

Saarivuoma Sami Community- Compensation for Financial Losses 1972–2021 due to Expulsion of Traditional Pasture Lands in Troms, Norway

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Preface

This report is a commissioned work for Saarivuoma Sami Community (Saarivuoma Sameby). We thank for receiving the opportunity to accomplish this challenging and interesting task. We are grateful for the cooperation with chairman Per-Anders Nutti and his board. Niklas Labba from Saarivuoma has also been an important source of information.

My fellow researchers Hans Tømmervik at Norwegian Institute for Nature Research (NINA) and Sven Adler and Per Sandström, Swedish University of Agricultural Sciences (SLU) have made important contributions.

We are also grateful to journalist Eilif Aslaksen, NRK Sapmi, that made extra media search for us improving the documentation of the conflicts between Saarivuoma and Norway's Government.

Narvik, Norway, February 16, 2023



Jan Åge Riseth

Summary

This report is written by independent experts. The purpose is to calculate the financial losses for Saarivuoma Sami Community (Saarivuoma Sameby) for by law being locked out from two areas in inner Troms, Norway during the period 1972-2021.

The report put the areas in a nature geographic and a reindeer herding context and explores the potential of Saarivuoma's grazing land from the 1960s to current time. As for the winter pastures the report states that Saarivuoma has, and have had sufficient winter pastures the last five decades, and that they have had possibilities to adjust their pasture use to changing conditions.

The report has used the established FATIMA model for calculating the loss of bare ground pasture capacity. The loss is calculated to be a loss of pasture capacity for 5494 reindeer for 182.5 days per year.

As an assumption for the further calculation the report has chosen that with full access to the summer land as ruled by the Supreme Court of Norway in 2021 the productivity level of Saarivuoma would minimum had been as the level of Norrbotten County with 4.4 kg per winter reindeer. It assumed a meat price based on a three years mean from Sametinget.se at SEK 74.44 and and price addition of SEK 12.34 providing a total meat price of SEK 86.78. The annual production loss is calculated to be SEK 2.1 million.

The production loss should be calculated for at least 33 years (1972-2005). With these assumption the operational production loss is calculated to SEK 69.2 million for these 33 years. For the additional period of 16 years 2005-2021 we have calculated a production loss of SEK 4.5 million. Accordingly, the total operational loss is calculated to SEK 73.7 million.

Grazing fees are calculated to be SEK 1.34 million in today's value, and extra herding costs SEK 0.61 million in today's value. The total financial loss is calculated to be SEK 75.65 million.

Table of contents

1.	Background.....	5
1.1.	Problem statement/Mandate.....	5
1.2.	Time and costs	5
2.	Operating Loss.....	6
2.1.	Area Characteristics	6
2.1.1.	Area "Northwest"	7
2.1.2.	Area "Southeast" (Mánnančearru)	8
2.2.	Areas in Context.....	9
2.2.1.	Grazing seasons and pasture balance.....	12
2.2.2.	Natural borders and landscapes	14
2.3.	Saarivuoma	15
2.3.1.	Winter pastures	16
2.3.2.	Bare ground pastures.....	19
2.3.3.	The split of Uhcanjárga (Saarivuoma's land in Norway).....	22
2.4.	Methods and Assumptions	26
2.4.1.	Previous calculations (Tveraa)	26
2.4.2.	Our approach	26
2.5.	Calculations.....	27
2.5.1.	"Northwest" Area (C).....	28
2.5.2.	"Southeast" Area (D) Mánnančearru.....	30
2.5.3.	Alternative calculation?	31
2.6.	Assessment	32
2.6.1.	Assumptions.....	32
2.6.2.	Utilization level "Northeast" Area (C).....	32
2.6.3.	Utilization level "Southeast" Area (D), Mánnančearru.....	33
2.6.4.	Reduction of pasture loss	34
2.6.5.	Saarivuoma development.....	35
2.6.6.	Assumptions.....	36
2.6.7.	Operation loss	37
3.	Grazing fees and fines	39
4.	Extra monitoring and herding expeditions.....	40
4.1.	Late winter/Spring	40
4.2.	Summer	41
4.3.	Autumn/ Pre-winter.....	41
4.4.	Costs.....	41
5.	Total financial losses	44
6.	References.....	45

1. Background

1.1. Problem statement/Mandate

In connection with a court case before the ECHR, there is a need to clarify what has been Saarivuoma's financial loss in the period from 1972 to 2021 because of the exclusion from the two areas in question. The mandate for this report is to calculate this loss as far as possible. In the letter from Saarivuoma's lawyers the mandate is specified like this:

*“The loss for which there is a need for a closer specification is
- loss of production
- costs to remove fences etc.,
- lost working time in the form of, for example, time spent on more intensive herding etc.”*

Beyond the direct mandate we also will comment on directly relevant issues that emerge from the material, especially the historical assessments of Saarivuoma's winter pastures.

Non-pecuniary costs (see e.g., Nicholls and Nolan. 2019, Gregory et al 2020) are not included in this report.

1.2. Time and costs

The compensation claim will be presented in current monetary value. The largest part of the calculated costs in this report is assessed pasture loss which will be calculated in today's value. Other costs as accrued grazing fees and other expenses are registered at the point of time where they apply, and then recalculated to contemporary value by using recognized Norwegian and Swedish calculators (SSB and SCB respectively).

2. Operating Loss

2.1. Area Characteristics

The two disputed areas which Saarivuoma won back by the Supreme Court ruling in 2021 are both located within Uhcanjárga. The historical district 12 Uhcanjárga is shaped like a peninsula, a *njárga*, which has natural borders by large lakes, rivers and valleys keeping the reindeer within the area (Blind and Nutti 2021), cf. figure 1.



Figure 1. Uhcanjárga (Renbetekommissionen 1916).

In this report, the two disputed areas are mentioned as “Northwest” (about 900 km²) and “Southeast” (about 208 km²). Before 1972 Saarivuoma had 1735 km² bare ground area on the Norwegian side of the national border (Reinbeitekommissjonen 1967:192), so these two areas make up 64 percent of Saarivuoma’s pastureland on the Norwegian side. Moreover, in 1972 Saarivuoma also lost another area which was transferred back in 1985 and partly still another which still is disputed. These areas are not a part of this case but should be mentioned to understand the full picture.

2.1.1. Area "Northwest"

The area "Northwest" is a mountain area mostly delimited by main valleys/ivers (cf. Figure 2). In the north it is the river Målselva, in the west the river Barduelva, as well as the valleys Bardudalen and Østerdalen, in the south the western part of the lake Altevatn, the valley Strømskardet and a high mountain area in southeast, and finally the valley Kirkesdalen in the northeast. This area is characterized by many high mountains with peaks from about 1200-1500 meters asl. and steep hillsides down to the main valleys. The landscape between the peaks is pierced by more elevated and smaller valleys, both over the tree line (*vaggi*) and below (*vuobmi*). The area is very valuable for reindeer herding as, with exception of the main surrounding valleys, it practically lacks big encroachments (Riseth & Johansen 2019, 2022).

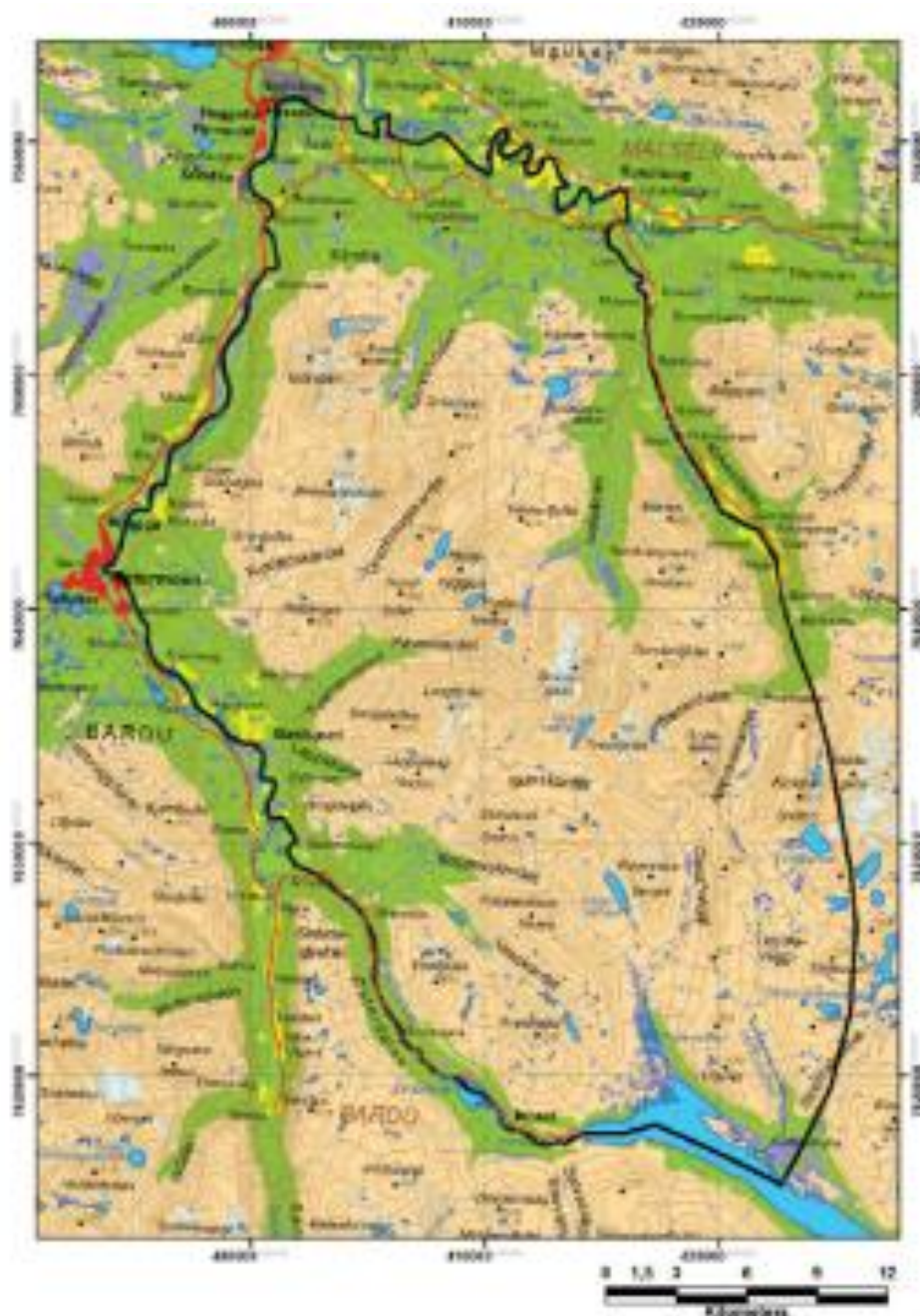


Figure 2. Area «Northwest»

The area is a part of the alpine mountain ridge with a rich bedrock of mica slate which provides a rich soil with lush vegetation. This area is both a *spring* area with calving grounds, and a rich *summer* land (Blind and Nutti 2021). According to the the professional comitté of the Reindeer pasture commision of 1997 it is an outstandingly rich summer pasture (Reinbeitekommissjonen 2001: 95). The landscape allows the reindeer to follow fresh and sprouting plants near the melting snow through a long growing season and move up and down in the landscape as weather conditions and insect harassment shape opportunities (Sara 1997). The high mountains in the area are also emergency pasture in catastrophic winters (Riseth et al 2011).

The data for the part area Lapps kardet, which is in the northwestern part of this whole area, indicates that this is a rich summer pastureland with a relatively high percentage of rich forests and rich heaths, meadows, and snow beds over the treeline. Tall herb and fern deciduous forests are especially abundant in Lapps kardet. Mountain meadows are abundant over much of inner Troms (Johansen et al. 1995:45-46).

2.1.2. Area “Southeast” (Mánnančearru)

The area “Southeast” (208 km²) is named Mánnančearru, and is situated in the very southeast inland close to the border towards Sweden, for the details see figure 3.

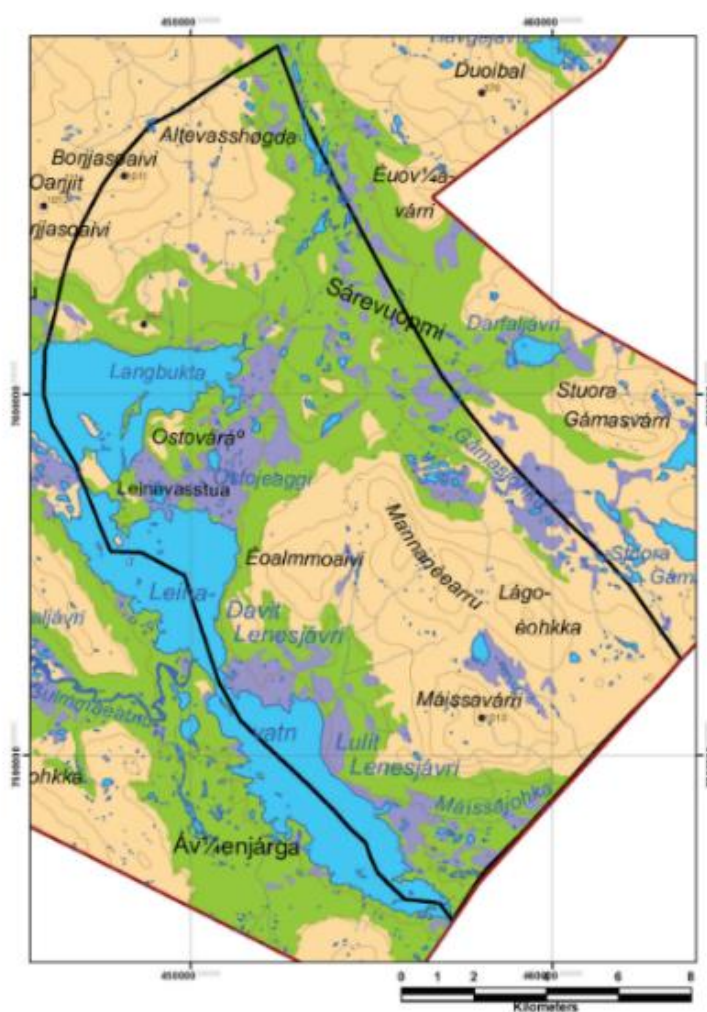


Figure 3. Area «Southeast» (Mánnančearru)

The area is located on barren bedrock and has a high proportion of lichen pastures (Reinbeitekommisjonen 2001). The area is also close to the spring and autumn areas on the Swedish side and a core area on the spring migration towards northwest that need to be completed before calving in May. The area is delimited by the lake Leinavatn in southwest, three mountain peaks over 1000 m asl in the northwest and a wide forest and mire valley with small lakes (Sárevuopmi) in the northeast and the national border towards Sweden in the southeast. As both the map and the data indicate mires and wetlands are an important part of the landscape. These vegetation types include many plants with deep roots and/ or which are palatable or even grow under snow cover (Wahrenberg et al. 1999). Accordingly, mires and wetlands are particularly important in early spring and late autumn/autumn winter.

To consider what the loss of these areas have implied both practically, and finally economically, we need to paint on a broader canvas.

2.2. Areas in Context

Reindeer herding is a distinct industry and lifeform. It is based on a complex interaction between landscape, animals, and humans (Skum 1955, Ruong 1964, Paine 1972). As for the landscape, the animals are dependent on finding specific types of pastures during a series of seasons of an annual cycle (Sara 1997). Most of Sápmi is situated on the low Fennoscandia bedrock shield, which is covered by glacial sediments. The mountain range consists partly of metamorphic rocks and rich Cambro-Silurian rocks. Moraines and rolling stone hills, forests and shrubs, mires, and numerous lakes and ponds cover much of the landscape. The inland of Sweden towards the Norwegian border comprises a low undulating plateau of low mountains, birch-covered hills, low pine forest, and open lichen land. Major vegetation regions of Fennoscandia are depicted in figure 4.

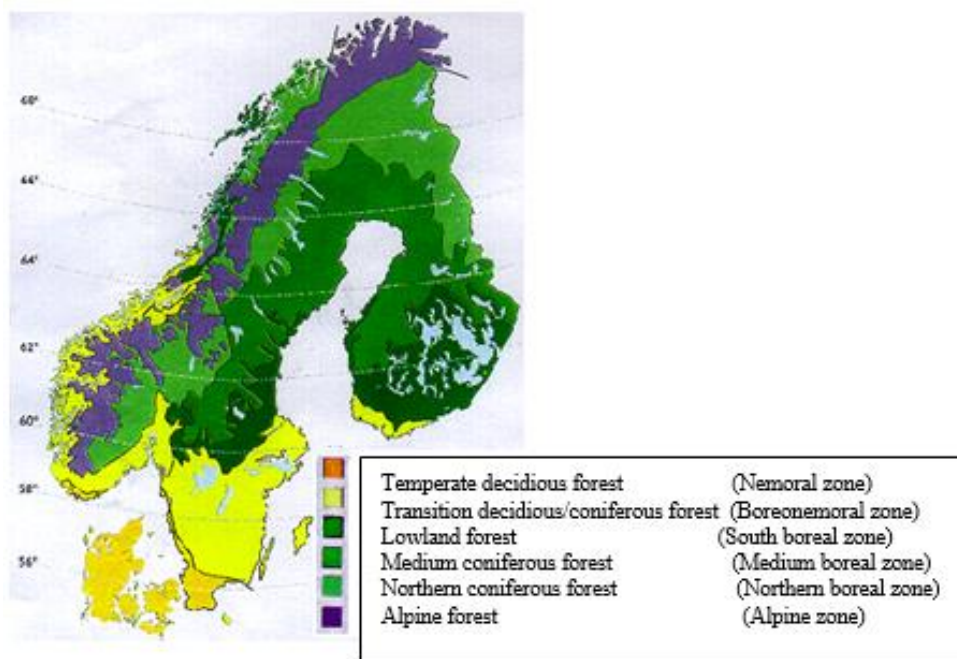


Figure 4. Nature Vegetation Regions of Fennoscandia. Source NUB, 1977:34, cf. Gaare, 1997b.

The reindeer belongs to the alpine and the northern boreal zone. The latter is dominated by spruce forest (birch North of the Arctic Circle in Norway) when moisture is sufficient or pines at drier and



Figure 6. Herding systems in Fennoscandia (Adapted from Gaare 1997.8)

As the sketch in figure 6 indicates, Fennoscandia currently has three different herding systems.

The dominating herding system in Sweden and Norway (I) is based on medium or long spring and autumn migrations. Norway also has coast-oriented reindeer herding utilizing the near-to snow free coastal areas in northern Norway in winter (II), while the third type is a local year-around herding in the taiga areas of North Sweden and Finland (III).

2.2.1. Grazing seasons and pasture balance

Reindeer herding should be understood in the perspective of a sequence of seasons where the animals' needs form specific requirements to the landscape. A standard presentation with four main seasons is provided in figure 7.

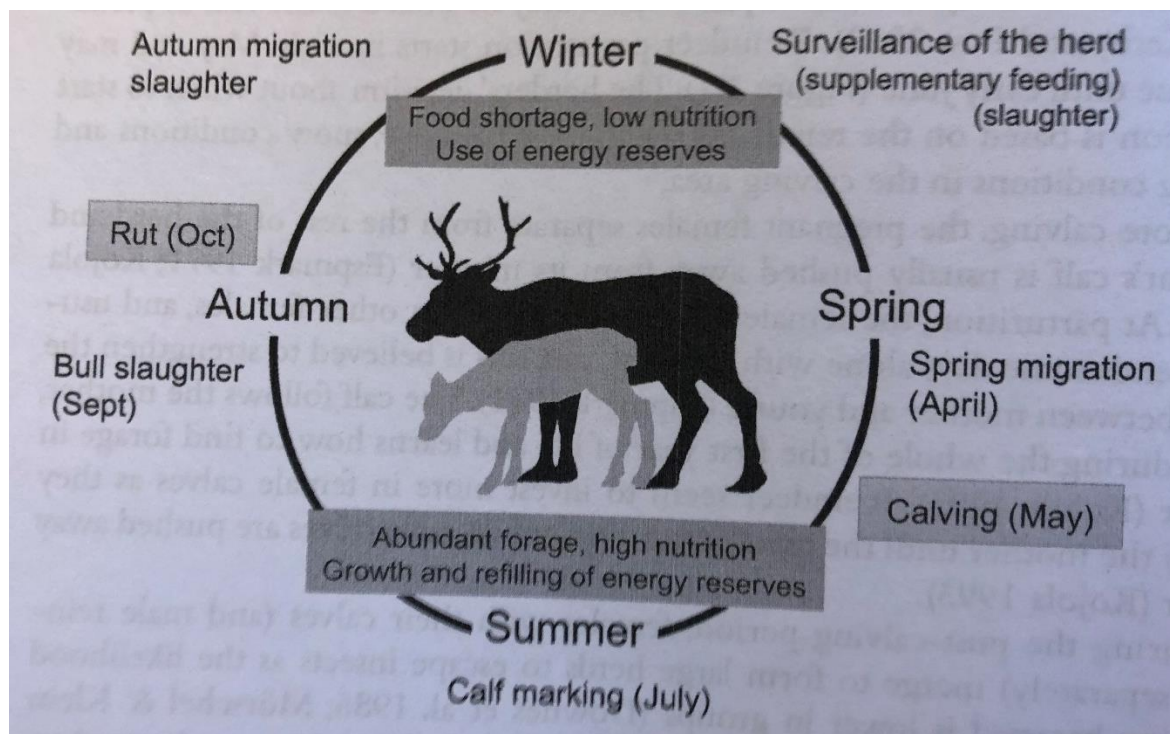


Figure 7. The annual cycle of reindeer husbandry in Scandinavia (Skarin et al. 2022)

Traditionally a reindeer herding year is split into eight subseasons. In a note of a few pages Saarivuoma herder leaders provide a number of concrete examples from Saarivuoma's traditional land use (Blind & Nutti 2021). Here we provide a general description and fill in some of their examples.

Seasons

The annual cycle starts with spring (*giđđa*) and calving. The calving grounds are usually situated at shielded locations just above the tree-line (*orda*). Calving takes place in May when most of the landscape still is snowcovered, but the females seek the first snow-free spots (*bievla*). Mires are also important pasture in this period.

When the snow melts,³ the reindeer descend to the valleys and seek the first sprouts of protein-rich green plants. Adult males are the most transcendent followed by young animals. They can be a challenge as they also seek farmers' fields. Females with calves are calmer as they stay close together creating maternal bonds during their embossing time. From the valleys the animals follow the greening as it continues uphill. Blind & Nutti (2021) describe this as taking place within their calving and summer areas.

³ Spring-summer (*Giđđasgeassi*) in June

Further into summer this green wave *pull*, whilst blood-sucking insects *push*, the reindeer up the mountains as high as there is ground vegetation unto high summer (*geassi*). In hot weather the animals have their daily up and down movements seeking relief for the insects on snow-spots (*jassat*) and glaciers during day-time while they are going down to valleys to graze during nights. Dwarf willows being parts of melting snowbed communities are important grazing. This is also the essential time for calf-marking.

When the summer is over the peak, and further throughout the autumn, the reindeer seek ever lower in the landscape as the vegetation wither, first in the mountains, later in the woods. August⁴ is mushroom time. From September it is autumn (*čakčča*) and mires and wetlands again are core grazing areas.

Later in October ice is formed on rivers and lakes and the first durable snow is falling. The season of autumn winter (*čakččadalvi*) lasts until New Year time. The main grazing landscapes now are mires and thickets. The vegetation utilized are lichens, mire plants and grasses that are palatable even through the cold seasons.⁵

In winter (*dalvi*) pasture conditions are dependent of snow depth⁶ and consistence (Riseth et al. 2011). Wind-blown ridges are usually the landscapes that provide accessible food, mainly ground lichens. Deep or hard windblown snow, bottom ice or ice within the snowpack can make the vegetation inaccessible.

Spring winter (*giđđa dalvi*) is the time⁷ of beginning snow melt. Grazing are found in open areas in the forest (*vuopmi*) or mires with lichen tussocks, but also at wind-blown or hilly and slopy areas.

To sum up; *each season have its possibilities and limitations*; temperature, wind directions, and precipitation, i.e. seasons may be optimal or not depending of the combination of different influences. Reindeer herders consider the relations between seasons as links in a chain where effects of what happens in the one season will be reinforced or levelled out of what happens in the next. The Sami word for the outcome of a year is *jahkodat* which means *the total outcome of a year as the sum of seasonal effects*, such as the number of calves, reindeer condition, and possible slaughter (Sara 1997).

Pasture balance

An even coarser division of pasture lands is the dichotomy between the seasons of *snowcover* and *bare ground* as both the pasture dynamics and the reindeer physiological adaptatation are quite different between them. In winter the main diet is *ground lichens*. They are slow-growing and vulnerable to as well heavy grazing as trampling when not covered by snow. Traditional herder strategies include rotational use of winter pastures while governments rely on setting quotas. Bare ground pasture is green pasture (mainly herbs and grasses) which most typically characterizes summertime. As commented in the preceding paragraph spring and autumn pastures have a composition in-between these extremes.

⁴ Autumn summer (*Čakčageassi*)

⁵Some grasses (ex. *Dechampsia*, *Poa*, *Agrostis* spp.) have the ability to continue growth even under the snow, and some plants are green/have nutritional value the throughout winter (Warenberg Storeheier Staaland).

⁶preferred <0,5 meter and maximum 1,0 meter

⁷ March-April

For the animals the green-pasture seasons are an *anabolic* phase with a physiological building-up of protein reserves, while winter is a *catabolic*⁸ phase where food-intake is reduced and the animals to a considerable extent survive on the accumulated reserves from summer. While protein reserves are stored from summer to winter, lichen pastures are stored from year to year. Grasses and herbs not being grazed are wilting by the end of the growing season, while lichens not grazed can live for many years.

This corresponds with fundamental differences in both growth pattern and resilience. Today it is well known that *winter pastures set the limitation for how many animals that survive, while the snow free seasons, in particular the summer pastures, decide to which extent the growth potential of each animal is realized.*⁹ As a rule of thumb, a recent book chapter,¹⁰ states it like this:

*“Reindeer accumulate body reserves (fat and muscle tissue) in summer and use these reserves during winter (Klein 1986). As a rule of thumb, food abundance in summer determines the growth and size of animals, while food abundance in winter determines density¹¹ and fecundity¹² (Klein 1965)” (Skarin et al 2022:63).*¹³

The more complex relation between the different seasons is illustrated by the circle in figure 7. The circle can be seen as a link in a chain where the effects of what happens in one season is reinforced or leveled out in the successor.¹⁴ The total outcome of a year as the number of progeny, reindeer condition and slaughter results emerge as a sum of all these effects. This includes that the quality and capacity of the summer pastures also are important for winter survival and next year’s calving result.

Reindeer herders name this as mentioned above, *jahkodat*, how the year has been. Reindeer herder and researcher Mikkel Nils Sara states: *“Jahkodat.... Is an aggregate of how season follows season, and how the effects of these build up gradually” (Sara 1977:62).*

2.2.2. Natural borders and landscapes

As already indicated above (2.1) *natural borders* are an important feature in a reindeer herding landscape. Accordingly, the Sami professor Israel Ruong divides between «landscape with natural obstructions» (*oaggás eatnan*) and «landscape without natural obstructions» (*luomokis eatnan*) (Ruong 1982:69). This distinction is connected to another Sami concept; *collecting landscapes (oktilaš eatnamat)*. A Troms herding district plan mentions the concept like this:

“....areas where a whole herd of reindeer can graze in peace.... over a longer period. The reindeer will spread out a bit, but [one] will always know where the rest of the herd is. Such an area has a terrain that causes the reindeer to gather rather than disperse when disturbed or startled by something transient (hikers etc.).

⁸ Energy releasing

⁹ This the classical nature science theoretical understanding used as a basis for pasture capacity calculations. The reasoning is that calculation built on this understanding will be correct in average.

¹⁰ with the current professor in reindeer husbandry at The Swedish University of Agricultural Sciences (SLU), Uppsala, as first author and her predecessor as last

¹¹ How many animals per sq. km

¹² How many calves per female

¹³ The references within the citation both refer to the American biologist David R. Klein from Alaska who were active more than a half century (Woodford 2021). Students of wildlife management at the Agricultural University of Norway were taught exactly the same doctrine in the mid-1970’s.

¹⁴ This is the more practical traditional reindeer herder understanding including annual variations.

Precisely because oktilaš eatnamat causes the reindeer to gather and not disperse, such areas are particularly important for reindeer husbandry.the terrain is such that the reindeer regroup if disturbed or frightened instead of scattering. Such areas are also suitable for having reindeer fences, precisely because you manage to gather the herd in such areas. For this reason, such areas are particularly important during calving, and during the entire bare ground period” (Kvaløy 2018:18, our translation, and italics)

2.3. Saarivuoma

Saarivuoma is an example of the dominating type reindeer herding with relatively long migrations (II). The total extent of Saarivuoma’s area in Sweden and Norway approved by the governments¹⁵ as it was in the period 1984-2005 is depicted in Figure 8.

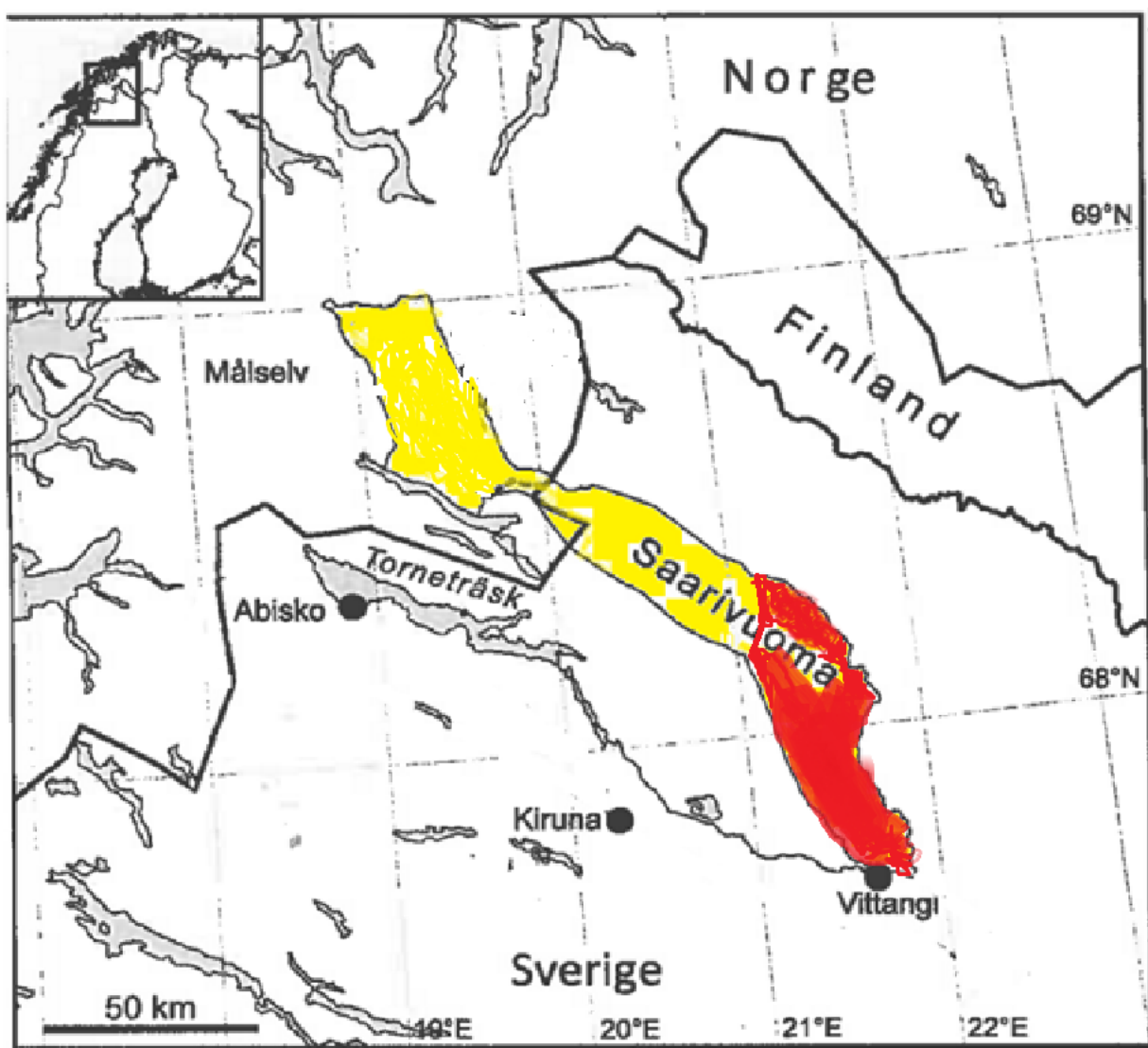


Figure 8. The total extent of Saarivuoma land in Norway and Sweden 1984-2005. Winter land in red (Adapted from Riseth et al. 2012).

¹⁵ In accordance with the actual border convention

2.3.1. Winter pastures

The winter pastures are situated on southeastern part of Swedish part of the Sami community. Recalling figures 5 and 6 the main winterland is situated mostly in coniferous forest (pine). The reindeer move in the directions northwest (spring, cf. figure 6) and southeast (autumn). Details of the seasonal use is depicted in figures 9 and 10, which together is the official Saami Parliament (Sweden) map for Saarivuoma.



Figure 9. Saarivuoma's winter land.¹⁶

(https://geodata.sametinget.se/webb/sameby/ars/103_saarivuoma_arstid.pdf)

In figure 9 the western limitation of the winter lands are given by violet dots. Prewinter and autumn/early spring land are further west (see continuation in figure 10).

In prewinter time Saarivuoma reindeer are collected and separated into 8-10 siida-groups, usually in December at Jarin north of Övre Soppero. This is also the time for main slaughter. The siida-groups move separately south and east from Soppero towards Vittangi to the forested winter lands.

Normally, there is ample winter grazing at the usual winter lands, but....

“..sometimes it happens that the pasture in the forest land become locked by snow and ice so the reindeer do not get access to the lichen pasture. In such situations it is vital that there is flexibility for use of the lands both at the Swedish and Norwegian side. Emergency pasture on the Norwegian side can rescue many reindeer, but are the lands used by others have been there for winter pasturing, there is no pasture when we arrive. **Double grazing¹⁷ is something that Sami have not practiced, it does not function**” (Blind & Nutti 2021:2, our translation and highlighting).

The reindeer stay in the winter land as long as there is grazing in the forest.

“Ahead of spring the reindeer strive westwards, and at some point of time they cannot be held any longer, so then the reindeer either are let to roam freely westwards or siidas migrate collectively to the west” (Blind & Nutti 2021:2, our translation).

¹⁶ The map is the Sami community's own basic description of its land use published by the Sami Parliament of Sweden.

¹⁷ Grazing the same lands both summer and winter

Saarivuoma and the commissions I

Before both the 1972 convention and the new convention planned from 2005, but still not implemented, commissions were set up to prepare the proposals. We will present parts of their work.

The commission of 1964

The commission that prepared the background for the reindeer pasture convention of 1972 (Reinbeitekommisjonen 1967) had in its mandate to evaluate the pasture capacity of all Sami communities and reindeer pasture districts in Norway and Sweden which the regulations concerned.

The commission, which included leading reindeer pasture experts of both Norway and Sweden, explored relevant material, traveled and interviewed reindeer herders and bureaucrats and made field trips. The commission explained modern pasture inventory techniques and evaluation. In chapter VIII of the commission report the commission calculated pasture capacities for all Sami communities and reindeer pasture districts.

The commission stated that the net winter area for Saarivuoma was 1782 km² and that it had a *pasture capacity* for 14791¹⁸ reindeer while the average reindeer number of Saarivuoma were 11500 reindeer. These numbers are remarkably precise and are given without a defined safety margin. However, the commission also defines a practically optimal reindeer number 13863 because of reduction due to nature conditions, i.e., a reduction with 6.4 percent.

Seen with today's eyes it may seem that the pasture specialists of the late 1960s overstates the accuracy of their judgment. Usually, the academics had local and experienced reindeer herders as their assistants. Generally, we may be somewhat suspicious that the experts over 60 years back under-communicated their reliance on the traditional herder knowledge of their assistants. Probably assistants or herder members contributed with traditional herder experience of pasture capacities (Riseth 2009).

Rennäringsgruppen

A Swedish expert group commissioned by the authorities wrote a report about the issues concerning the reindeer husbandry the use of reindeer pastures in the northernmost Sami communities of Sweden. We have seen two documents concerning this work. The first is from the expert group (Rennäringsgruppen). The second is from Lantbruksstyrelsen (The Board of Agriculture) which defined the task.

The document from the Norwegian state date 02. December 2022 points to a quotation from the Supreme Court's Judgment (para. 85):

"Based on the values, which the reindeer pasture investigation (1966:12) and the Swedish-Norwegian reindeer herding commission of 1964 has made regarding the need for Swedish summer pastures in Norway, it is stated that in the proposed convention for Swedish

¹⁸ Practically optimal 13863 because of reduction due to nature conditions

the areas designated for reindeer husbandry are sufficient for all the Sami Villages concerned, taking into account **that the capacity of the winter pastures limits the number of reindeer**" (our translation and highlighting).

This quotation is from the second document (The Board of Agriculture), but the quotation is in our judgment cut too early as it continues:

In the Sami Villages north of Tornetrask, **winter grazing capacity has not been fully utilized in recent years**. This has resulted in a change in pasturing towards the west. When it now appears that the summer pastures will be reduced, it is of importance taking action to securing the access of the Sami Villages winter pasture. Proposals for actions are previously reported by the Rennäringsgruppen (26.3.1971) (our translation and highlighting).

The content of first document is neither quoted nor mentioned directly. This is remarkable as when we read the document from Rennäringsgruppen we get quite another impression of the case in question. On their page 10 Rennäringsgruppen have a table of winter pastureland stating that *a rational herd size for Saarivuoma is 11 000 reindeer, but it then (1971) was only 6 600*.

The text clearly states that the reason is that *Vittangi forest Sami community had expanded out over their own borders and that it was necessary to limit the use by Vittangi herders*. However, when this limitation (including a long fence) is done, the group finds that there will be space for both Saarivuoma (and the neighbor Talma) to increase their herd sizes, that then were low, back to normal levels because the herd sizes was low due to the expansion of Vittangi (Rennäringsgruppen 1971).

In our view it seems as the work Rennäringsgruppen is misinterpreted by the Supreme Court as the real content of their work is not brought forward by The Board of Agriculture. This mistake is passed on by both the Supreme Court, and now also by the Norwegian state part.

We clearly find that what the group stated that that the winter pasture was temporarily limited by Vittangi's overuse of their neighbours' areas. Moreover, this leaves us with an open-ended question of how the lichen pasture state really was, and therefore we have seen it necessary to bring in some research.

Research on the historical development of winter grazing land in Saarivuoma Sami Community.¹⁹

The Supreme Court Judgment (para. 85) is far as we can see, built on a misunderstanding of Saarivuoma's winter pasture situation as both Swedish and Norwegian claimed that Saarivuoma was limited by the winter pastures in Sweden. This is now repeated by the Norwegian Government (Attorney General 2022: page 9). We therefore have included a short historical analysis of the development of the winter pastures in Saarivuoma utilizing the reports of pasture inventories from the 1960s and contemporary research.

The long historic trend is a decrease in lichen pastures, but there was registered an increase in the 1960s:

Riseth et al. (2016) have documented international events and consequent government policies and actions in Fennoscandia from 1852 to 1921 which had dramatic consequences, including excessive

¹⁹ By Hans Tømmervik, Sven Adler, Per Sandström and Jan Åge Riseth

numbers of reindeer and people in northernmost Sweden, leading to overutilization of lichen pastures. Beyond any reasonable doubt this must also have reinforced the effects of several of the documented catastrophic climatic events, especially in areas like Saarivuoma and neighboring reindeer herding districts to where many families from Finnmark were relocated (Riseth et al. 2016). Riseth et al. (2016) report reduced lichen cover for the Karesuando and Jukkasjarvi regions in the period 1906-1917 with a subsequent increase to mid-1950'ties (Reinbeitekommissjonen 1967).

In 1955, a decrease was recorded for Saarivuoma and surrounding districts (Riseth et al. 2016) but for the period 1961 to 1970 an increase was recorded (Riseth et al. 2016). This is in concert with information found in Skuncke (1964), SOU 12/1966 and Sandström et al. (2016).

I.e. in the years preceding the 1972 convention the winter pasture state in Saarivuoma was improving.

Research at the Swedish University of Agricultural Sciences reveals that in lichen dominated forests during the period 1966 to 1987 *the portion of good lichen pasture of the total forest in good condition seemed to quite stable, even increasing* (Adler et al 2022).²⁰

Further, research states that grasses and sedges may keep half of the summer content of nutrients. These green plants are more important for winter grazing than earlier known by researchers (Storeheier et al. 2002). For Saarivuoma the commission work (Reinbeitekommissjonen 1967) states that there is 60 percent of the pasture proportion at the winter land is grass/dwarf shrubs while 40 percent is lichen.

Our own snow research in Saarivuoma's winter land was performed several winters from 2006 to 2011 (see Riseth et al. 2011,2012). We explored the lichen pastures and their use on site during this period. We compared with Kautokeino winter herding district (Norway), see Riseth et al. (2016).

Our judgment based on documentation of history and our own research experiences is that Saarivuoma has, and have had sufficient winter pastures the last five decades, and that they have had possibilities to adjust their pasture use to changing conditions.

On account of that we find that there are good reasons to assert that both the Swedish and Norwegian governments in the early 1970s and the Norwegian government now advanced judgments of Saarivuoma's winter pasture capacity that are not in line with the facts.

2.3.2. Bare ground pastures

The reindeer pasture commission preparing the 1972 convention found that the pasture capacity in the bare ground area²¹ was 14024 reindeer. That was more than the average number of reindeer in Saarivuoma that was 11500 (Reinbeitekommissjonen 1967). The preceding year the whitebook "*Renbetesmarkerna*" (The reindeer pasture land, SOU 1966:12) also had proposed 11 500 as a normal herd size for Saarivuoma. The same report also stated Saarivuoma "*has no part of its summer land within Swedish area*" (SOU 1966:12:24).

Figure 10 is the continuation of figure 9 westwards and covers the bare ground seasons of Saarivuoma.

²⁰ From 5.7 % in 1966 to 8.5 % in 1987

²¹ spring summer and autumn

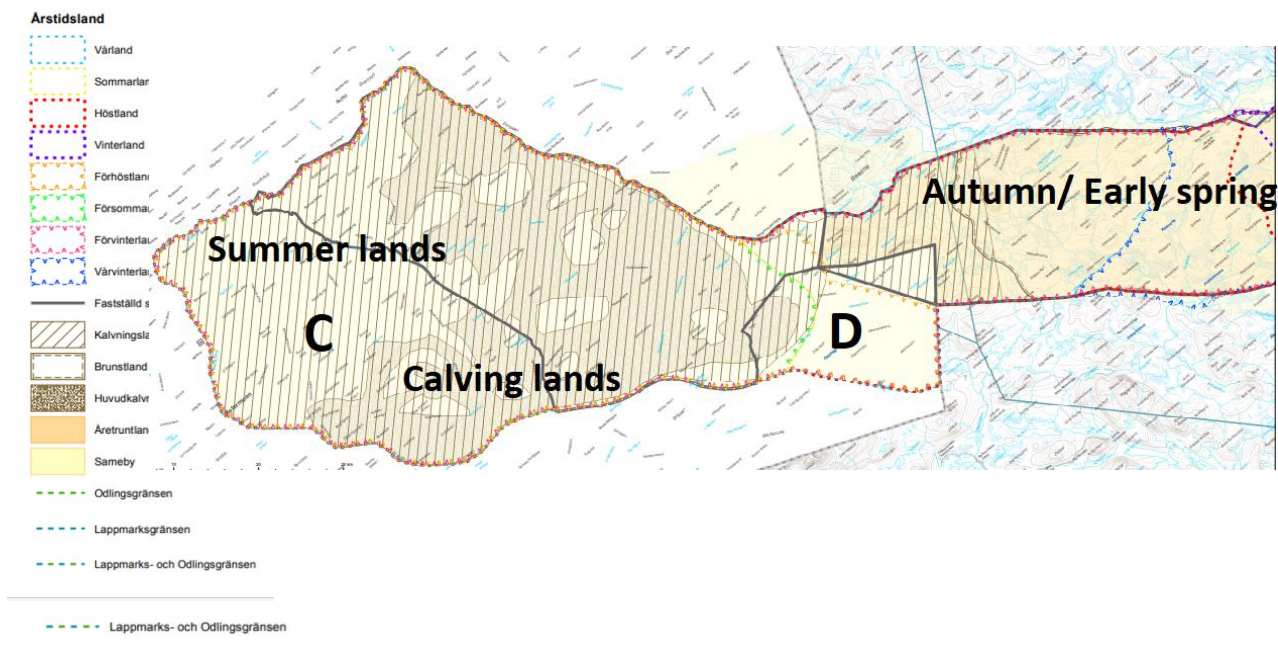


Figure 10. Saarivuoma’s spring, summer and autumn land.²²
https://geodata.sametinget.se/webb/sameby/ars/103_saarivuoma_arstid.pdf

There are a few particularly important pieces of information that can be drawn from figure 12. The light yellow colour shows the extension of Saarivuoma’s traditional land, note especially the areas near the national border. The areas covered by brown diagonal stripes are the *calving grounds*. Nearly all of them are on the Norwegian side. A darker brown colour indicate the *main calving grounds*. Knowing that calving grounds normally are situated in hilly landscapes just over the treeline (*orda*) and comparing with a topographical map, we note that the main calving grounds are east or south of most high mountains. The high mountains are mainly summer lands.

There is also a *black line* going diagonally through all of the Norwegian part of Saarivuomas land. The areas south of the black line but still within the outer border (marked C and D)²³ are the focus areas of this case. More accurate maps and explanations will come in the next figure.

Saarivuoma and the commissions II

The commission of 1964

The bilateral reindeer pasture commission was set up in 1964 had its report ready in 1967. The report presents a clear dilemma. On the one hand:

“In the 3 northernmost²⁴ av the 4 north Sami communities there is a distinct lack of bare ground pastures. Accordingly, there is a biological conditioned need for summer pastures in Norway, even though the stay at the winter land will be prolonged” (Reinbeitekommissjonen 1967:226, our translation).

But on the other hand:

²² The map is the Sami community’s own basic description of its land use published by the Sami Parliament of Sweden.

²³ Same letters used as in figure 13

²⁴ i.e., Könkämä, Lainiovuoma, and Saarivuoma

*“In Finnmark too, there is a lack of summer pastures that must be mitigated partly by permanent outmigration from Finnmark to and partly by instruction of additional summer pastures in Troms. The challenges by accommodating both Swedish and Norwegian reindeer husbandry interests foremostly consists of that **the areas in inner Troms that can come up for discussion as summer pastures for Swedish sami communities, in wide extent simultaneously content lichen resources which are significant for an extension of the Norwegian reindeer husbandry in Troms, to relieve the pressure in Finnmark**” (Reinbeitekommissjonen 1967:226, our translation and highlighting).*

On that background the commission proposed a sharp reduction of Saarivuoma’s grazing area in Norway. The commission made clear that the proposal implied changes in reindeer husbandry and that *“the changes in Talma and Saarivuoma communities will be particularly far-reaching”* (Reinbeitekommissjonen 1967:227, our translation). The commission’s proposal was followed up by the authorities in both countries and the 1972 Reindeer Grazing Convention was adopted by the border pasture law. The 1972 Reindeer Grazing Convention implied a substantial reduction of Saarivuoma’s grazing area in Norway.

The commission of 1997

The bilateral reindeer pasture commission was set up in 1997 and had its report ready in 2001. Parts of the work is a millennium shift state of the art report. As for the bare ground pastures the professional committee of the commission summarizes:

“Saarivuoma lacks access to pre- and high summer areas on Swedish side. The preconditions for good spring pastures on the Swedish side of the mountain area is very limited as barren spots are created very late in spring in the flat landscape²⁵...

Saarivuoma is completely dependent of summer pastures, and to a great extent spring pastures, on the Norwegian side. Without access to pastureland in Norway, there is no condition for traditional mountain reindeer herding in Saarivuoma ” (our translation, Reinbeitekommissjon 2001. Annex 1:103).

The professional committee stated that:

“Saarivuoma is completely dependent of summer pastures and, to a great extent, also spring pastures on Norwegian side. Without access to pasture land in Norway it is not conditions for traditional mountain reindeer herding in Saarivuoma ” (our translation, Reinbeitekommissjon 2001, Annex 1:103).

The committee primarily proposed that Saarivuoma established a joint operation of both districts, alternatively that Saarivuoma get an extended summer area just north of Altevåtn and Mánnančearru while Hjerttind receives a convention area for winter pasturing in Sweden, and further alternatively that Saarivuoma get the convention area as in 1984 and that Hjerttind get Mánnančearru as winter area with adjacent convention area in Sweden supplied by new fences. Both the first and the second alternatives implies considerably increased summer areas for Saarivuoma while the third is status quo.

²⁵ i.e. more rugged mountain landscape

2.3.3. The split of Uhcanjárga (Saarivuoma’s land in Norway)

The changes in Saarivuoma’s areas in Norway from 1919 up to 2022 are shown in Figure 11.

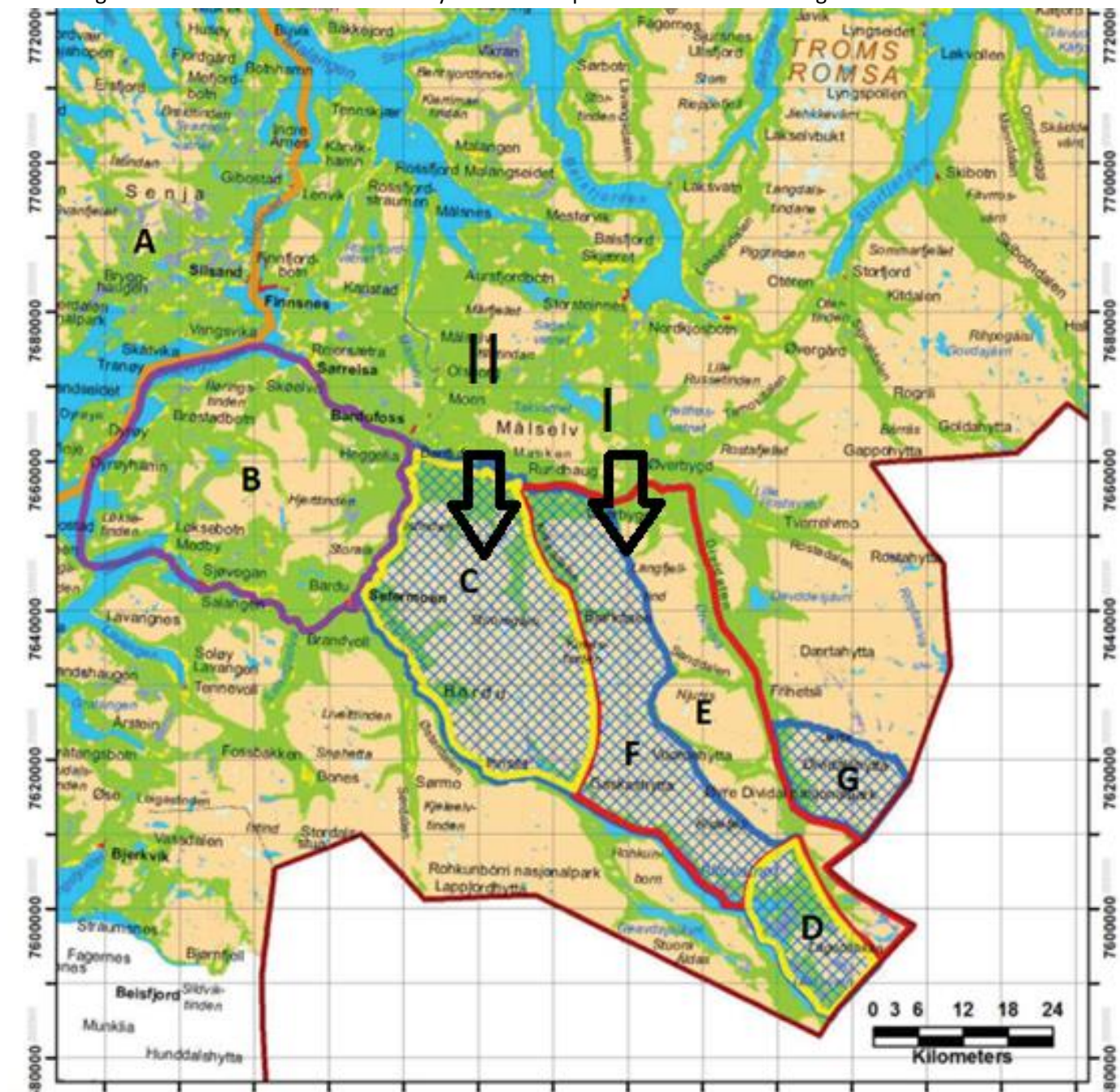


Figure 11. Changes in Saarivuoma legal land in Norway 1919-2022.

Saarivuoma lost the island Senja (A at the map) already by the first convention of 1919. The peninsula surrounded by a violet line is Stallonjárga (B at the map), which was lost by a convention change in 1949. The focus areas of this case are the two areas (C and D) marked by yellow lines around them, in total 1108 km², which was taken from Saarivuoma as a consequence of the 1972 Reindeer Grazing Convention.

However, in 1972 Saarivuoma also lost areas further east, the western part of the land between the valleys Kirkesdalen and Dividalen (**F**), and finally the Beadná area (**G**) which also has been contested.

Recalling from 2.1 Blind and Nutti (2021) describe the whole Uhcanjárga having the property of keeping the reindeer within itself. However, as an outcome of the new convention, beyond 1972 the Uhcanjárga became formally split up into several parts with the letters given in figure 13.

As for Ruongs concept of landscapes and borders, the big and narrow valley Kirkesdalen is an important natural border. It divides between the areas **I** (called Ánjavuopmi) and **II** (called Oarjjábealli²⁶). Accordingly, area **C** makes up large parts of Oarjjábealli while area **D** is called Mánnančearru.

As an outcome, the remaining summer land for Saarivuoma then became the eastern part of the area between the valleys Kirkesdalen and Dividalen (**C**). We should note that the Saarivuomas new west border, between areas **E** and **F**, goes through a «landscape without natural borders» (*luomokis eatnan*) (Ruong 1982:69). There is nothing holding the animals back before they meet the valley Kirkesdalen. The convention protocoll assumed the erection of a very long barrier fence through a mountain massif along the northwest border of this area. However, due to nature conditions this fence project was clearly unrealistic from the start, and also showed to be in practice, and therefore it was only partly completed (Prestbakmo 2007).

Calving areas and summer land

To understand the adaptation situation for Saarivuoma herders when the 1972 convention became effective, one needs to know some basics of reindeer ethology. Female reindeer have their own individual calving grounds which they return to every year. *Attempts of forcing females to new calving grounds usually are unsuccessful.*

If the herders should have done their very best to fulfil the new convention they could have tried to force the animals to other potentially suitable calving grounds in the now legal eastern half of Ánjavuopmi (i.e. area **F**). Notwithstanding formal borders, they did not, at least out of two reasons; *ethcial* and *practical*. Firstly, they would not force their reindeer onto the calving grounds of other herders. Secondly, they would not succeed, as the female reindeer would go to their old areas against the herders will.²⁷ So, the outcome of this was that the herders had to let the animals roam free.

The outcome was that the females found back to their old calving grounds. Even though this is not optimal, as all herders want to guard their animals during the vulnerable period before and around calving. Human presence prevents, or at least reduces, predator attacks and other disturbances.

As for the summer lands Saarivuoma leaders themselves have stated:

²⁶ Literally meaning the western part

²⁷ Saarivuomas herders also had historical experiences, especially from the summer 1947, of that forcing reindeer, when animals forced eastwards in summer, ran back faster than the herders that had forced them (Labba 2010).

“The westernmost lands have good pastures.... There are no natural border to this lands as the lands hang together. The lands are parts of the same peninsula²⁸.....

The lands have also been used after 1972 because the reindeer thrive there. This is their natural and inherited “hiking trail”. Though we have not used the lands fully from 1972, to avoid fees and surcharges from the Norwegian state. We have tried to balance the fact that **we are fully dependent of this lands** and the consequences of forced decisions. **The reindeer also need grazing calm and to drive them full days against their natural line is not possible, they do not cope with that.** It is on the border of animal cruelty if we should carry out the herd movements that the state during the years has demanded from us” (Blind & Nutti 2021:3, i.e. statement 6, our translation and highlighting).

Figure 10 demonstrates which areas the herder leaders refer to. Studying the figure we can note the lands (on the Norwegian side) which are light brown with half diagonal brown stripes. In practice, these are the *lands over the tree-line*²⁹, i.e. low to high mountains, which are the main summer areas.

The problems with the full implementation of the convention plan for Saarivuoma land use in Norway became increasingly visible during the 1970s. Accordingly, during the last part of the 1970s Saarivuoma and the Troms branch of NRL established a dialogue, and the parties agreed upon a protocol (Protokoll 1978) on exchange of areas and building of fences. The agreement included that Saarivuoma accepted that the Norwegian district got right to use an area on the Swedish side of the same size as area F. This initiated a process that led to a change in the convention and border grazing law in 1985 where Saarivuoma received back the westernmost part of the land between the valleys Kirkesdalen and Dividalen (**F**). This area is not a part of this case, but this is necessary contextual information. From 1985 areas E and F make up Ánjavuopmi convention area.

Early spring/late autumn

Saarivuoma reindeer start the move eastwards to areas near the national border, with Mánnančearru (D), the area Southeast in this case, as a core area. As stated by Blind & Nutti (2021) the Mánnančearru area is naturally coherent with the remainder of Saarivuoma lands.³⁰ It is required for the migration both ways.

In early spring the low mountain peaks have little snow and there is early bare ground (*bievla*) which makes available grazing. Lower in the landscape it is all packed with snow

In autumn winter the area is used on the migration way eastwards, with grazing low in the landscape. The last calves are marked, castration of bulls takes place and domestic slaughter takes place for Saarivuoma before the animals roam into Sweden. Rutting time stretches into October.

The herder leaders also state about the Mánnančearru area: “The area is vital for the performance of migration to and from calving areas and summer land in Saarivuoma” (Blind & Nutti 2021:2, our translation).

²⁸ *njarga*

²⁹ *orda*

³⁰ Cf. Figure 11 and the breadth of the D and E corridors

Saarivuoma and the commissions III

The Scandinavian professional members of commission (Reinbeitekommissjonen 1967) had the same ecological understanding of the relation between summer as professor Klein taught (cf. 2.2.1), and demonstrate that by their handling of the bisection between bare ground and winter pasture capacities. In chapter VIII of the commission report, there are calculations of biological and practical optimal reindeer numbers.

The commission found that there were pasture capacity for more than the average number of reindeer (11500) both in the bare ground area (14024) and in the winter area (14791). We can note that the bare ground and winter capacities are fairly even, i.e. there is *a good pasture balance*. The commission also found that there was additional pasture capacities for the opposite season in both main season areas. Especially important, there are additional winter pasture capacities in the bare ground area. This is compatible with Saarivuoma herders' long time experience (Riseth et al. 2011). When there is blocking ice at the winter pastures, the reindeer have possibilities to find emergency grazing somewhere in the mountains on the Norwegian side.

Nevertheless, if one main season is the limiting one, it is clearly *the bare ground season*. In 2.2. we also have cited that the commission state that *there is a distinct lack of summer pastures for the three northernmost Sami communities of Sweden, Saarivuoma included*. Note, both the national report (SOU 1966:12) and the commission stated that there are no summer pastures on the Swedish side.

Later in the report, i.e. its chapter XI the commission (Reinbeitekommissjonen 1967:226) present their final proposals. The commission prioritizes the interests of Norwegian Sami reindeer husbandry having moved into Troms from Finnmark. After having made the statement that there is a biological lack of summer pasture in Norway in Saarivuoma and its neighbour communities the the commission articulates:

“The difficulties by accomodating both Swedish and Norwegian reindeer husbandry interests foremostly are that the areas in Inner Troms that are relevant as summer pasture districts for the Swedish Sami communities to a large extent contain lichen resources that are important for an extention of the Norwegian reindeer husbandry in Troms....(Reinbeitekommissjonen 1967:226, our translation)

The commission then presents its assumptions and make a calculation which implies dramatically reduced summer land in Norway for all four northernmost Sami communities and changes in community borders and extensive adjustments, in particular between Saarivuoma and Talma. For Saarivuoma core numbers are these: Based on a winter pasture capacity of 11 000 reindeer about 4300 of the bare ground capacity from now on needs to be found on the Swedish side (ca. 40 percent) while about 6500 reindeer (ca 60 percent) can graze on the Norwegian side. With shortened pasture time (100 days) this can be covered by 399 km². *This is only 23 percent of the bare ground* (Reinbeitekommissjonen 1967:192, table 14) (1735 km²).

In practice, the commission implied that *Saarivuoma lost the best summer pastures and mainly had to use typically spring and autumn areas in Sweden and Norway for most of the bare ground seasons*. This is also confirmed by Prestbakmo (2007). The main part of Saarivuoma's financial loss is the *production loss* by exchange of excellent summer pastures by mainly spring and fall pastures.

These areas are located both on the Norwegian and the Swedish side of the national border, *but as summerlands, they are inferior*. It is the main part of our mandate to assess this loss.

2.4. Methods and Assumptions

Established legal practice (case law) in Norway for calculating loss of reindeer pastureland has been based on the so-called *Fatima model*³¹ first recognized by Hålogaland Court of Appeal November 13, 2001 (RG 2002-303), where the base is calculation of *forage units* on lost area.

2.4.1. Previous calculations (Tveraa)

Dr. Torkild Tveraa (2020) was engaged to conduct a preliminary valuation of pasture loss for both the Appeal Court and Supreme Court cases. In the Appeal Court he also was an expert witness. As his point of departure, he chose the *amount of slaughtered meat per square kilometer pastureland*. This is an alternative approach to the Fatima model, which also can provide relevant outcomes. Lacking data from Swedish statistics Tveraa used data from Vest-Finnmark and Sør-Trøndelag/Hedmark which are the areas in Norway that are the most relevant for comparison as they both have continental and stable winter pastures (Tveraa et al. 2007). Finding a slaughter withdrawal of 21 kg/km² for the two areas as an average for the period 2002-2020 Tveraa estimated that on condition that the winter pastures are sufficient, and that the reindeer husbandry is well managed, the 1108 km² can produce 23.2 tons of meat annually. Swedish prices for reindeer meat are published at the homepage of the Sami Parliament in Sweden: sametinget.se. Based on a mean price for the last three years at 73 SEK, Tveraa found an estimate of 1.7 million SEK per year to be a best possible value for the potential production of the 1108 km² area.

2.4.2. Our approach

Legal practice in Norway during much of the last couple of decades with respect to the Fatima model has been somewhat variable. Because of that Tømmervik et al (2022) ask whether the Fatima model is on a receding front or whether there is a lack of reindeer husbandry competence among the legal judges leading to variable and inconsistent verdicts. An alternative explanation could be that disruption and avoidance effects are at the core of many cases, and that how these effects are evaluated greatly influences the judgement of pasture loss. In this case the judgement can be more straight forward as the two areas per definition have been forbidden areas, while in practice it has not been possible to keep the animals completely out of them. I.e., the loss has not been complete, and we need to subtract a certain factor, which of course will be discretionary.

The Fatima-model

Therefore, we find that the conditions for using the Fatima model here are good. However, we will use an adapted version of the model, also used by Nord-Troms District Court in a verdict November 4, 2010 (09-124431SKJ-NHER).

The model is based upon the professional tradition of Scandinavian reindeer pasture specialists which also were at the core of the bilateral pasture commission from 1964 on, i.e., the works of state consultant Loyd Villmo (Villmo 1979) and pasture consultant Erling Lyftingsmo

³¹ This model is mainly built on income as costs to a large extent is independent on herd size (Kosmo 1985), but costs are included when interventions and disturbances imply extra direct cost extra work

(Reinbeitekommissjonen 1967). The reindeer grazing capacity for an area says something about how many reindeer which can be kept within an area without reducing the grazing resources (carrying capacity). Traditionally, line assessments have been used to get a representative view of the condition of the pastures. Nowadays, vegetation maps are used combined with inspection. Usually, the starting point is the vegetation map of Norway (Johansen 2009). The areas of different vegetation/pasture types can be extracted directly from the vegetation map. The calculations of pasture capacities for different vegetation types are based on research and are shown in tables developed by Villmo (1979, 1982). Plant communities with a high grazing value will be more heavily grazed than plant communities with a low grazing value. Accordingly, based on a series of investigations in various districts, tables have been set up for average utilization percentages for reindeer on the various vegetation types. The result arrived at by multiplying the gross return by the utilization percentage is the *net return or usable pasture* (Villmo 1979, 1982). This is a calculation of the available grazing in the investigated area.

While the normal procedure is to base a pasture value calculation on a total vegetation survey/map of the areas in question (Johansen 2009, Tømmervik et al. 2022), in this case we had to find a proxy due to the time constraint for this work. The solution became to use a former study that partly cover the areas in question (Johansen et al. 1995) and assume that the studied areas are representative for the total. The study is performed with establishing area statistics for part areas. For the area “Northwest” the part area Lappskardet (321.9 km²) is used (Johansen et al. 1995:44). The nature conditions in this area are largely the same and for our task we consider Lappskardet to be representative for the whole area.

For the area “Southeast” the part area Leina (172.2 km²) is used (Johansen et al. 1995:45). In our calculations we will first evaluate the pasture capacities of each of the two areas and how much is lost due to the lockout (2.4) and then evaluate the total effect (2.5).

2.5. Calculations

We follow the Villmo (1979, 1983) approach and start by identifying the area for each vegetation type (25). Vegetation types close to each other are collected to pasture types (12). For each of the pasture types we use standard tables (Villmo 1979, 1983) for gross production (forage units per square km) and degrees of utilization (percent) ending up with an assessment of useable pasture forage units for each of the areas.

Further, we based our evaluation on that the average pasture use per reindeer in spring herd is 2.5 forage units per grazing day. The number is based research of how much forage reindeer need under different conditions (Villmo 1982).

We also evaluated the relevant number of grazing days for each of the areas. For the pasture capacity (number of reindeer) for a given area and a given number of pasturing days we use the formula:

$$\text{Pasture capacity} = \text{useable pasture forage units} / \text{pasture days} / \text{forage units pr. pasture day}$$

We proceed by conducting pasture capacity calculations for A (“Northwest”) and C (“Southeast”).

2.5.1. "Northwest" Area (C)

Table 1. Northwest area (C). Calculation of useable forage units.

		Lappskardet		Gross production		Degree of useable		"North" area	
Vegetation type			Pasture type	forage units /km ²	forage units	utilization	pasture forage units	for 900 km ²	
1	Not classified	0,1	1 Not classified	0,1					
2	Water	3	2 Water	3,0					
3	Impediment/shadow	16,5							
4	Impediment/shadow	15,8	3 Imped snow/ice	112,0					
5	Snow	52,6							
6	Ice/melting	27,1	4 Heather and lichen forest	17,7	45 000	0,08	63 720		
7	Empetrum birch forest	6,3							
8	Bilberry birch forests	30,3	5 Heather forest	30,3	45 000	0,07	95 445		
9	Grass-rich birch forest	29,5							
10	Tall herb/fern deciduous forests	12,4	6 grass/fern forests	41,9	75 000	0,13	408 525		
11	Open pine forest	0							
12	Lichen heath pine forest	11,4							
13	Lawn and carpet mire complex	5,7							
14	Grass mires	1,2	7 Mires	11,0	50 000	0,09	49 500		
15	Mud-bottom fens	4,1							
16	Mid-alpine ridge societies	10,4	8 Ridge societies	29,7	5 000	0,01	1 485		
17	Exposed gravel ridges	8,5							
18	Open lichen and dry grass heather communities	10,8							
19	Empetrum/Betula nana ridges	5,8	9 Heather/Betula nana heath	12,5	45 000	0,08	45 000		
20	Betula nana and grey-willow heaths	3,1	Betula/willow thickets	3,1	75 000	0,10	23 250		
21	Bilberry heaths	6,7							
22	Mid-alpine snowbeds	16,8							
23	Grass heaths	9,9	10 Grass heaths	9,9	40 000	0,11	43 560		
24	Mountain meadows	22,3	11 Mountain meadows	22,3	75 000	0,13	217 425		
25	Snowbed communities	11,6	12 Snowbed communities	28,4	20 000	0,04	22 720		
	Sum	321,9		321,9	9 432 500		970 630		2 655 219

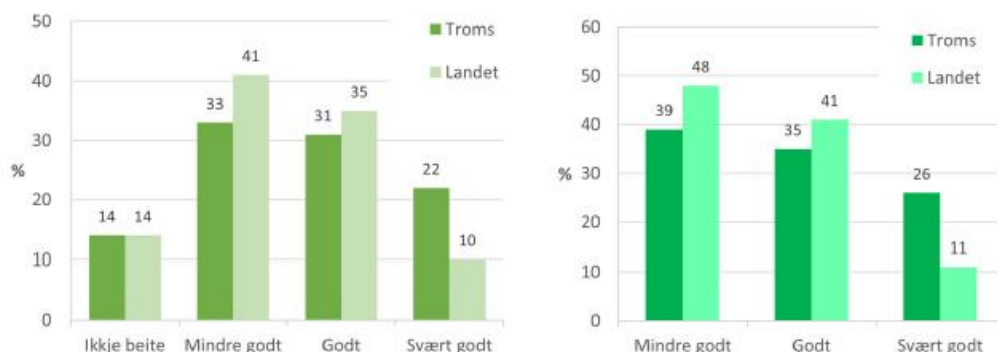
Table 1 is a calculation of usable pasture for Area "Northwest" (C) based on the vegetation survey for Lappskardet (Johansen et al. 1995). 970 630 usable forage units on 321.9 km gives in average 3015 forage units per square kilometer ($970\ 630/321.9=3015$). Extrapolated to the whole "Northwest" area (900 km²) this adds up to 2 655 219 forage units. As the area is both a spring and summer area, we assume four and a half months of use (May – medio September), i.e., 135 pasture days. This is a long period due to that the area include both calving and summer, so the length of the use can be varying in practice. Assuming a forage need of 2.5 forage units per reindeer (in spring herd) and day during the bare ground season (Villmo 1982), the full calculation becomes: 3015 forage units/km² *900 km² = 2 655 219 forage units which means for pasture capacity:

$$2\ 655\ 219\ \text{forage units}/135\ \text{pasture days}/2.5\ \text{forage units/reindeer/day} = 7876\ \text{reindeer}$$

I.e., the "Northwest" area has a pasture capacity for 7867 reindeer in 135 days. This implies a pasture utilization level of 8,9 reindeer pr. square kilometer.

This is relatively high for a summer pasture area, and it would be even higher with a shorter pasture time, but this was, and still is, the real grazing time in area C (Saarivuoma board, pers. communication). The utilization level is comparable to what one can expect in very good areas (cf. Tømmervik and Riseth 2010), so we find this level probable here too. It is also compatible by the herders' own description of the pasture qualities (Blind and Nutti 2021).

A grazing report produced by Norwegian Institute of Bioeconomy Research (NIBIO) concluded that Troms County has the best pastures in Norway with 26 percent very good and 35 percent good pastures of the available outfield pastureland, clearly better than the national average (Rekdal & Angeloff 2021).



Areal av ulike beitekvalitet for husdyr i Troms og for heile landet, vist som prosent av totalt landareal til venstre og som prosent av tilgjengelig utmarksbeiteareal til høgre.

Figure 12. Areas of different pasture quality for domestic animals for Troms County and whole Norway. Percentage of total land area to the left. Percentage of available outfields area to the right (Rekdal og Angeloff 2021:99).

Inner part of Troms County has also very good summer pastures for reindeer (Lyftingsmo 1974, Tømmervik et al. 2005). Area "Northwest" and has also been as outstandingly rich summer pastures (Reinbeitekommisjonen 2001:95).

In the paragraph pasture balance (2.2.1) we have explained the bare ground seasons and winter as the anabolic and catabolic phases of the reindeer's annual cycle. Taking the starting point that that the bare ground phase in Norway is the *productive phase* we recalculate pasture capacities into *grazing days* and assume that the reindeer should graze in Norway half of the year, i.e., 182.5 days,

as we consider this biologically optimal. We then assume that the snow cover seasons in Sweden is the other half, that of survival. Recalculating the pasture capacity for a half year is: 7867 reindeer * 135 days/182.5 days = **5820 reindeer**, which is the start number we use in our assessment (2.6).

2.5.2. "Southeast" Area (D) Mánnančearru

Table 2. Southeast area (D). Calculation of useable forage units.

Leina				Gross production		Degree of utilization		Useable pasture forage units		"SE area"
Vegetation type	km ²	Pasture type	km ²	forage units /km ²	forage units	utilization	forage units			
Classes										
1 Not classified	0	1 Not classified	0							
2 Water	19,6	2 Water	19,6							
3 Impediment/shadow	0,9									
4 Impediment/shadow	1,1	3 Imped snow/ice	2,4							
5 Snow	0,1									
6 Ice/melting	0,3	4 Heather and lichen forest	17,2	45 000	774 000	0,08	61 920			
7 Empetrum birch forest	17,2									
8 Bilberry birch forests	4,5	5 Heather forest	4,5	45 000	202 500	0,07	14 175			
9 Grass-rich birch forest	5									
10 Tall herb/fern deciduous forests	0	6 grass/herb forests	5,0	75 000	375 000	0,13	48 750			
11 Open pine forest	0									
12 Lichen heath pine forest	0									
13 Lawn and carpet mire complex	7,9									
14 Grass mires	6	7 Mires	18,0	50 000	900 000	0,09	81 000			
15 Mud-bottom fens	4,1									
16 Midalpine ridge societies	4,8	8 Ridge societies	29,6	5 000	148 000	0,01	1 480			
17 Exposed gravel ridges	8,2									
18 Open lichen and dry grass heather communities	16,6									
19 Empetrum/Betula nana ridges	23,3	9 Heather/Betula nana heath	52,9	45 000	2 380 500	0,08	190 440			
20 Betula nana and grey-willow heaths	15,5	Betula/willow thickets	15,5	75 000	1 162 500	0,10	116 250			
21 Bilberry heaths	29,6									
22 Mid-alpine snowbeds	0,6									
23 Grass heaths	2,1	10 Grass heaths	2,1	40 000	84 000	0,11	9 240			
24 Mountain meadows	4,6	11 Mountain meadows	4,6	75 000	345 000	0,13	44 850			
25 Snowbed communities	0,2	12 Snowbed communities	0,8	20 000	16 000	0,04	640			
Sum	172,2		172				568 745		686 986	

Table 2 is a calculation of usable pasture for Area “Southeast” (D) based on the vegetation survey for Leina (Johansen et al. 1995). The calculation gives 3303 forage units per square kilometer ($568\,745/172 = 3303$). Extrapolated to the whole “Southeast” (Mánnančearru) area (208 km^2) this adds up to 686 986 forage units.

This area is the first area on the Norwegian side used in the early spring and the latest in autumn to utilize autumn pastures in Norway and to save winter pastures in Sweden. Seen from an ecological and practical view the legal pasture times from 1972 (May 1st to September 14th)³² are too narrow both spring and autumn, i.e., the pasture times in Norway should be extended from four and a half to six months in total.

Assuming one and a half month of use, i.e., 45 pasture days (15 in spring and 30 in autumn) and 2,5 pasture units per reindeer (in spring herd) and day (Villmo 1982), the full calculation becomes:

$$3303 \text{ forage units/km}^2 * 208 \text{ km}^2 = 686\,986 \text{ forage units}$$

$$686\,986 \text{ forage units}/45 \text{ pasture days}/ 2.5 \text{ forage units/reindeer/day} = 6107 \text{ reindeer}$$

i.e., the “South” area has a pasture capacity for 6107 reindeer in 45 days.

To proceed we recalculate this into grazing days and follow the assumption that the reindeer herd could graze in Norway half of the year, i.e., 182,5 days.

$6107 \text{ reindeer} * 45 \text{ days} / 182,5 \text{ days} = \mathbf{1506 \text{ reindeer}}$, which is the start number we use in our assessment (2.6). For the sum of the two areas C and D the total becomes:

$$(5820+1506) \text{ reindeer} = 7326 \text{ reindeer.}$$

2.5.3. Alternative calculation?

The assumption of six months’ grazing in Norway is contrary to current legal framework which only permits four months and a half. Therefore, we need to check whether it is necessary to perform an alternative calculation. We then assume in total 137 days in Norway distributed with 107 days in area C and 30 days in area D.

Performing the same calculations as in 2.5.2 and 2.5.3 just changing the number of pasture days as above, the outcome is 7752 plus 2006 = **9758 reindeer in 137 days**. However, as this calculation anticipates that the reindeer graze a larger part of the year in Sweden, the total pasture loss will become the same as calculated above.

$$\text{Control: } 9758 * 137 \text{ days} / 182.5 \text{ days} = 7325$$

The reason is that the total pasture capacity in the two areas still is 2 655 219 plus 686 986 forage units making up in total 3342 205 forage units. Still assuming 2.5 forage units per reindeer per day (Villmo 1982) the total number of pasture days will be:

$3\,342\,205 \text{ forage units} / 2.5 \text{ forage units per pasture days} = 1\,336\,882 \text{ pasture days}$. This will be the potential total annual pasture capacity for the two areas regardless of how many days the areas are used in practice.

³² https://lovdata.no/dokument/NL/lov/1972-06-09-31#KAPITTEL_1-2

2.6. Assessment

The calculations in 2.4 are based on that before 1972 there has been full utilization of the two areas in *four and a half* and *one and a half* months, respectively, and that this pasture lands were completely lost as a result of the implementation of the convention through the border grazing law. If the two areas C and D were totally lost, the total loss would be the pasture capacity for $(5280+1506) = \mathbf{7325}$ reindeer in **182.5** pasture days.

In Environmental Impact Assessments (EIAs) and other assessments of pasture loss the situation is often that the loss of areas is not complete, but partial. In this case, even though both areas were forbidden areas, the herders could not fully hinder the reindeer to enter them as the animals were used to go there by instinct and habit. The citation from Blind & Nutti in 2.2.2. precisely explains the challenge and implications of that. Therefore, it will be reasonable to assume that *the loss of these areas is not complete*, and therefore as already introduce reduce the calculated pasture loss by a factor. It is difficult to assess this factor.

2.6.1. Assumptions

In 1972 the areas C, F and D of figure 7 became illegal areas, but area F became legal again from 1985. The preferred calving areas are found within as well area C as area F. The areas north of the lake Altevattn are dominated by marsh herbs, and the mire tufts are preferred as spring grazing. As stated by Blind and Nutti (2021:2, statement 6) the “peninsula” (*njárğa*) is a coherent area without natural borders³³ and with a low degree of human activities.

The scope of use has been different for the two areas C and D.

2.6.2. Utilization level “Northeast” Area (C)

The citation from Blind & Nutti is especially relevant for area C (North). The calving areas most used are situated from lowland areas near the lake Altevattn and upwards to landscapes near the treeline (*orda*). The calving areas are situated both in areas C and F with a more extensive use of calving grounds within area F than area C.

However, when the calving period is over and the greening come, the reindeer draw up the valleys and towards the high mountains. The highest mountains are situated in the west (cf. figure 6 and comments). This means that many of the females and their calves that have been in area F also go over to area C because this is the best high summer land. The male herds also draw over to the west. In mid-July Saarivuoma herders have round-ups taking their herds east, but there is still some use of the area until mid-September.

We have invited Saarivuoma’s community board to evaluate to what extent the area C *de facto* has been used during the whole period 1972-2005. Based on the preconditions given, the board find the average rate of use compared to the situation has been a quarter, i.e., 0.25.

Accordingly, this is the factor that we use to reduce the calculated pasture losses. This can be explained by that (1) only a limited part of Saarivuoma’s total female herd have their calving area

³³ The main valley Kirkesdalen cuts deep into the Oarjjábealli, half way from the north, i.e., there is free passage in the southern part.

here, (2) due to excellent summer pastures and lack of natural borders a bigger share of the total herd utilizes the mountain high summer pastures here, and (3) due to the risk of grazing fees, everybody tries to move the animals out as soon as possible (July). Nobody can provide an exact evaluation of the combined effect of these factors, but we consider this result as the best possible “gestimate” by the persons in the best position to evaluate.

The “Northwest” area is both a spring and summer pasture area. The summer area is the most important for the production (Klein 1965, 1968) but we cannot leave out the spring and autumn areas either. So we calculate on account of both areas C and D. The effects of summer pasturing on different areas can sometimes be observed directly by the herders. Saarivuoma herders name calves coming from the njárga “njárgaorut” (i.e., coming from the njárga = peninsula). These calves normally are significantly larger than others. There also are stories of years when a siida occasionally stayed far towards the east, when the calves became much smaller than normally (pers. communications Nils Ola Sikku and Niklas Labba).

2.6.3. Utilization level “Southeast” Area (D), Mánnančearru

The Mánnančearru area is an early spring and late autumn area. As stated by Blind and Nutti this land is naturally connected with all other lands in Saarivuoma and

“..it is impossible to migrate neither towards the east or towards the west without using these lands. In spring the area is used as pasture for the herds moving west. Here it is low in snow at the mountain peaks, and it becomes bare ground early so the reindeer have access to the pasture. At this time the reindeer do not have access to the pastures at lower elevation where it is packed with snow.

In autumn winter, on the move eastwards...the reindeer graze in the sinks and lowlands at areas where there was snow in the spring and there, they find grazing (Blind and Nutti 2020:3, statement 8).

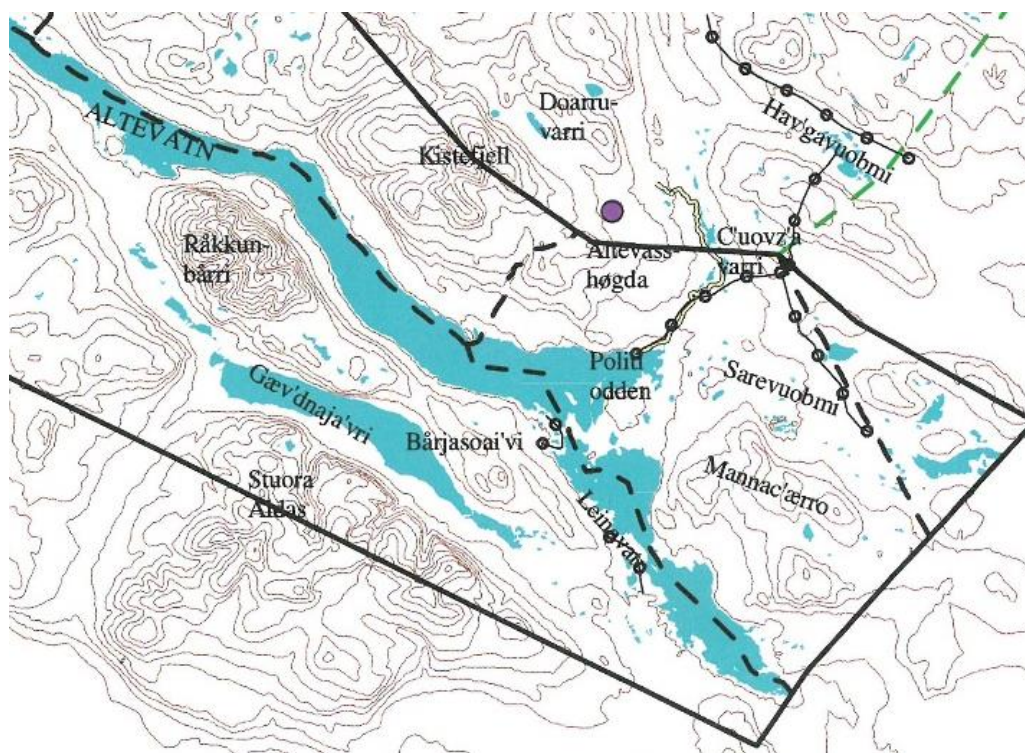


Figure 13. Conventions fences for Mánnančearru (Reinbeitekommissjonen 2001 II, Kart 2.7)

Further, as a corollary of convention decisions there were built a series of bar fences around the Mánnančearru area, a somewhat complicated story,³⁴ but the outcome in 1991 was “*accordingly the Mánnančearru area was fenced in with border fences, except the parts towards Leinavatn that was natural borders*” (Reinbeitekommissjonen 2001 Annex I:93).

In 1991 and 1997 Saarivuoma was fined with large fees for illegal grazing. The combination of the fences and risk of large fines promoted that that the herders actively worked to delimit the use of the area (Saarivuoma board, pers. comm.). Anyhow, the configuration of areas and the animals’ natural instincts are strong forces for using the area. Especially in early spring when all fences are covered by snow use of the area is unavoidable.

We have invited Saarivuoma’s community board to evaluate to what extent the area D *de facto* has been used during the whole period 1972-2005. Based on the preconditions given, the board find the average rate of use compared to the situation has been a quarter, i.e., 0.25.

Explanation: (1) Some use, especially in spring is unavoidable, (2) fences are more effective in autumn, and (3) grazing fees motivates to avoid the area. Accordingly, this is the factor that we use to reduce the calculated pasture losses. We sum up the reduction of the pasture loss in next paragraph. As for area Northwest, nobody can provide an exact evaluation of the combined effect of these factors, but we consider this as a best possible “gestimate” by the persons in the best position to evaluate.

2.6.4. Reduction of pasture loss

In so far as the Saarivuoma board has chosen the same reduction factor for both areas the calculation for the reduced pasture loss becomes straight forward. The calculated loss of pasture for the bare ground half of the year is for the period 1972-2005:

$$7325 \text{ reindeer} * 0.75 = 5494 \text{ reindeer (for 182.5 days)}$$

This is a calculation of potential loss of pasture based on evaluation of pasture capacity based on grazing quality and quantity (Johansen et al. 1995, Tømmerviik et al. 2005, Rekdal og Angeloff 2021) in the different areas following methods used in monitoring of reindeer grazing areas and in court (Tømmervik et al. 2022). For *the productivity* we do not have quality checked published data for Saarivuoma, so we have chosen to use governmental published data for the whole of Norrbotten County as a proxy, see table 3.

Table 3. Average productivity 1996-2020. Calculation from published statistics (Sametinget.se)

	Productivity in kg per winter reindeer		Slaughter in percent of winter herd
	Slaughtered	Adjusted for herd change	
Norrbotten	4,42	4,38	16,5%

The data for Norrbotten is slightly above the 2021-levels for Troms, Kautokeino and Karasjok in Norway while other regions in Norway double and triple this level (Landbruksdirektoratet 2021).

³⁴see Reinbeitekommissjonen 2001:93 for a description

2.6.5. Saarivuoma development

Our calculations in 2.5 are based on agronomical knowledge about the potential pasture value (Lyftingsmo 1974, Villmo 1979, Tømmervik et al. 2022). To understand what have taken place in Saarivuoma since 1972, we need to see this in a perspective of *traditional herder knowledge* and common pool resource theory (Ostrom 1990, Riseth & Vatn 2009).

Reindeer herd management is a combination of an individual (family) enterprise and a collective cooperation within the Sami community (Sami village) where the reindeer are the individual property of the single owners and the right to the pastures are a collective right for the whole Sami community. Professor Robert Paine (1964) defined reindeer management as a combination of herding (collective) and husbandry (individual).

Before 1972 there were a balance within Saarivuoma where certain families had access to their traditional calving grounds and a mutual respect for each other's land use. With the implementation of the convention in 1972 this pattern was broken.

This led, at least for some families, to a decrease in intensity of herding which further made alternatives to reindeer herding more attractive, e.g., working in the mines of Kiruna. This is a well-known development pattern (Beach 1981, Riseth 1991, 2015) known as an *extensive spiral* which reduced the output of herding further. There are good indications that is what have taken place in Saarivuoma. To break such a pattern requires a new effort. A new effort requires a basic trust in a safe future. This trust has been lacking until 2021 and the Supreme Court ruling.

Since 2005 the governments of Norway and Sweden have not agreed about the legal framework as the 1972 convention expired. Sweden went back to the Lap Codicil while Norway unilaterally prolonged the 1972 border pasture law (Ravna 2020), i.e., meaning that use of areas Northwest and Southeast still was considered illegal by Norwegian authorities.

Saarivuoma have since 2005 changed their position; on the hand arguing based on the Swedish position and have had the clear intention of using the areas in full (Blind & Nutti 2021) , but on the other hand having to adapt to the actions from Norwegian authorities accusing them of breaking Norwegian law.

We will provide some examples given by former Reindeer Husbandry Agronomist Sveinung Rundberg in his statement to the Supreme Court supplied with some media reports:

Erection and removal of a fence 2005-2007

In the summer of 2005 Saarivuoma Sami village built a fence system for calf marking on Lifjellet north of Altevatin in Bardu Municipality. The fence was erected outside the Sami town's summer grazing area, as was previously stipulated in the Reindeer Grazing Convention and continued in the Border Reindeer Grazing Act. Nor was permission obtained or applied for to erect the fence in accordance with the provisions of the Reindeer Farming Act. In accordance with § 12 of the Reindeer Management Act, the area board in Troms ordered the removal of the fence. The order was not complied with, and the fence was removed by the Reindeer Management in July 2006. However, the fence was put up again the same summer, and a removal order was again given. This order was not

complied with either, and the fence was again removed in September 2007 (Rundberg 2021:7, our translation).

Eviction of reindeer 2007

“In my time as a reindeer husbandry agronomist, the following decisions were made after 2005: i. In the summer of 2007, in accordance with Section 13 of the Border Reindeer Grazing Act, an order was given to remove reindeer that were outside the legal grazing area and west of the border for Saarivuoma's summer grazing area. The order was not complied with, and the Reindeer Management Authority carried out the expulsion of around 600 reindeer back to Saarivuoma's grazing area in late summer (Rundberg 2021:6, our translation)

The summer 2011 Norwegian reindeer husbandry authorities decided forced eviction of reindeer from Altevatt by use of helicopter³⁵ and a thousand reindeer was forced out from the area (Rundberg 2021).

Further, Rundberg (2020) provides an oversight of decisions of forced action in the period 2014-2020, see table 4.

Table 4. Decisions on eviction and fines 2014-2020 (Rundberg 2021:6)

Year	Decision
2014	Decision on an order followed by a compulsory fine.
2018	Decision on an order followed by a compulsory fine.
2019	Order on cessation of illegal grazing and compulsory fine
2020	Order on termination of illegal relations and decision on forced eviction

According to Rundberg (2021) none of the decisions in 2014-2020 were followed up on forced eviction or collection of forced property.

To sum up the period 2005-2021 there were decision on actions more or less regularly, at least four decisions that were followed up and four others that were not. Even though all decisions were not followed up, Saarivuoma herders the whole period lived under a threat that forced actions could be used if they entered areas considered illegal by Norwegian authorities.

2.6.6. Assumptions

In practice the loss of these areas will mean increased pasture competition for the remaining bare ground pastures, accordingly *the production and the slaughter weights of the whole Saarivuoma herd will be reduced*. Proceeding from the reasoning above, we will calculate possible annual operation loss. We start by the potential loss of 5494 reindeer and multiply by the documented

³⁵ <https://www.nrk.no/sapmi/flytter-svensk-rein-med-helikopter-1.7734366>

level of *production per reindeer* for Norrbotten County and *average slaughter prices* (Sametinget.se).

Productivity level

A reindeer herds average production level depends on several factors including nature geographies (geology, vegetation, climate), external encroachments and disturbances, pasture utilization as well as herding and husbandry strategies. The Norrbotten productivity level used in Table 3 is lower than we would expect in Saarivuoma because of the documented very good pastures in the evaluation in 2.3 and our calculations (2.5). By using Norrbotten's productivity level in our calculation, we also are conservative in our judgment not overstating Saarivuoma's productivity level.

Time

Saarivuoma received its first grazing fee for illegal summer pasture at the first of January 1973, i.e., for the summer of 1972. When the situation changed in 2005 with contradictory legal frameworks Saarivuoma changed their position and started "utilize the lands in full" (Blind & Nutti 2021:2) and "erected fences and moved reindeer into areas outside the pasture area defined in the border grazing act" (Rundberg 2021:6).

On account on this the periods 1972-2005 and 2005-2021 must be considered differently.

For the first period (1972-2005) we have calculated the loss based on that the loss of the two areas C and D is 75 percent of the production (2.5 and 2.6).

For the second period (2005-2021) Saarivuoma herders have had the clear intention of full use of the two areas C and D but as shown in the last part of 2.6.5 the reactions from Norwegian authorities have obstructed that to some extent and caused extra costs directly and indirectly by loss of infrastructure, extra work and machine use, stress on animals with possible reduction of slaughter weights, increased winter mortality, reduced fecundity etc.

This loss is difficult to evaluate in some precise manner, but we will propose that this loss in average is 10 percent of the pasture production for areas C and D. We consider the Supreme Court ruling to have potential as a new start as Saarivuoma now has legal access to the full summer area.

2.6.7. Operation loss

As for the period 2005-2021 we start with the full potential of areas C and D is 7325 reindeer. 10 percent of that is 733 reindeer.

Based on the assumptions in 2.6.6. and the numbers from 2.5 and 2.6 we have calculated the operation loss in table 5.

<i>Table 5. Operation loss</i>	Production pr. reindeer	Period	# Reindeer
Pasture capacity loss	4,4 kg/reindeer	1972-2005	5494 reindeer
		2005-2021	733 reindeer
Production loss per year		1972-2005	24174 kg
		2005-2021	3223 kg
Meat price	SEK 74,44		
Price addition³⁶	SEK 12,34		
Total price	SEK 86,78		
Annual production loss		1972-2005	SEK 2 097 718
		2005-2021	SEK 279 692
Production loss 1972-2005		33 years	SEK 69 224 688
Production loss 2005-2021		16 years	SEK 4 475 131
Total production loss			SEK 73 699 820

Pasture loss for 49 years (1975-2021) is calculated to have been in total the least SEK 73 699 820.

Going back and comparing with Tveraa's (2020) calculation we observe that the result of our calculation is only slightly higher than his level (four percent).³⁷ Our calculations are based on grazing quality and quantity (Johansen et al. 1995, Tømmerviik et al. 2005, Rekdal og Angeloff 2021) in the different areas following methods used in monitoring of reindeer grazing areas and in court (Tømmervik et al. 2022). Accordingly, we would expect that excellent summer pastures would have had a higher production than this level, so our result in table 6 should be considered a minimum level.

³⁶ Paid by the Sami Parliament when slaughtered by approved slaughterhouses. The amount is a weighted medium for adults (SEK 9.00) and calves (SEK 14.50) based on Norrbotten statistics.

³⁷ Using our price SEK 74,44 Tveraa's result becomes SEK 1,727 Mill. The comparison thus becomes: $1.7994/1.727=1.04$. Moreover, the difference becomes larger because Tveraa had not included the price addition, which however is a real loss.

3. Grazing fees and fines

These data are based on a statement brought forward by the Norwegian former official Sveinung Rundberg for the Supreme Court case, cf. table 6.

Table 6. Grazing fees and fines (Rundberg 2021)

Grazing fees	Issued by	Date	Amount	Today's value ³⁸	Today's value in SEK ³⁹
Illegal summer pasture use	Lapp Sheriff	01.01.1973	NOK 20 000	NOK 167 945	
Illegal summer pasture use	Lapp Sheriff/ Governor	12.01.1978	NOK 50 120	NOK 248 178	
Illegal winter pasture use		1983	NOK 45 000	NOK 140 025	
Illegal summer pasture use		1991	NOK 210 000	NOK 415 928	
Illegal summer pastures ⁴⁰		29.12.1997	NOK 173 000	NOK 303 430	
Sum			NOK 498 210	NOK 1 275 506	SEK 1 339 281

The sum in today's value will be added other costs in chapter 5: Total financial costs.

³⁸ Using a calculator for pris change over time: <https://www.ssb.no/kalkulatorer/priskalkulator>

³⁹ Rate of exchange on the day of writing

⁴⁰ We have received a copy of an invoice/receipt documenting Saarivuoma during the period 1996-2000 had paid back to Länsstyrelsen (regional Swedish authority) in total SEK 223 545 which Länsstyrelsen had prepaid for grazing fees imposed on Saarivuoma

4. Extra monitoring and herding expeditions.

As reindeer follow their habits and instincts, Saarivuoma during the whole period at least from 1972 to 2005 has had a continuous challenge to keep reindeer out of illegal areas. Several barrier fences were erected over long distances, parts of the fences are illustrated in figure 10, but fencing was neither effective nor appropriate to obstruct all reindeer trespassing. Therefore, Saarivuoma herders had to monitor entry areas and when considered necessary and possible, to go there and drive animals out.

During the more than three decades, the herders established and developed a pattern for actions that with some variations were taken every year as a part of the annual work cycle. Though technology use developed during the period the basic pattern were kept.

With regards to the case of compensation for losses the main challenge is to divide between the actions which are parts of a normal routine and those that are extraordinary due to the illegality of pasturing in areas “Northwest” (C) and Southeast (D).

4.1. Late winter/Spring

In difficult winters, with ice on the ground or within the snowpack or very deep snow and more or less inaccessible pastures, it is a traditional strategy to let the reindeer spread. As noted above (2.2.2) Saarivuoma’s reindeer have been used to find emergency pastures on the Norwegian side. When entering Norway, Mánnančearru was closest to the border, but an illegal area. Accordingly, the siida that was located as the westernmost had the task to monitor the area, and if needed, to drive them out (cf. figure 14) to legal pasture.



Figure 14. Driving reindeer out of Mánnančearru (Photo: Niklas Labba).

Later in the spring it could be needed to monitor whether reindeer, adults, and young males, entered farmers meadows. Then it was necessary to travel to the Målselv valley and stay extra at a camping site/husky farm. However, these actions would have been necessary to take regardless of the convention. i.e., they are not relevant as parts of the compensation claim.

4.2. Summer

Due to the reindeer's natural instincts and habits and the lack of natural borders between areas E and F many reindeer went further west and there was established a routine to collect as many as possible back. From 1985 the valley Kirkesdalen was a natural west border, but further south towards Altevatn there is an open mountain area which gives free access to the westernmost part of the njárga area Northwest (C). Accordingly, during the whole relevant period there it was necessary to collect reindeer to bring them back.

Before 1985, reindeer were collected by foot, but herders were transported out by seaplanes. From 1985 on 4-6 men, sometimes as many as 8 regularly travelled to the Altevatn siida to collect reindeer. Usually there were two paid expeditions, one in July and the other in late August. Both were with cars and trailers, usually with two motorbikes per car (pers. com. Niklas Labba).

4.3. Autumn/ Pre-winter

In December before migrating southeast towards the core winter pastures around Vittangi, it is an established practice to separate larger herds into siida-groups which migrate together. Before the migration from Jarin, it has also been practiced going back to the summer pastures to collect animals that could be remaining there. From the 1972 convention Saarivuoma herders felt that this became extra urgent, as it became "doble illegal" to leave reindeer in this area. This was organized as longer snowmobile expeditions, up to two weeks.

This was most demanding when it was very bad conditions in the "shoulder season" area. In situations with ice cover, it might be some accessible lichens on the hills in the very west by Altevatn. Under such conditions it was very difficult to drive away reindeer.

Saarivuoma has been organized of up to 8 groups and then it has been usual to send one representative for each group. The standard effort has been 8 men with snowmobile for 3 days.

4.4. Costs

We have explored Saarivuoma archives from 1977 to 2004 and about 250 invoices/receipts. Most of these documents are payments for work and compensation for costs as transport, accommodation etc. Most documents concern costs up to a few thousands of SEK. When helicopters are involved, from about 1990 and on, the costs can be several ten-thousands of SEK.

We have not found it cost-effective to perform a full accounting and analysis of all these documents. Rather, we singled out more obvious actions cost, with relatively higher costs, see table 7.

Table 7. Extra herding costs (Saarivuoma's archive)

DATE/PERIOD	ACTION	WHERE	COST	Today's value*
18-27.1.1986	Collection of reindeer	Norway	SEK 16 000	SEK 38 739
22.-27.11.1988	Collection of reindeer	Norway	SEK 13 200	SEK 28 372
Late July -Oct. 1988	Collection of reindeer	Altevatn area	SEK 3 000	SEK 6 510
Until 1.2.1988	Collection of reindeer	Norway	SEK 8 500	SEK 19 217
16.2-1.3.1990	Reindeer separation, monitoring and driving	Altevatn	SEK 19 504	SEK 37 846
17-23.12.1991	Reindeer collection with helicopter	Norway	SEK 23 154	SEK 38 920
7-12.9.1991 & 17-23.11.1991	Reindeer collection with helicopter	Norway	SEK 14 878	SEK 25 083
Nov 1991	Reindeer collection	Mánnancearru	SEK 7 880	SEK 13 230
2.10.1992	Airplane	Soppero-Altevatn	SEK 2921	SEK 4 820
17.-18.7.1997	Reindeer driving with helicopter	Norway	SEK 42120	SEK 63 511
20-22.11.1998	Reindeer driving with helicopter		SEK 31 160	SEK 47 097
31.8.2000	Helicopter transport		SEK 11 550	SEK 17 219
1992-2004**	Reindeer collections (stipulated) 15000*12		SEK 180 000	SEK 271 340
SUM			SEK 373 867	SEK 611 904

* <https://www.scb.se/hitta-statistik/sverige-i-siffror/prisomraknaren/>

** se main text

The archived costs before 1986 are very limited. Therefore, they are not included.

In the report from Rennäringsgruppen (1971) a part of the proposal was that Saarivuoma should receive a compensation for extra work. This also mentioned in Prop. 1972: 16 p. 36. The ministry writes:

“I calculate that maximum SEK 100 000 for extra work within Saarivuoma ...”

We do not know if, and possibly what was paid, or if anything ever actually was paid out. In any case we have not included any costs before 1986, so that this has no significance for the calculation of Saarivuoma's costs.

From 1992-2004 there are more relevant costs than is listed in the table. Based on our experience from the material before 1992, we have simplified our work by simply stipulated a possible average cost per year beyond the costs we have picked out as especially relevant. This is not accurate, but the error is limited.

5. Total financial losses

In table 8 we have summed all costs calculated in chapters 2, 3 and 4.

Table 8. Total financial losses

Operational loss		SEK 73 699 820
Grazing fees	NOK 1 275 506 ⁴¹	SEK 1 339 281
Herding expeditions		SEK 611 904
Total		SEK 75 651 005

We note that the operational loss is the dominating cost in relation to the other cost items.

The length of the time where compensation is found to be eligible, will be the decisive factor for the level of the total compensation.⁴²

Conclusion

We find that Saarivuoma is entitled to a compensation of at least SEK 75.65 million.

⁴¹ Rate of exchange on the day of writing

⁴² 49 years would increase operational loss to SEK 102.9 Mill.

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