Jämtland (Z) (Statistical Yearbook of Forestry, 1951, 1955, 1960, 1965, 1970, 1971, 1975, 1980, 1985, 1990, 1995, 2000 and 2004; SOU 2001:101).

The forest land area¹ has remained relatively constant during the last 50 years. The largest proportion is located in Västerbotten County, and the lowest in Norrbotten County, but Norrbotten has the highest proportion of lichen-rich land² area and the county of Jämtland the lowest (Fig. 1). However, considerable reductions in the proportions of lichen-rich land have occurred in all three counties.

Changes in the age distribution of the forests provide a possible explanation for the changes in the extent of lichen-rich land since light and moisture influence the growth of lichens. Conditions are generally optimal for lichen in open-canopy forests with high light intensities on the ground; conditions that are most common in medium-aged stands (40 to 80 years old) (Sedia & Ehrenfeld, 2003; Gaio-Oliveira *et*

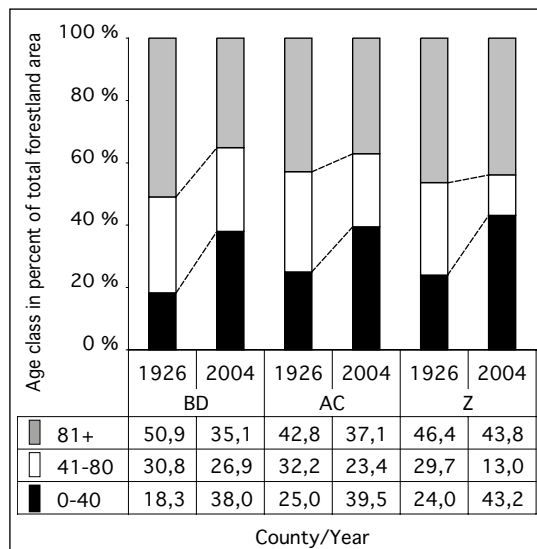


Fig. 2. Age structure of the forests within the three counties Norrbotten (BD), Västerbotten (AC) and Jämtland (Z) in 1926 and 2004 (Mattsson, 1981; Statistical Yearbook of Forestry, 2004).

al., 2006). Between 1926³ and 2004 the age structure changed dramatically in all three counties (Fig. 2), since the proportions of older forests declined while those of younger forests increased (as much as doubling in the county of Jämtland). Since the age structure has changed dramatically, a tentative conclusion is that the conditions have become more adverse for lichen growth.

¹ Area defined by land considered suitable for production of timber.

² Lichen-rich land is defined as land in which there is more than 50% lichen cover within representative test areas. Comparable proportions of lichen-rich land is observed in the two years 1955 and 1995, as shown in Fig. 1.

³ When dealing with statistics, it is desirable to use the same time period for comparison. However there are few data from before 1951 when the first Statistical Yearbook of Forestry was printed. Furthermore, there were inter-annual variations in the surveys. There are some other sources of information but no complete picture of the forest, its owners or status can be created with certainty.

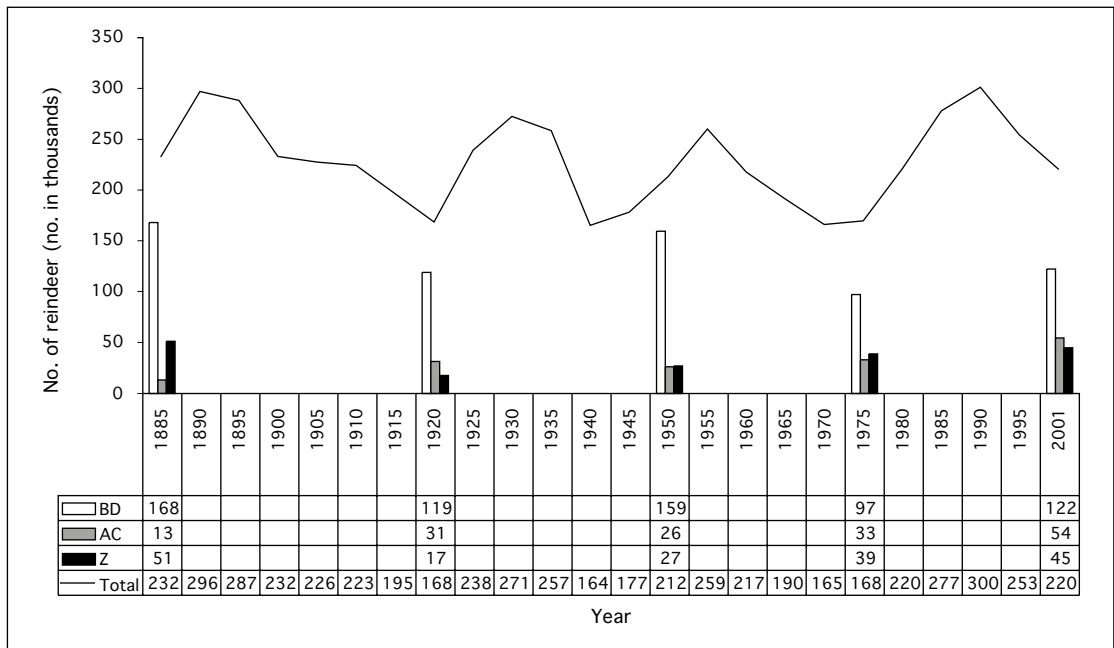


Fig. 3. Numbers of reindeer in Sweden in total and in the three counties Norrbotten (BD), Västerbotten (AC) and Jämtland (Z) 1885 to 2001 (Moen & Danell, 2003).

The reindeer resource

About 220 000 reindeer live and breed in northern Sweden, about half of which are found in Norrbotten (Fig. 3). The number of reindeer in Sweden has also fluctuated over the years, but interestingly the number of reindeer (248 000) was almost the same in 2004 as it was in 1900.

Are there enough resources to co-manage?

When considering the physical attributes of the resources there are two important questions to address. Firstly, are there enough resources to extract from the system or are they so limited or close to deterioration that making arrangements for their use would be futile?

The rapidly increasing use of the forest resources is damaging both industries' future prospects, but at the moment there seems to be enough resources left to co-manage. However, of the two stakeholders, the reindeer herding sector is the most likely to suffer from the decline in resources to such an extent that its continued existence is threatened (Danell, 2004). Currently there seem to be sufficient resources for both industries, but the proportion of lichen-rich land is decreasing, while it still supports the same numbers of reindeer as at the beginning of the last century, so the numbers are probably close to the limits that the land can support in current conditions. Furthermore, the National Board of Forestry declared, in 2004, that Swedish forests were being

overused; especially in the north and that harvest rates could not be sustained (<http://www.svo.se>; <http://www.sveaskog.se>). In addition, the storm Gudrun in January 2005 affected recent felling rates, and Skogseko (2006) states that if the current deficit between growth and felling continues the forests will be seriously affected within 15 years.

The second key question to consider is whether there are any reliable and valid indicators of the condition of the resources. The answer to this is a partial yes. The forest resources are well documented by the forestry sector, but the pasture components, especially lichens, are not well documented and in some cases even the reindeer herders have limited knowledge of their winter pasture areas. Attempts have been made to fill this gap in knowledge through the development of the Land Use Plan for Reindeer Herding, but only six RHCs are currently using this Plan.

In summary, there seem to be two major problems concerning the physical attributes: forest resources, both timber and lichens, are diminishing and there is an information deficit. Results presented in this study support the assertion that forest resources are declining, a statement supported by the reindeer herders, based on traditional knowledge of the land. Further, the evidence suggests that the forests must be better managed in the future to safeguard the reindeer herding sector. The imbalance in available information is also reflected in a corresponding imbalance between the two sectors, which is in

favour of forest companies, an issue in need of change to improve the situation of the reindeer herding sector.

The attributes of the community – resource use in historic perspective

Before the Swedish Crown began to take an interest in northern Sweden, the Sami lived in the area in a hunter-gathering society, supported mainly by gathering, fishing, and hunting and they had some few domesticated reindeer for decoy and transport (Lundmark, 1982). The reindeer herding sector, as we know it today, did not appear until the 16th and 17th centuries, as demands for skin and hides grew in Europe, encouraging the Sami, when natural resources diminished, to acquire larger herds and become more nomadic, following the reindeer's natural migrations (Steckzén, 1964; Fjellström, 1986). Furthermore, at around this time, the Swedish Crown began to take increased interest in northern Sweden, largely for economic and geopolitical reasons. Land in northern Sweden that no one had claimed was subsequently considered Crown property, and settling was encouraged with promises, *inter alia*, of full property rights to colonised areas (Stenman, 1983; 1998).

The development of early agriculture and forestry in northern Sweden has a joint history. The peasant, tax-paying settlers needed additional means to support themselves, and as the industrial value of the forest increased and communications between inland and coastal areas developed, forestry activities became more common (Eliasson, 2002; Lundmark, 2002). Attitudes toward forested land have changed over the centuries. From being regarded as potential agricultural and grazing land in the 16th century, it came to be seen as an important source of timber for the developing mining industry in the 17th century. Governmental control over the forest tightened as the economic value of the forest grew, and the use of forested land for mining purposes was weighed against other land uses, e.g., reindeer herding. The 1647 and 1734 Forest Proclamations stated that the forests were the most important assets of the country and reclamation of common forest land was prohibited (Stenman, 1983; Eliasson, 1997; Eliasson & Hamilton, 1999). The first Lapland treaty in 1673 opened northern Sweden to all settlers and introduced the notion of parallel land use; meaning that agricultural (and thus forestry) and reindeer herding sectors were to co-exist. Settlers were instructed to apply to break new land and the Sami had to state the effects it would have on their activities. Consequently, few conflicts over land use occurred during this period, especially on winter grazing areas (Korpijakko-Labba, 1994; Eliasson, 1997).

The Lappish border, drawn in 1749, was intended to protect the Sami population and their rights to land, but had little practical effect. A cultivation border was subsequently drawn in 1867, restricting settlements at higher altitudes, however it had little effect (Arell, 1979; Lantto, 2000; Lundmark, 2002). Nevertheless, the border still remains, restricting grazing areas (Swedish Reindeer Husbandry Act, 1971:437).

The delimitation process starting in the 19th century shifted power over land towards the local community. The main objectives were to support cultivation and expansion of the population, to make sure that every farmer had sufficient land, and to encourage new settlers to break new land. The delimitation was also intended to satisfy the needs of the reindeer herding sector concerning grazing and calving areas as well as migration areas and routes (Stenman, 1983; Egerbladh, 1987; Eliasson, 1997; Sjölin, 2002).

When the delimitation process was finished, the forest began to be used more extensively for industrial purposes, but to prevent devastation and forest being bought for speculative purposes the Crown's forests were set aside. Initially sawmills bought limited felling rights from local farmers, but after 20-year time limits for felling rights were introduced, they began to buy more extensive tracts of forestland to secure their timber supplies. In 1906, sawmills were totally prohibited from buying felling rights (Stenman, 1983; Eliasson & Hamilton, 1999; Enander, 2001).

The 1896 Forest Committee investigated the condition of the Swedish forests and in northern Sweden the general opinion was that there were no over-fellings (i.e., fellings exceeding the rate of growth), and that governmental controls were working. However, in contrast to this optimistic appraisal, the forests often appear to have been over-logged at this time, since for instance, representatives of the county of Ångermanland stated (in English translation): "*the forest does not grow at the same pace as it is felled*" (Enander, 2001, p. 40).

Modern changes in the industries and the impact of forestry on reindeer herding

The population in northern Sweden continued to grow and the need for land grew further following increasing industrialisation at the end of the 19th century, and land increasingly distant from the coast and rivers was cultivated (Egerbladh, 1987). However in the mid-19th century, the value of the forests was increasingly recognised by the Swedish government and the colonisation efforts became more cautious (Arell, 1979). At the beginning of the 20th century, farming was still considered to be extremely important, but the forestry, mining and water resources began to

be significant contributors *inter alia* to the Swedish welfare system, and thus increasingly politically as well as economically important later in the century (Stenman, 1983).

During the beginning of the 20th century, forestry underwent major changes as the scale of its operations expanded, and large industrial companies began to dominate instead of private, small-scale enterprises. At the same time, reindeer herding practices also changed, from mainly intensive approaches, in which the herds were kept close together, to more extensive regimes, in which the herds were only gathered at strategically important times, e.g. for slaughtering or marking (Lantto, 2000).

Both sectors affect each other, however to different extents. Reindeer herding affects forestry because the reindeer graze and trample the forest land, but forestry has much greater effects on reindeer husbandry through logging, soil scarification and construction of forest roads (Mattsson, 1981). However, various studies have shown that modest changes in forest management practices e.g., increased thinning (Bostedt *et al.*, 2003) or modifications to scarification practices (Roturier & Bergsten, 2006), could yield significant benefits for the reindeer herding sector.

Shifts in attitudes to land use in northern Sweden

Social attributes have also affected the two sectors and the relationship between them, notably shifts in the community's attitudes towards them and the forest resources.

In the 16th and 17th centuries forested land was only considered to be important for colonisation purposes, and reindeer herding was one of the main uses of the land. Later, following industrialisation of mining and subsequently forestry, the forests were recognized as important sources of income for the government and later forest companies. Due to the development of large-scale forestry in the 1950s, the reindeer grazing areas were affected by forestry activities to such an extent that grazing areas were destroyed for prolonged periods, leading to conflicts becoming even more severe.

The establishment of the cultivation border provides an example of attempts by the Swedish government to protect the Sami, and thus the reindeer herding sector, but as the value of timber, the economic importance of forestry and tax-payers needs all grew, protecting the Sami became a subordinate issue.

In conclusion, shifts in attitudes to both land use and the stakeholders probably affected the conditions under which each of the sectors operated, leading to confusion over land use rights and, in the long term, affected land use patterns.

Rules-in-use – Regulations concerning forestry and the reindeer herding sector

As colonisation of northern Sweden preceded the conflicts over land use became more apparent, leading the Sami to mobilize politically at the turn of the 20th century. At this time the first regulations concerning reindeer herding were also drafted, and general regulations concerning forestry became applicable in northern Sweden. The ownership of forest land in northern Sweden and the right to use land for reindeer herding are currently regulated by two laws: the Swedish Forestry Act (1979:429) regulating forestry, and the Swedish Reindeer Husbandry Act (1971:437) which regulates reindeer herding. Furthermore, various other laws, regulations and certification affect both industries.

The development of the Swedish Forestry Act

The Swedish Forestry Acts were initially laws designed to ensure the regeneration of the forest but they developed, during the 20th century, into laws that also cover industrial needs and nature conservation.

The main objective of the 1923 Swedish Forestry Act, which strongly influenced forest policy later in the 20th century was (in English translation) to ensure “*that all forest land shall be used for forest activities*” (Ekelund & Hamilton, 2001, p. 38) and placed the responsibility for new planting on the owners (Ekelund & Hamilton, 2001; Enander, 2001; 2003; National Board of Forestry, 2002).

After several revisions, the present Swedish Forestry Act (1993) places equal emphasis on production and environmental factors, including natural production capacities, biodiversity, and genetic variations of the forest resources. It states (in English translation) that “[*the*] *forest shall be used in such a way that plants and animals that naturally belong in the forest shall be able to continue living in the forest*” (Bäckström, 2001, p. 136). It also makes provisions for protecting the cultural and social values of the forests. However, to support the aims forest management was de-regulated to give the owners wider scope to choose the silvicultural methods to apply (Bäckström, 2001; SOU 2001:101; National Board of Forestry, 2002; Enander, 2003).

The development of the Swedish Reindeer Husbandry Act

The Swedish Reindeer Husbandry Act is based on the joint Swedish-Norwegian regulation of 1883 concerning the movement of reindeer in the two countries and the regulation of reindeer markings. The Act laid the foundations for the present Swedish Reindeer Husbandry Act since it introduced Reindeer Herding Communities as administrative units. In addition, it established the Sami right to herd reindeer, meaning that only Sami were allowed to herd and own rein-

deer, with the exception of residents in the county of Norrbotten, the intention being to protect the reindeer herding sector and, in the long term, Sami culture (Mörkenstam, 1999; Lantto, 2000).

The Sami have usufructuary rights on forest land in northern Sweden based, on both 'lapp-taxation-land', and immemorial rights. In the 18th century, the Sami's right to use land and water was based on the 'lapp-taxation-land' concept, i.e., ownership of land, and is comparable with the ownership settlers were granted over their colonised land. Besides restricting the right to use land, e.g. for grazing, to the Sami, the 'lapp-taxation-land' provided a basis for taxation. Due to the complexity of the factors affecting the legal status of land used for reindeer husbandry, e.g., that the government considered the 'lapp-taxation-land' to be part of the land owned by the state, the rules relating to 'lapp-taxation-land' were abolished in 1928 (Lundmark, 2002). Subsequently, rights to use this land were based on 'immemorial rights' which, according to the Act of Land from 1734, applied when a person had used or possessed real estate for such a long time that no one could recall how his parents (or other prior owners for at least 90 years) came into possession of the estate (Korpijakko-Labba, 1994; Sveg district court, 1996). Thus, the right to own or use land shifted to become a usufructuary right based on immemorial rights as the Swedish

Reindeer Husbandry Act were introduced in 1886. The currently applicable Swedish Reindeer Husbandry Act (1971:437) regulates in detail the conditions under which reindeer herding is to be conducted.

Consultations regulated in law

Under the Swedish Forestry Act and the Swedish Reindeer Husbandry Act, the forestry industry and reindeer herders are both obliged to consider the effects of their activities on the other sector. The relevant paragraph was first introduced in the 1979 Swedish Forestry Act (1979:429) and rewritten in 1993 with stronger implications for both sectors. It provides a certain degree of freedom-under-responsibility, which means that the legal framework does not stipulate how this consideration should be formulated or applied in detail, but leaves implementation of the law to the two sectors. The forestry sector was given the superior role, as the owner of the resource, while the reindeer herding sector's usufructuary rights were recognized, thus they have equal rights to use land.

Reindeer herders have to consider the other sector's land uses when moving their herds (Swedish Reindeer Husbandry Act 1971:437), while large-scale forestry companies have to consider the requirements of the reindeer herding sector when planning final fellings in year-round grazing areas (see Box 1 for further details).

Box 1.	
Consultations according to the Forestry Act (Swedish Forestry Act 1979:329, translation on http://www.svo.se)	
Section 20	Before felling takes place in an area where reindeer husbandry is permitted throughout the entire year (year-round grazing areas) in accordance with the Reindeer Husbandry Act, the Sami village concerned shall be given the opportunity to participate in joint consultations, as stipulated in regulations issued by the Government, or public authority designated by the Government.
Section 21	When applying for felling permission pursuant to section 16 above, the forest owner shall describe planned measures to satisfy reindeer husbandry interests. In year-round grazing areas, felling is not permitted, if it: (i) causes such a significant loss of reindeer grazing land that the possibility to maintain the permitted number of reindeer is limited; or (ii) precludes the customary grouping and migration of reindeer herds. When felling permission is granted, the Regional Forestry Board shall decide what consideration shall be taken to reindeer husbandry interests as regards, inter alia, the size and location of the felling site, and permissible felling method. These conditions may only apply to what is clearly required with regard to the rights applicable to reindeer husbandry.
Section 31	Forest management measures, which concern the form and size of felling areas, the establishment of new stands, the retention of tree groups, and the routing of forest roads, are to take account of essential reindeer husbandry requirements. When planning and implementing forest management measures, it is desirable that the Sami village concerned be given annual access to both a sufficiently large and cohesive grazing area, and an ample amount of vegetation in those areas used for reindeer corralling, migration and resting.

A recent Reindeer Herding Committee report suggests that consultations should be conducted within the whole area where reindeer husbandry is permitted, to increase the cooperation between *all* forest owners, including non-industrial private forest owners, and the reindeer herding sector, and states that winter grazing areas are especially valuable and important. (SOU 2001:101).

Voluntary consultations

Currently the other sector only has to be considered with respect to activities affecting the all-year-round-land, but the two sectors have agreed to extend voluntary consultations to activities affecting winter grazing areas. This is done through the FSC, the Forest Stewardship Council; a voluntary certification system that is applicable to forestry and considers the rights of indigenous people. The FSC is an independent membership-based international organisation that certifies companies and organisations that use forest land or forest products. Within the reindeer herding area, foresters shall, according to the FSC, consider reindeer herding, conduct consultations and consider areas that are important to the reindeer herding sector for cultural, ecological, economic or religious reasons (Hemberg, 2001; <http://www.fsc-sverige.org>). Several Swedish forest companies are certified according to FSC standards and in total about 10 million hectares of forest land in Sweden are presently certified (<http://www.fsc-sverige.org>). The Pan European Forest Certification, PEFC, is another certification system, recently introduced but not yet implemented, which also includes considerations of indigenous people in its criteria (PEFC, 2006).

Consideration – a confusing issue

The important judicial factors in this context are whether (and if so, to what extent) rules are appropriate means to regulate the relationship between the two stakeholders and thus avoid land use conflicts.

At the constitutional level, the legal framework prescribes that forestry has to consider the needs of the reindeer herding sector and the law prescribes management by objective. However, the nature and degree of the consideration that should be applied is not prescribed in the law, making it rather vague. At the constitutional level rules only cover the year-round grazing areas, leaving decisions regarding the important winter grazing areas to be regulated by the voluntary rules at the collective-choice level. However, these rules are based on the legal framework, making them as vague as the law.

Furthermore, the lack of clarity in the legal relationship, based on confusing property rights, illustrated by for example the abolition of the 'lapp-taxation-

land' regime, inevitably extends to the consultations and the power distribution within them, since the power distribution is based on the fact that the forestry companies are the owners of the resources, while the reindeer herding sector has usufructuary rights.

In conclusion, due to the lack of clarity regarding the power distribution within consultations, confusion regarding property rights, together with the vagueness of the legal framework, the present rules at constitutional and collective choice levels are probably insufficiently clear to regulate effectively the relationship between the two stakeholders, or therefore to resolve conflicts between them.

Discussion regarding attributes affecting consultations

In an attempt to elucidate the problems complicating the co-existence of forestry and reindeer herding, and to identify the key issues that need to be changed to improve present institutional arrangements, the situation was analysed using CPR theory. In an IAD framework, the impacts of three sets of attributes (physical, societal, and use of rules) were assessed in an analysis of the action arena, i.e., the consultations between the forestry and reindeer herding sectors.

The physical attributes assessed were the ownership structure, forest resources, and reindeer resources. The area of forest land has not changed substantially in the last century, but the age structure of the forests has changed dramatically; the proportions of young stands have risen sharply, while the proportions of older stands have declined. These changes have had adverse effects on the reindeer herders since older stands are assumed to provide the best reindeer grazing areas with the greatest abundance of lichen. In addition, similar numbers of reindeer to those at the beginning of the 20th century are grazing on the same forest area, so the amount of lichen-rich land available per reindeer has decreased immensely, which is not sustainable in the long run.

Another factor is that knowledge of pasture resources is limited, since neither of the two sectors has detailed data on the lichen resources. The land use plan for reindeer herding is a tool designed to increase knowledge of the pasture resources, but its implementation is rather expensive and time-consuming, so only six RHCs currently use it.

The analysis of the societal attributes affecting the action arena indicates that attitudes towards forestry, reindeer herding and other types of land use have continuously changed. In the 16th and 17th centuries the Sami used the land for reindeer herding, while colonisers had to ask permission to break new land. However, as the value of timber (initially for mining

purposes, and subsequently also for industrial uses) increased, the land use rights of the Sami became weaker. As forestry transformed from a small-scale industry to a large-scale industry of greater monetary value, in the beginning of the 1950s, land use conflicts became more common. Reindeer grazing areas were destroyed for long periods, mainly due to the soil scarification methods applied, and became fragmented. With the development of mechanized forestry, the land use conflicts became even more severe.

Analysis of the ways in which rules regulating land used developed shows that forestry came to have higher priority than reindeer herding, due to its importance to the Swedish economy.

It was not until the 1980s that the needs of reindeer husbandry were recognized at the constitutional rule level, when consultations were introduced in the Swedish Forestry Act (1979:429). At the collective-choice level, regulations from the Swedish forestry Board and FSC constitute important rules. However, the rules at the collective-choice level are not compulsory and the reindeer herding sector has little influence over their design.

Key judicial factors affecting the relationship between forestry and reindeer husbandry include the ownership rights and power distribution between them. The land use rights of the Sami are disputed since the property rights are confusing, and the matter has been discussed in several court cases. The uneven power distribution, based on ownership structure, is also straining the relationship.

Concluding remarks

This paper considers the relationship between forestry and reindeer herding in a broader perspective than previous studies, including physical and societal as well as judicial issues.

The results of the analyses show that the forest resource is becoming scarce, maybe even too limited to support the reindeer herding sector. To avoid its demise, the two land use sectors probably have to find viable and stable ways of co-managing the forest resources. In order to extend the potential effectiveness of the co-management arrangements, several issues need to be addressed. Notably, more information about the resources is required. In addition, information on the economic effects of forestry activities on reindeer herding and vice versa, and the economic consequences of agreements reached in consultations, is needed. Thus, further empirical studies are clearly needed.

Changes in community and judicial attitudes toward land use issues in northern Sweden have contributed to a lack of clarity regarding legal rights to use the land; notably the confusing and unequal

rights to decide how to use the resources, since forestry companies own the land, while reindeer herders have usufructuary rights. Consequently, the reindeer herding sector is dependent on forestry and its good will, and has to make greater compromises in land use conflicts.

The legislation is also written in a rather vague manner, leaving the two sectors to act with a certain degree of freedom-under-responsibility. There are, for instance, no stipulations regarding how much the forestry companies have to consider the reindeer herding sector. One possible solution to the problem would be to create better operational and collective-choice rules, i.e. rules regulating the manner in which the two sectors should consider each other's requirements and consultations in more detail, possibly developed in co-operation with the forestry and reindeer herding sectors.

The contextual factors collectively indicate that the forestry and reindeer herding sectors are currently closer to a conflict situation rather than co-existence, and that certain problems need to be overcome to foster their co-existence. Efforts should be made to create co-management models that would effectively promote co-operation between the involved parties in order to ensure that the forest resources in northern Sweden can be used sustainably by both sectors.

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Skogsbruk och rennäringen i norra Sverige – utveckling av en markanvändningskonflikt

Abstract in Swedish / Sammandrag: Skogsresursen i norra Sverige nyttjas för bland annat timmerproduktion och renbete och skogsbruket respektive rennäring påverkar varandra negativt. För att minska konflikterna har samråd instiftats men processen fungerar inte tillfredsställande eftersom det finns ett missnöje bland rensköterna. Denna studie ger en översikt av den parallella utvecklingen av de två näringarna och deras inbördes relationer och därmed identifieras flera nyckelområden som komplicerar relationen mellan de båda näringarna och därmed även samråden. Genom att analysera de fysiska, sociala och juridiska aspekterna av relationen mellan rennäring och skogsbruk pekar studien på ett antal problem som måste lösas för att kunna säkerställa en fortsatt parallell existens.