

6 Sustainable Reindeer Herding?

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Summary

The sustainability of reindeer herding has been a relevant discussion over the last 20 years in terms of both international policy as well as reindeer herding policy. The Reindeer Herding Act states that reindeer herding is to be ecologically, economically and culturally sustainable. Currently, this is only defined concretely in terms of ecological sustainability, through a 2008 advisory from the Ministry of Agriculture and Food. For a more fundamental starting point, I will use the approach of international common resource research.

This chapter gives an industrial economics overview of reindeer herding in Norway with respect to physical geography and legal history. It presents a complex picture from south to northeast. Semi-domestic reindeer herds in central Sør-Norge has a long history influenced by South Sami herders. These enterprises have the highest productivity of all reindeer enterprises in Norway, with the highest slaughter yields, high productivity and stable and good finances.

South Sami reindeer herding south of Stjørdalen has had a very difficult history because of political setbacks with especially severe consequences. Reindeer herders in Trollheimen lost all their rights with the decisions upheld by the Supreme Court as late as 1981. The Ministry of Agriculture and the Norwegian Parliament preserved the future of reindeer herding in this area through a new law in 1984. Samis who earn a living through reindeer herding in the Røros area have been exposed to high pressure from the expanding agricultural community and authorities. It was worse around the turn of the last century, when unreasonable compensation for alleged damage to farms ruined many Sami reindeer herders. After the war, and especially from the 1970s, Sami reindeer herders in this area have created a new and more productive reindeer herding industry, but have still needed to fight for their rights against both farmers and the legal system, which have been influenced by old attitudes. Reindeer owners finally won full acceptance of their rights in a 2001 Supreme Court decision but, especially in the last 10 years, have sustained a decrease in productivity because of increased predation.

Reindeer herding in Nord-Trøndelag has also taken part in the productivity revolution of the 1980s but since the early 1990, has more and more felt the consequences of the new policies regarding predation. The percentage loss has gradually increased and both slaughter yield and productivity have diminished from a high to a middle level. Reindeer herding areas in Nordland and Troms have both been affected by border clashes between Norway and Sweden in 1751, which led to Norway receiving an excess of summer pasture and Sweden receiving an excess of winter pasture. Nationalistic ideologies from the middle and end of the 1800s led to stronger control of reindeer herding to promote agricultural expansion and, in 1923, to the exclusion of Swedish reindeer Samis from, among other areas, the islands in Troms. Norway and Sweden are currently without a valid convention and questions can be raised about the validity of

Norway's one-sided extension of the 1972 convention in 2005. The last convention negotiations were very difficult but a Sami working group has recently presented recommendations for a new convention.

Large portions of reindeer herding in Finnmark are in a precarious position. The exception is Polmak/Varanger which has sustained a productivity revolution and has had good profits. Over the last 30 years, the number of reindeer in Karasjok and the 10 inner districts of Kautokeino has fluctuated greatly, but is still higher than before. Use of pasture in Finnmark is therefore much more intensive than before. The authorities' monitoring program documents that lichen regrowth in Finnmark is much better than expected. However, increases in reindeer numbers in the 2000s have none the less resulted in a pasture situation again in rapid decline.

After demands from NRL (Norske Reindriftsamers Landforbund - Sami Reindeer Herders Association of Norway), investigation and dialogue, a new Reindeer Herding Act was enacted in 2007. In addition to sustainability, this act focuses on particular reindeer herding institutions and processes, but has an exemption clause which gives central authorities the power to overrule reindeer husbandry agencies. The authorities have now used this to initiate compulsory processes to reduce reindeer numbers. I fear that these measures will function as a derailment and stop, rather than promote, the industry's essential processes.

The results of common resource research are clear; resource users themselves should be responsible for solving their own problems. The government's role should be to support processes that build institutions and solve problems.

I recommend that:

- government authorities develop a policy to strengthen the protection of the reindeer herding industry and prioritize the positive contributions this industry has made to sustaining an open landscape and biodiversity*
- the consultation scheme be used more actively to develop a binding dialogue with Sami reindeer herders, the NRL and the Sami Parliament*
- government authorities give reindeer herding in Finnmark and other reindeer herding organizations peace to determine rules of use and subsequent reduction of reindeer numbers*
- the Sami working group's propositions for a new reindeer pasture convention with Sweden be ratified and implemented as soon as possible*
- authorities formulate a predation policy which more clearly considers reindeer herding and other pasture users*

6.1 Introduction

The Expert Analysis Group for Sami Statistics invited me to write a chapter on reindeer herding statistics. The challenge was to first find a subject which would be considered important and interesting by business, Sami organizations and Sami and Norwegian authorities. Secondly, sufficient data had to be available to write about the subject. The answer was to write about sustainability as this is the official goal for reindeer herders as formulated in the Reindeer Herding Act of 2007, but also because it is an objective that has played a prominent role in international environmental and development policy over the last quarter century. The subject is especially interesting since a government declaration in 2013 signalled the government's goal of a new parliamentary report about sustainability in reindeer herding. Existing industry statistics through *Ressursregnskap* and *Totalregnskap*, published yearly by Reindrifftsforvaltningen¹, give a good foundation from which to assess many aspects of sustainability in today's reindeer herding industry.

It is important to point out that sustainability as an overriding political objective for reindeer herding and not just a given. In the last 100 years, Sami reindeer herders have experienced dramatic changes in national Sami and reindeer policy. The expressed goals of the Lapp Codicil (1751) was the 'Lapp nation's conservation'. The system it established involved the recognition of Sami self-determination within national frameworks. During the last half of the 1800s, this completely turned around. The political practice included border closures², district divisions with shared responsibility and monitoring of land use³, domestic reindeer prohibition⁴, controlling lappfogder⁵ and a restitution tyranny that in some districts sent most Sami reindeer herders into poverty (Fjellheim 2012). The first Norwegian-Swedish reindeer grazing convention was entered into in 1919 and resulted in comprehensive restrictions on Swedish herders grazing in Norway. For example, they were excluded from the islands in Troms. The political goal for reindeer herding at the time could be characterized as a decommissioning goal and was formulated as such in an adjustment to the Reindeer Herding Act:

Saalenge Flytlappernes Næring nyder Lovgivningens Beskyttelse, har den Følgelig Krav paa at bydes saadanne Vilkaar, at den kan bestaa. Men i og med dens Stilling som en historisk Overlevering, der ikke i ringe Grad virker som en Hemsko paa Udviklingen af bedre og formaalstjeneligere Samfundsinteresser, er Grænserne for dens Krav givne. Og disse Grænser maa etter Forholdets Natur blive vikende (Indredepartementet 1904).

This objective established that reindeer herders were *permitted* to use the land but had to *yield* to other interests, especially agriculture. This was the basis for the first national reindeer herding act which was passed in 1933 and in force until 1978. The preceding law, the Common Lapp Law of 1883 and the first Norwegian-Swedish reindeer grazing convention put aside the Lapp Codicil and created a new 'constitution' for relations between reindeer Samis and government authorities, and consequently also between Reindeer Samis and their neighbours, especially

¹ Since 1980, *Reindrifftsadministrasjonen*, until last year *Reindrifftsforvaltningen*, after the new year *Statens reindrifftsforvaltning*, since 1.7.2014 *Landbruksdirektoratet, Reindrifftsavdelingen*.

² Norway-Russia 1826, Norway-Finland 1852 and Sweden-Finland 1889.

³ *Felleslappeloven* of 1883 which applied to Sweden and Norway, south of Finnmark.

⁴ In municipalities in Sør-Norge not included in the then established district divisions.

⁵ Tax collectors from the 1890s south of Finnmark, in Finnmark from 1935.

farmers. Much of reindeer Samis' later political history is about the struggle to come out of the constricted and repressive institutions which were established at the turn of the last century. This has proven to be very difficult. Both geographical frameworks for reindeer husbandry and basic principles in the legislation are still basically unchanged. It is also apparent that much of the progress made is being threatened with setbacks.

As a reaction to strong pressure from agricultural expansion and government regulations, Sami reindeer herders organized. They had their first national meeting in Trondheim in 1917, but 30 years went by before they established a permanent nationwide organization: the National Federation of Norwegian Reindeer Samis (Norske Reindriftssamers Landsforbund - NRL). The first practical result of the struggle to organize came at the end of the 1960s and involved reindeer husbandry being accepted as an agricultural industry. Parallel to the state establishing a vocational training school, research station and advising services, the Supreme Court concluded in 1968 that reindeer husbandry, because of long-standing traditions, had legal protection against expropriation, in line with real estate. Further dialogue lay the groundwork for NRL and the Ministry of Agriculture signing the General Agreement on Reindeer Herding in 1976. A new reindeer herding law in 1978 strengthened this reform. The most important political objectives in these documents were economic and cultural. The economic goals centred on obtaining the highest possible income and meat production as well as protecting natural resources. The cultural objective focused on preserving reindeer herding as an important factor in Sami culture. This dual reform, with a new law and general agreement, constituted the final break from the decommissioning goals.

Partly in parallel with this, a broader ethno-political movement grew around the National Federation of Norwegian Samis (established in 1968). Around 1980, extensive demonstrations developed and actions against the expansion of the Alta-Kautokeino water system turned from an environmental issue to an indigenous people's issue, not least because of two young Sami hunger strikers in front of the Norwegian Parliament. This lay the groundwork for a new Sami policy which included constitutional amendments (1988), the establishment of the Sami Parliament (1989) and the recognition of Samis as indigenous peoples (1990). Until the passing of the Finnmark law, the process also led to an agreement between the authorities and the Sami Parliament in 2005 – an agreement which, among other things, gave the reindeer herding industry consultation rights regarding political changes and land encroachment. This also had consequences for reindeer herding legislation. The committee responsible for the legislation consisted of a majority of Sami reindeer herders and had a leader who enjoyed broad support among them. The new law, passed in 2007, focused on reindeer herders' particular regulatory needs and the traditional *siida* institutions, which were overlooked in the Reindeer Herding Act of 1978. These now received a central place in the act, while reindeer grazing districts received responsibility for regulation of reindeer herd size and pasture use. With this, reindeer herding came one step further and succeeded in acquiring an empowering Reindeer Herding Act.

In this chapter, I will first look at the concept of sustainability and analyse how it is defined and understood. I will then present criteria for how these can be evaluated. Further, I will use these criteria and available data to analyse the situation of reindeer herding in Norway. Finally, I will summarize and then evaluate future opportunities and threats.

6.2 Conditions for Sustainability

The concept of sustainability became universally known after the World Commission on Environment and Development used it. The commission was created by the United Nations (UN) to propose development strategies that could contribute to solving world environmental and poverty related issues. It described how environmental, economic and social development were closely tied together. The main message in the report was that the international community should organize and do what is necessary to ensure sustainable development. This means *to ensure that people's needs are covered without weakening the foundation for future generations to cover their needs.*

This notion was met with rapid support in the environmental movement as well as international and national politics. The large international environmental conference, which the UN arranged in Rio de Janeiro, Brazil in 1992, contributed significantly to this. At this conference, with most world leaders in attendance, several important conventions (the Convention on Climate Change, the convention on Biological Diversity and Agenda 21) were passed. In Norway, the idea of sustainability started to be used in relation to reindeer herding policy already with the 1992 parliamentary report *En bærekraftig reindrift* (Sustainable Reindeer Husbandry). The report's starting point was that the objectives for the industry could be expressed by three goals:

- A (1) production goal, expressed as grazing resources will be utilized as much as possible for food production without deteriorating the natural foundation.
- A (2) income goal, expressed as herders will have income and living conditions in line with other occupational groups, and that these incomes will be distributed in a way that ensures economically sustainable household units. This involves an indirect efficiency demand of the reindeer herding industry.
- A (3) cultural goal, expressed as reindeer herding is of crucial significance in the development of Sami culture. This has been interpreted to mean that Sami culture can best be preserved by having the largest possible reindeer herding population, i.e. that as many Samis as possible be permitted to herd reindeer.

These three goals were translated to the concepts of ecological, economic and cultural sustainability. These are also the terms we find in today's Reindeer Herding Act (2007). Section 1 of the act (the objectives) states:

For Sami reindeer pasture areas, the law will lay the groundwork for an ecologically, economically and culturally sustainable reindeer herding industry based on Sami culture, tradition and practice for the benefit of the reindeer herding population and rest of the community. To reach these goals, the law will set the grounds for an appropriate organization and administration of reindeer herding. Reindeer herding shall be preserved as an important foundation of Sami culture and society...

Outside Sami reindeer pasture areas, the law will arrange conditions for an ecologically and economically sustainable use of reindeer grazing resources based on local culture and tradition in the areas with legal authorization for reindeer herding according to §8.

The intentions are clear. Reindeer herding shall be *ecologically, economically and culturally sustainable*. To go from intentions to political practice, one has to answer questions such as:

- Which factors affect sustainability, and how do they work together?
- How can we assess or measure whether, and to what degree, reindeer herding is sustainable, or possibly, in which direction sustainability is developing?

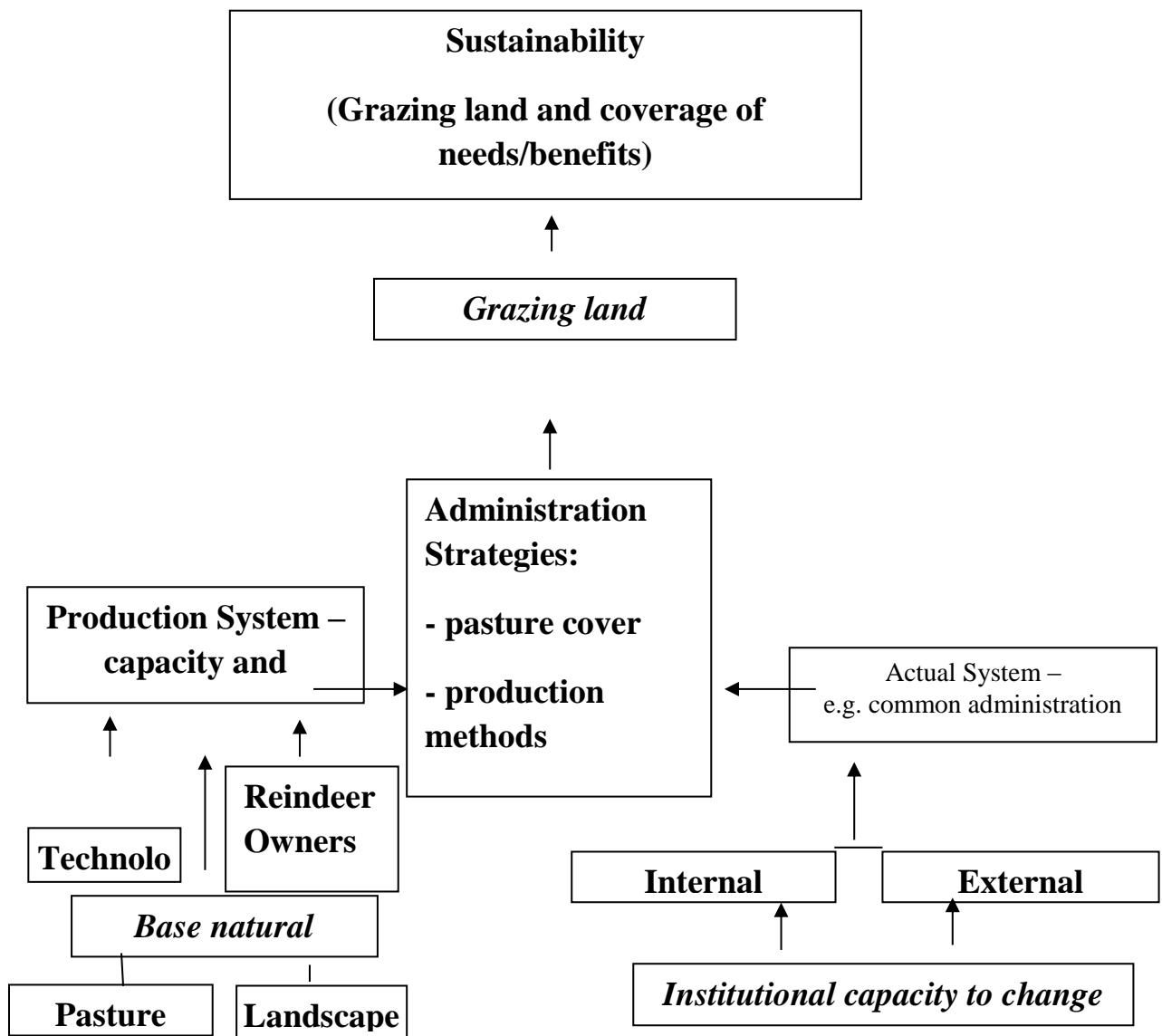
These are questions without an answer key, but I have found two starting points. At a primary level, there are useful approaches available from international common property resources research (Ostrom 1990, Ostrom et al. 1994). At a more concrete level, LMD (2008) has developed their own indicators which give a good starting point to assess ecological sustainability. No specific criteria exist for the other sustainability dimensions, so we are left to make discretionary evaluations.

6.2.1 Sustainability Analysis

Based on approaches used in common resources studies, Riseth and Vatn (2009) have developed a framework for analysing the sustainability of reindeer herding, see figure 1. They used this framework to analyse why reindeer husbandry in West Finnmark and the Trøndelag area, despite a uniform national policy, developed in very different directions (Riseth, 2009). Danielsen and Riseth (2010) have also used the same framework to analyse conditions for reindeer herding in Trollheimen. The framework builds on the following premise: *the sustainability of grazing land depends on how well the production and institutional systems work together*. The administrative strategies of each reindeer herder or siida (reindeer pastoral district) develops in balance with management needs (created by the production system) and management accountability to the actual⁶ government systems. Implied is that non-sustainable adaptation will most likely arise when management capacity is too small in relation to needs. The most important elements in the production system are natural resources, reindeer owners and technology, while the main elements in the management authority are internal (Sami) institutions and the greater community's institutions (political, legislative and market). The most important administrative strategies include production methods (technology and herd structure), use of grazing land and grazing density (number of reindeer per unit area). Reindeer owner's choice of administrative strategies lead to grazing adaptations. How sustainable this adaptation is can be evaluated by looking at criteria for different aspects of this adaptation: ecological, economic and cultural.

⁶ I use the word actual to emphasize the parts of government (regulation system) which are truly in power, that is the rules and regulations usually obeyed, which are important. Rules not in practice have limited significance.

Figure 6.1 Production and Institutional System (from Riseth and Vatn, 2009:91)



Production System: Management needs

Institutional System: Management capacity

A framework is not a detailed model. It will be more correct to say that this is an analysis scheme, which indicates how important factors can work together or influence each other. An example can illustrate how the framework can be used in an analysis.

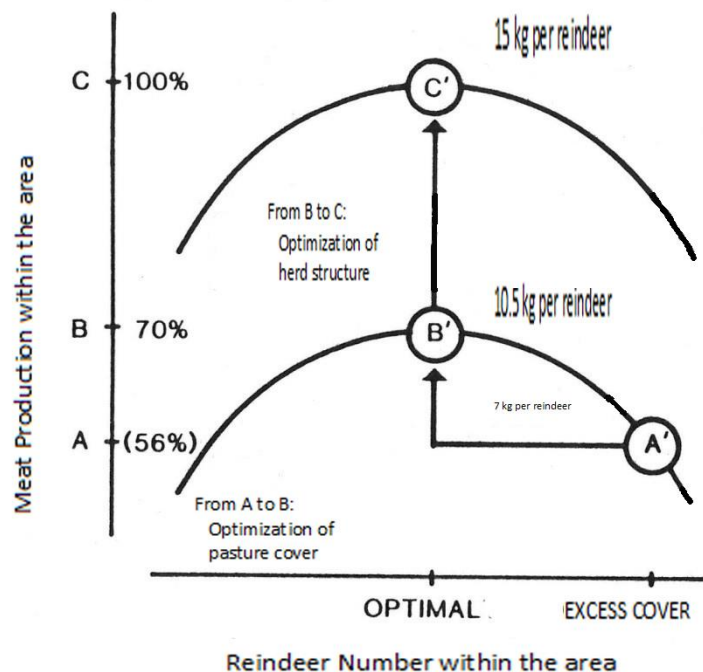
A technological revolution in reindeer herding started at the end of the 1960s. This developed with the introduction and spread of snowmobiles as well as the increased use of cars, ATVs and, in some cases, helicopter. In the course of a couple of decades, total dependence on human and animal muscle power changed to total dependence on engine power and fossil fuels. At the same time, relations to the surroundings changed and increased options to control the herd with less human resources involved a dramatic increase in costs. How were these costs to be covered? More reindeer? Higher productivity per reindeer? Other income? Different answers lay the foundation for different administration strategies. In the study mentioned, the framework

was used to identify complex explanations involving natural resources and historical factors on the institutional side (Riseth and Vatn, 2009).

6.2.2 Evaluation of Sustainability

Common criteria exist to evaluate ecological sustainability (see textbox 2). To understand the logic of these criteria, it is necessary to know the theoretical background for them.

Figure 6.2 Productivity and Reindeer Numbers (Kosmo and Lenvik 1985:24)



The theory is known as the *Røros Model* (Lenvik 1989) and in principle, is about double optimization (see figure 4.2). First, pasture cover is optimized. Then, the herd structure is optimized by a high portion of female reindeer and calf slaughter. This way, productivity can be doubled in relation to an adaptation of high pasture cover and traditional herd structure based on bull reindeer or *várit*⁷ as slaughter animals.

Corresponding criteria for economic and cultural sustainability do not exist. The Office of the Auditor General (2012) has criticized the Ministry of Agriculture and Food (Landbruks- og matdepartementet – LMD) for not having determined such criteria for the other subsidiary goals, and therefore considers the department as ‘lacking important prerequisites to inform about goal attainment and consequently, relevant management information’ (Riksrevisjonen 2012:10). Since such criteria do not exist for the other sub goals, I will use a more general approach, that of the framework in figure 1 and the design principles I present in textbox 1.

⁷ One and a half year old bull.

Ecological sustainability is fundamental to nature-based entities. In order to be economically sustainable, reindeer herding must also be ecologically sustainable. Productivity, loss level, costs, distribution and subsidization are the most important factors for economic sustainability. I will touch on these points, but will highlight ecological sustainability and connect the discussion of economic conditions to assessing ecological sustainability.

Cultural sustainability is maybe the dimension most difficult to operationalize, but I argue that this dimension includes at least a connection to local Sami tradition, respect for and valuation of Sami reindeer herders' hereditary knowledge and problem solving strategies as well as the conservation of reindeer herding to the extent that it sets the groundwork for a living, local, Sami community. In this way, the increased autonomy presumed in the Reindeer Herding Act of 2007 will be an integral element of attending to this dimension.

In addition to this, I will explain how the three dimensions of sustainability also depend on a stable and predictable management system, the institutional arrangement, not least in order to take care of the above-mentioned aspects of autonomy. I will therefore present the so-called design principles for robust common resource institutions (see textbox 1) and use them as my starting point.

Textbox 1.

6.2.2.1 Design Principles

A central finding in common resource research is the identification of design principles for robust, long-lasting common resource institutions. These principles are given in textbox 1. The principles were developed through a large number of empirical studies on management of common resources, conducted over various parts of the world. The studies included grazing systems, irrigation, forestry, local fisheries, etc. Common for these studies was that each of them included a significant number of users and that the systems were self-regulating. Research shows that there is wide range of rules used in proven sustainable systems.

There were no specific rules which could be said to be more successful

Design Principles

- *Resources must be clearly determined*
- *Rules of use must match local needs and requirements*
- *People affected by the rules should normally be able to participate in their adjustments*
- *The authorities must respect the local community's (resource users') right to develop their own rules*
- *A self-monitoring system must be established to oversee members' conduct (as resource users)*
- *A graduated sanctions system must be established (for rule violations)*
- *Community members must have access to reasonable conflict resolution mechanisms*
- *For multilevel systems where resource use and supply, monitoring and sanctions, conflict resolution and other management activities are organized on several levels, one must have rules for all levels (Ostrom 1990:90-92, my translation with supplementary comments in parentheses).*

than others. However, it was possible to identify general principles underlying the robust institutions.

The eight identified principles (factors) were those found in most of the robust institutions, while missing from non-successful systems. The principles have inspired a large number of further studies and are considered to be especially well suited to studies of smaller homogenous systems. I want to point out that principles (3), (4), (5) and (7) especially contribute to concretizing the *self-governing dimension* in local resource administration, which is also one of the most important elements in the Reindeer Herding Act of 2007.

Next, I will present the established criteria for ecological sustainability.

6.2.2.2 Sustainability Indicators

On the implementation of the new Reindeer Herding Act of June 15, 2007, LMD appointed a working group in January 2008. It was composed of representatives from the reindeer herding industry, research and administration, and developed suggestions for criteria to be used in the process of determining ecologically sustainable reindeer numbers. The working group received the following mandate:

According to the new act, reindeer husbandry is now given the responsibility of setting upper limits on reindeer numbers in connection to the formulation of district rules of use. Rules of use shall ensure an ecologically sustainable utilization of grazing resources. District management shall independently develop herding and grazing assessments which will form the basis of the stipulated reindeer numbers. The district management's decisions will be sent for final validation and approval to *Reindrifststyret*. The working group is requested to come with suggestions on criteria which will contribute to a good and effective resource administration. The criteria should function as a guiding elements list and a corrective for district leaders and authorities to use to determine reindeer numbers. It must be specified that the criteria shall not be a new method for the government to determine reindeer numbers.

The working group's main conclusion was that *a reindeer's condition was the best indicator of whether reindeer numbers matched the resource base available*. They therefore suggested criteria tied to reindeer condition in order to specify what indicates an ecologically suitable reindeer number for the districts.

Another recommendation was that the industry's more qualitative evaluations of reindeer conditions be used as supplementary indicators.

After a hearing process, an advisory position was developed to be used by the industry and authorities in connection with determining the reindeer numbers for each of the districts. Because of the working group's report, the guide 'Advisory for the determination of ecologically sustainable reindeer numbers' was published in 2008 (LMD, 2008). Factors to consider when determining an ecologically sustainable reindeer herd size are given in textbox 2.

The argumentations for herd size and management's assessment of herd size should further look at weights and production over the last five years, and expected development from the herd size that is being suggested. Once the herd size is determined, developments should be followed up for three years, and yearly variation should be documented in the district's annual report so that

administrative bodies can keep up with how the district contributes to maintaining or reaching ecologically sustainable resource administration.

6.3 Current Situation

To understand the reindeer herding industry's adaptation conditions, we need a basic overview of the industry's physical geography. After this introduction, I will present economic data for each region as a starting point for the sustainability analysis.

6.3.1 Physical Geography

Climate and geology create the physical geography that forms the basis for a reindeer's relationship to the landscape and, in turn, determine the migration patterns that reindeer herders must follow, especially those for winter and summer pasture.

Textbox 2

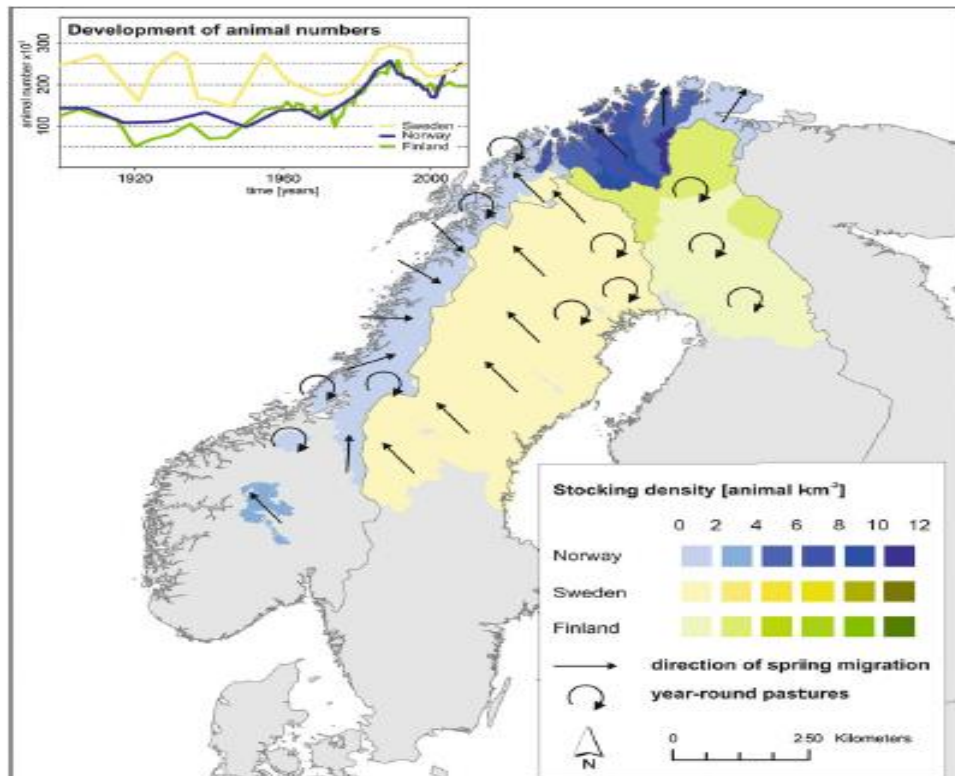
Sustainability Indicators

- *Area of the various seasonal grazing grounds.*
- *An account of the state of grazing land and operational conditions.*
- *Average slaughter weight for the various age and sex categories. Live weights can be used when necessary.*
- *Meat yields, kg meat produced per reindeer in the spring herd.*
- *Stability in supply of calves, portion of calves at the beginning of autumn.*
- *Previous experience with reindeer numbers which have shown to give good weights, meat yields and supply of calves can be used when necessary.*
- *Other expert reindeer evaluations of expected conditions and situations in the herd.*

The following norms should also be reached in an ecologically sustainable reindeer population:

- *Average slaughter weight for
calf: 17-19 kg
bull: 25-27 kg
cow: 27-29 kg*
- *Average meat yield: 8-9 kg per reindeer in the herd*
- *Annual variation in calf percentage in autumn:*

Figure 6.3 Management, Reindeer Numbers and Pasture Cover in Fennoscandia
(Pape & Löffler 2012)



To understand the industry's overriding logic, it is necessary to see it in an all-Sami and Fennoscandinavian perspective. Historically and ecologically, natural summer grazing land lies on the coast of Troms and Finnmark, also for Swedish and Finnish herders. The original patterns were modified because of border closings and reindeer grazing conventions. For example, areas now used as summer grazing land are previous autumn grazing areas.

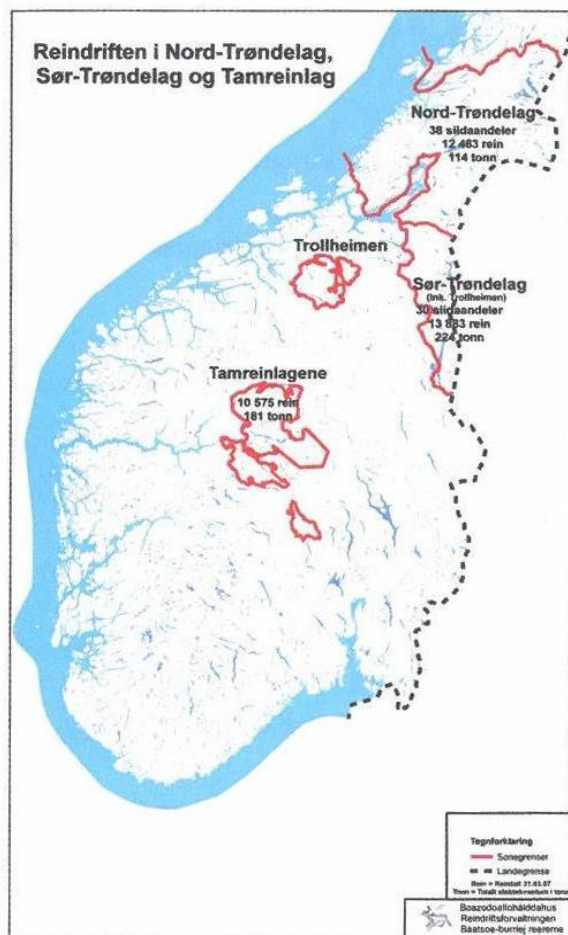
The main features of today's management patterns in Fennoscandia are shown in figure three. As shown in the figure, Norway has an industry based on longer seasonal migrations and relatively stationary all-year operations. We can note that all the arrows illustrating the direction of spring migration point to the mountains. Most of these mountains form Skandene (also called Kjølén), the mountain range that became the basis for the border between Norway and Sweden, and is the source of the name Scandinavia. The mountain range goes further out towards the sea in Troms and in Finnmark. Migrations towards the mountain range come from both the east and the west. From Frosen to Troms, we have industries directed to the coast, based on winter grazing land not permanently covered in snow or frozen. We can also note that reindeer herding in Finnmark, as in most of Sweden and Hedmark/Sør-Trøndelag, is completely nomadic with longer migrations and continental⁸ winter grazing lands. Most of all-year reindeer herding in Norway is based on relative nearness to the sea, in areas where alternation between climate zones gives access to alternative winter grazing land, while the southern industry in Hedmark resembles woodland reindeer herding in Sweden and Finland.

⁸ With dry and cold winters.

6.3.2. Economic Overview

This overview is based on the two yearly publications of *Reindrifftsforvaltningen* (Reindeer Herding Administration): *Ressursregnskap for reindrifftsneringen* and *Totalregnskap for reindrifftsneringen*. *Ressursregnskap* is a yearly report on the state of resources in the industry and builds on reindeer owners' own registered information. *Totalregnskap* is a yearly report on the economic situation in the industry and is published by the *Økonomisk utvalg* (economic committee) as the basis for the industry's negotiations. Presentation of the industry's economic situation is based on central data in mostly tabular form. The statistics represented are not complete, partly because data is not registered and partly because existing date is not comparable. I follow the official regional divisions and will start in the south.

Figure 6.3 Reindeer Herding in Sør-Norge and Trøndelag
(Økonomisk utvalg 2013:151).⁹



⁹ The author thanks *Landbruksdirektoratet*, the Norwegian Agriculture Agency, for permission to use the figures from *Ressursregnskapet* and *Totalregnskapet*.

6.3.2.1 Semi-domesticated Reindeer in Sør-Norge

A semi-domesticated reindeer herding industry operates in south Norwegian mountain villages. It has a long history, documented as far back as the 1780s (Bitustøy 2013). There are now only four districts, with Jotynheimen as the central area, but earlier, the districts the industry was operated over large parts of the central south Norwegian massifs.

«The most important period for semi-domestic reindeer herding was the period after 1880 and in many areas, t.d. Hardangervidda, until the middle of the 1950s, in Setesdal as late as 1979 and Hol I Hallingdal until 1982' (op. cit.:60).

The business is practiced mainly on state land, in some areas also on common and private property. Formally, the business is based on concessions from LMD in accordance with the Reindeer Herding Act.

Table 6.1 Reindeer Numbers, Herd Structure and loss. Semi-domesticated Reindeer. (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Reindeer numbers	9129	9736	12269	12159	10465	10856
Cows (%)	70	71	72	74	74	77
Calf supply(%) ¹	-	91	86	88	81	90
Percentage loss - adults	-	-	-	2	4	1
Percentage loss - calves ²	-	-	4	-	10	5

¹calves in autums (after loss), ² of born calves

Table 6.1 shows that semi-domesticated reindeer herding districts have very stable reindeer numbers and a high female reindeer percentage. As long as the females are heavy enough¹⁰, the herd structure is very productive. Relatively many female reindeer means that many calves are born. Loss of calves is also very low, and that means a very high portion of female reindeer have calves ved foten om høsten.

Table 6.2 Slaughter Yield, Productivity and Slaughter Weight. Semi-domesticated Reindeer.

(Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Slaughter percentage	50	63	61	62	58	58
Yield per live reindeer	-	-	17,0	17,1	16,3	18,0
Production per live reindeer	-	-	-	17,1	15,7	18,6
Average Slaughter Weight, kg						
– cow (> 2 years)	-	-	37,7	37,0	37,0	40,0
– bull 1–2 yers	-	-	39,5	37,0	37,0	43,4
– calf	-	20	23,4	24,4	24,4	26,1

¹⁰ Given a live weight of over 70 kg (slaughter weight of 35 kg), all female reindeer will normally have calves (Lenvik 1989).

Some semi-domesticated reindeer districts in Norway clearly stand out with the highest productivity. The slaughter percentage is extremely high and slaughter weights are significantly higher than the criteria given in textbox 2. We further see that the losses are very low. Figures 6.5 and 6.6 give an overview of incomes over the last decade.

Figure 6.5 Income from Semi-domesticated Reindeer Herding 2003-2013
(Økonomisk utvalg 2013:135)¹¹

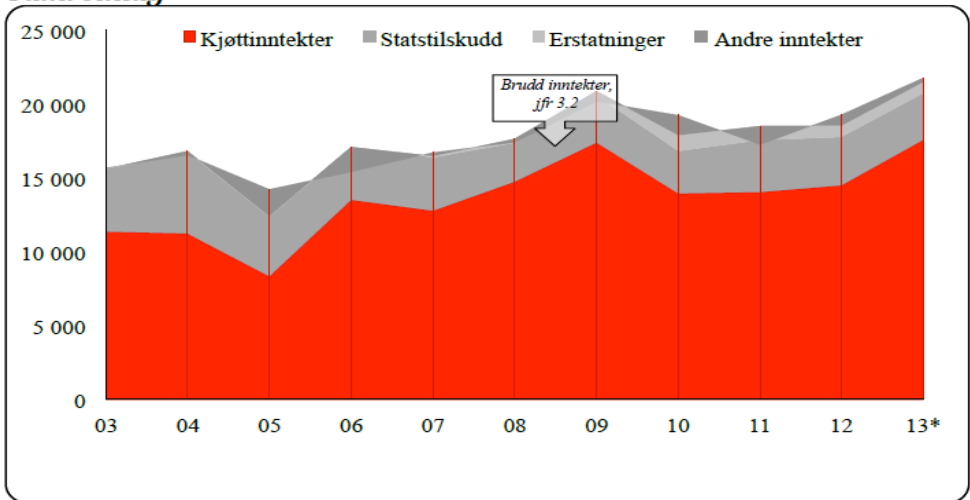


Figure 6.5 shows that meat income dominates while government subsidies also constitute a stable and significant portion.

Figure 6.6 Income, Costs and Profits for Semi-domesticated Reindeer Herding 2003–2013 (Økonomisk utvalg 2013:136)

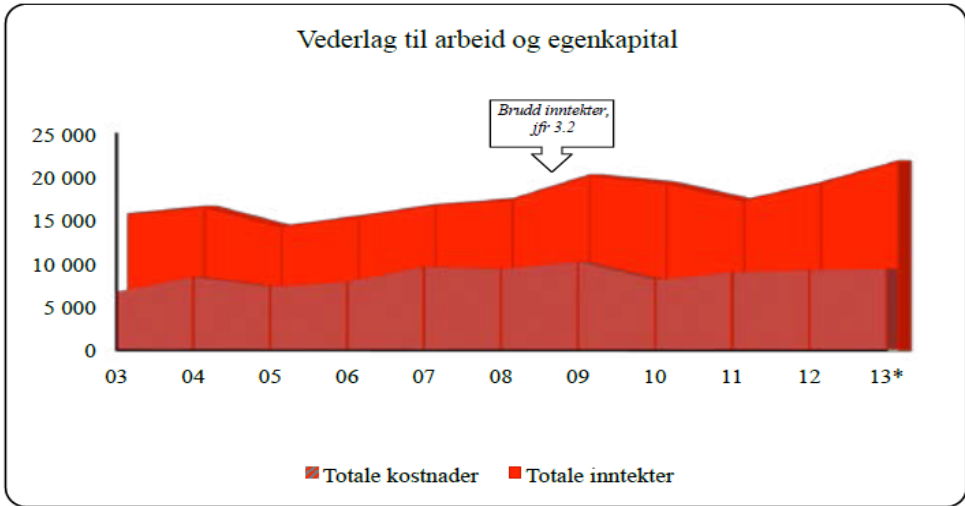


Figure 6.6 shows significant, and slightly increasing, profits throughout the period.

¹¹ The box marked ‘Brudd inntekter’ (breach proceeds) in this figure and a range of others from *Totalregnskapet* is the result of a reference from the *Økonomist utvalg* (2013:8-9). It explains that because of errors in reporting from slaughterhouses in the 2006-2009 period, meat proceeds for this period was not filled out in a way that was comparable to proceeds from the following years.

6.3.2.2 Sør-Trøndelag/Hedmark Reindeer Herding Area

Sør-Trøndelag/Hedmark reindeer herding area include three reindeer grazing districts within the established reindeer herding area. Two of these have a common winter grazing district, in the region along the border from Femunden to Stjørdalen, and the third, Trollheimen, has a special legal basis, further west.

Table 6.3 People, Reindeer Numbers, Herd Structure and Loss. Sør-Trøndelag/Hedmark. (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	Limit	1981	1991	2001	2005	2010	2013
Siidaandeler	-	28	33	30	30	30	30
People	-	97	125	150	151	154	150
Reindeer Numbers	13600	13345	14616	13015	13429	13805	12977
Females (%)	-	69	74	78			77
Calf supply (%)	-	-	79	80	76	76	75
Percentage loss - adults	-	-	-	5	7	6	5
Percentage loss - calves	-	-	-	14	-	21	20

Table 6.3 shows that the area has stable reindeer numbers, a high portion of female reindeer and a relatively high supply of calves, slightly decreasing over time. This is related to the increasing loss of calves. The level of loss in this area is clearly higher than in semi-domesticated reindeer herding districts.

Table 6.4 Slaughter Yield, Productivity and Slaughter Weights. Sør-Trøndelag/Hedmark. (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Slaughter percentage	53	63	58	53	45	52
Slaughter yield, kg per live reindeer	-	-	15,0	12,7	11,7	13,5
Production, kg per live reindeer	-	13,6	14,3	12,9	11,9	12,0
Average Slaughter Weight, kg						
– female (> 2 years)	-	-	33,6	31,8	34,8	33,0
– bull 1–2 years	-	-	33,6	32,0	34,2	33,9
– calf	-	20,2	22,1	21,5	22,1	21,2

Sør-Trøndelag/Hedmark has high productivity, but it is lower than in that of semi-domesticated reindeer herding districts. Productivity is decreasing somewhat over time as a consequence of increasing loss of calves. The slaughter percentage is also high. Moreover, slaughter weights are much higher than the criteria summarized in textbox 2. Figures 6.7 and 6.8 give an overview of income over the last ten years.

Figure 6.7 Income in Sør-Trøndelag/Hedmark 2003–2013
(Økonomisk utvalg 2013:132).

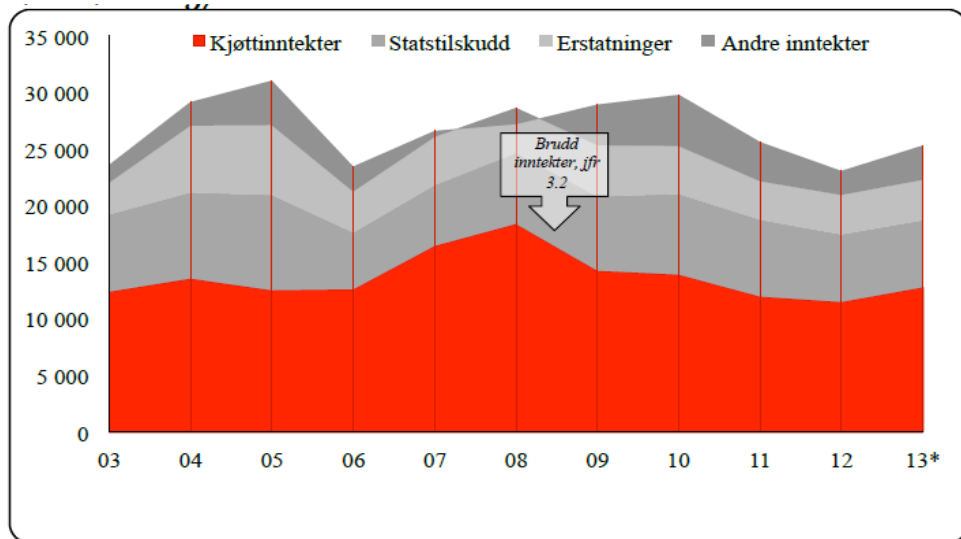
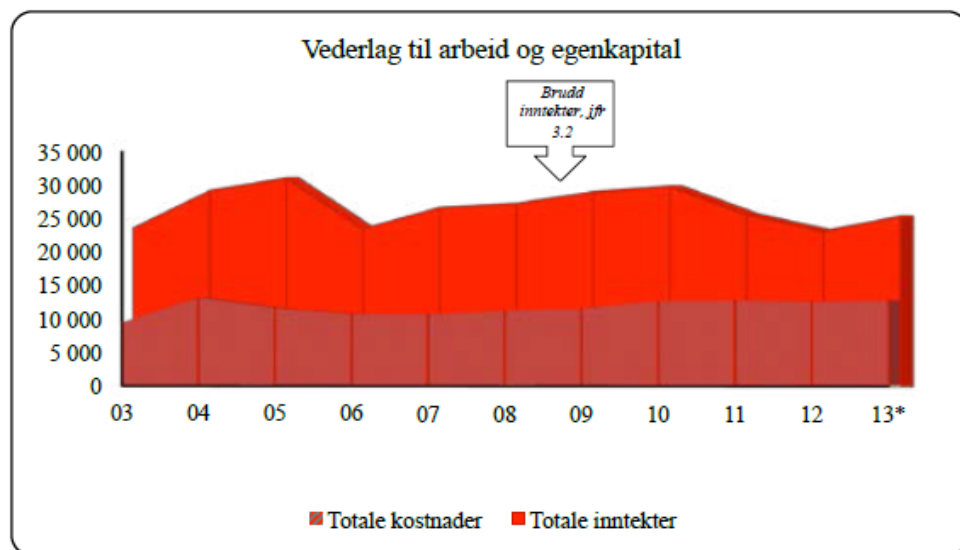


Figure 6.8 Income, Costs and Profits in Sør-Trøndelag/Hedmark 2003–2013
(Økonomisk utvalg 2013:133)



Figures 6.7 and 6.8 show that income in the area is high, but government subsidies and compensation constitute a higher portion of it than in semi-domestic reindeer herding districts. Profits are high and stable.

6.3.2.3 Nord-Trøndelag Reindeer Herding Area

The Nord-Trøndelag reindeer herding area includes six reindeer grazing districts. Four of these lie along the border¹², between Stjørdalen and Nordlad, and stretch towards Trondheimsfjorden and Namsen. The last two lie on the coast at Fosen and further out in Namdalen.

Table 6.5 Nord-Trøndelag. People, Reindeer Numbers, Herd Structure and Loss
(Reindriftingsadministrasjonen 1981–1991, Reindriftingsforvaltningen 2001–2014)

	Limit	1981	1991	2001	2005	2010	2013
Siidaandeler	-	42	38	38	37	39	39
People	-	131	169	181	174	190	177
Reindeer numbers	15900	10170	12475	13060	11976	13281	14074
Females (%)		62	75	79	77	75	76
Calf supply (%)	-	-	93	61	60	52	46
Percentage loss adults	-	-	-	12	13	10	10
Percentage loss calves ¹	-	-	-	35	-	44	50

¹Missing some figures because data is not comparable.

As shown in table 6.5, the area is somewhat larger than Sør-Trøndelag/Hedmark in terms of number of people. The herd structure is extremely productive but, over the last two decades, the area has experienced a dramatic decrease in calf supply because of increased losses. *Økonomisk utvalg* (2014) states that this area receives compensation for the greater portion of its losses due to predation. In other words, Nord-Trøndelag has the best-documented losses due to predation in the country.

Table 6.6 Slaughter Yield, Productivity and Slaughter Weight. Nord-Trøndelag (Reindriftingsadministrasjonen 1981–1991, Reindriftingsforvaltningen 2001–2014).

	1981	1991	2001	2005	2010	2013
Slaughter percentage	45	60	42	40	31	25
Slaughter yield, kg per live reindeer	-	-	10,4	9,5	7,5	7,2
Production, kg per live reindeer	-	15,8	9,6	7,9	7,9	7,7
Average Slaughter Weight, kg						
– females (> 2 years)	-	-	32,5	31,9	33,7	32,1
– bulls 1–2 years	-	-	30,2	30,3	31,2	29,4
– calves	21,4	21,8	20,3	20,0	20,7	19,2

According to table 4.6, Nord-Trøndelag has high to very high slaughter weights, for the most part well over indicator weights in textbox 2. Slaughter yield and production, after being very high earlier on, have come down to an average level. This has a clear connection to the increasing and large losses.

¹² The low coastal mountains in Nord-Trøndelag have given large parts of the area a relatively sub-oceanic climate, which can mean rain or mild weather in the winter.

Figure 6.9 Income in Nord-Trøndelag 2003–2013

(Økonomisk utvalg 2013:129).

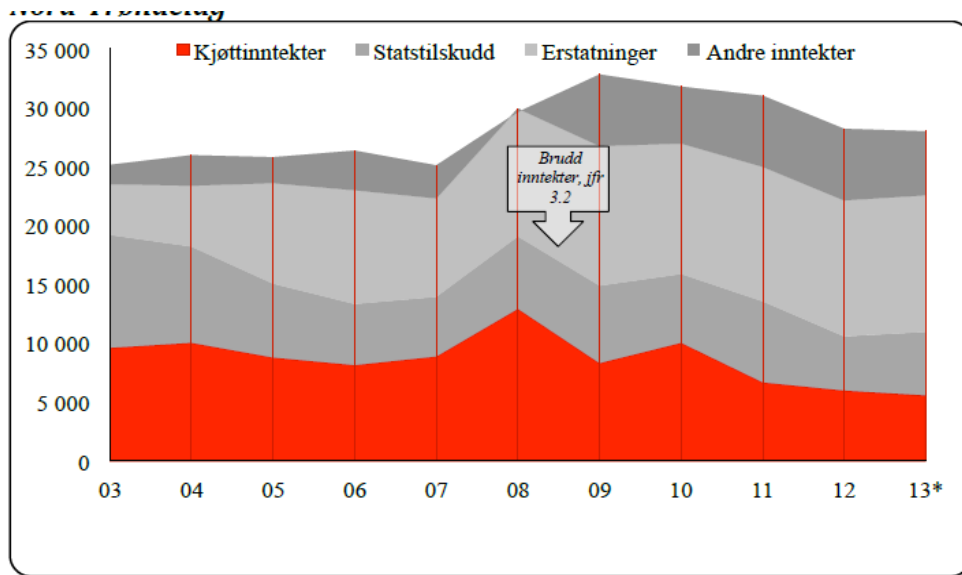


Figure 6.9 shows that compensation comprises an increasing portion of income in Nord-Trøndelag. Meat income has been decreasing to the point where compensation constitutes the largest percentage income over the last five years. To a large degree, the compensation replaces income lost to reduced slaughter.

Figure 6.10 Income, Costs and Profits in Nord-Trøndelag 2003–2013

(Økonomisk utvalg 2013:130)

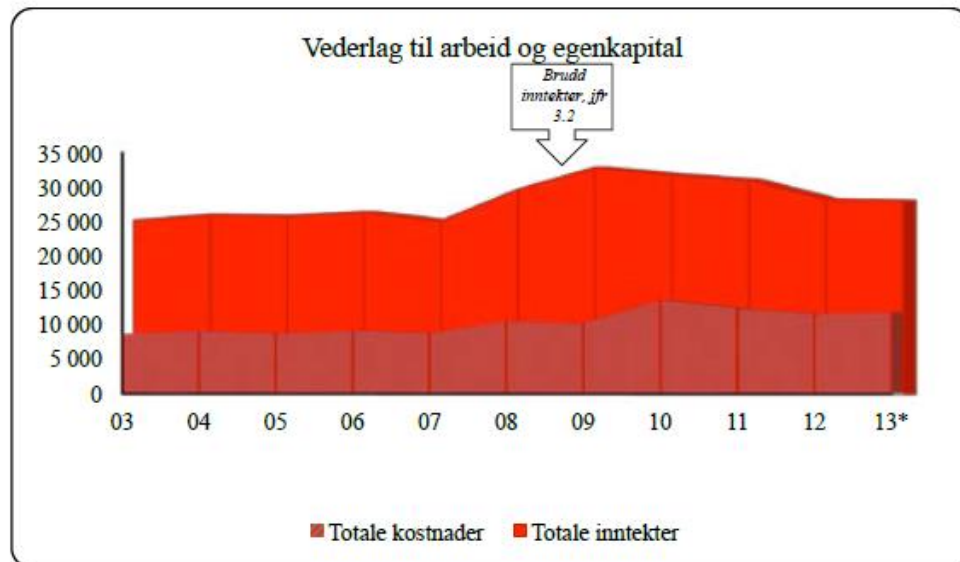


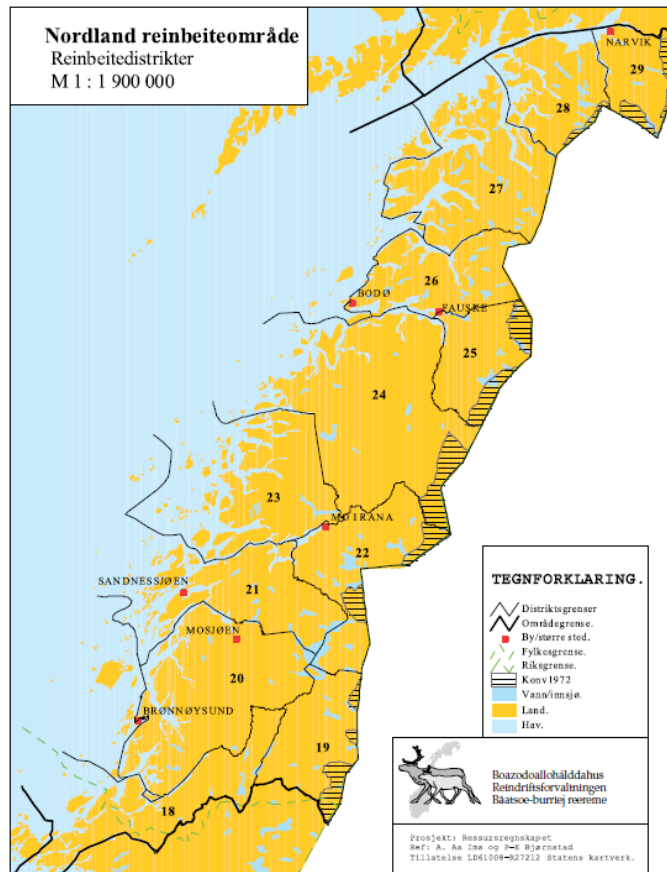
Figure 6.10 depicts the high incomes and large profits in the area.

6.3.2.4 Nordland Reindeer Herding Area

The Nordland reindeer herding area has 12 reindeer grazing districts which include the whole county, north to Vestfjorden and Ofoten (see figure 6.11).

Figure 6.11 Nordland Reindeer Herding Area. Reindeer Grazing Districts and Convention Areas

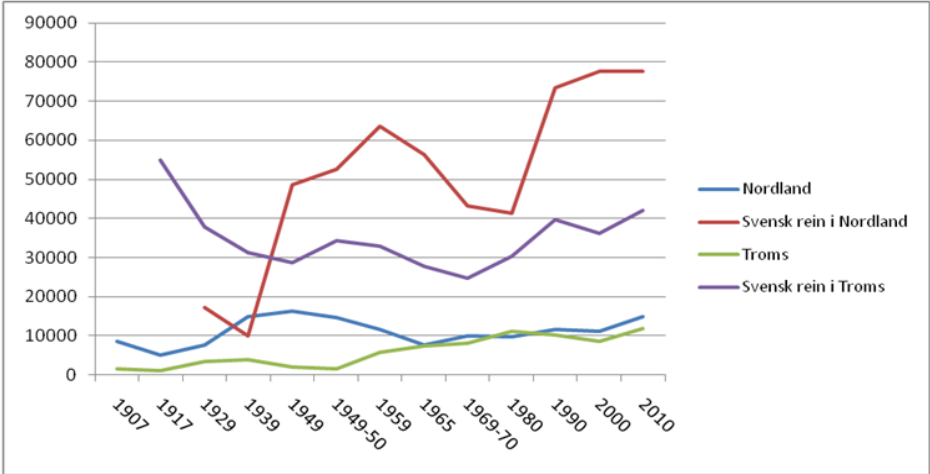
(Statens reindriftsforvaltning 2014: attachment not page numbered)



As commented for figure 6.3, reindeer migrate toward the coastal mountain range for summer grazing from both sides of the border (Norway and Sweden). Historically, this trans-border reindeer herding had been extensive. Since the end of the 1800s, Norwegian foreign policy has been to limit Swedish Sami reindeer herding in Norway as much as possible, primarily through the Norwegian-Swedish reindeer grazing land conventions of 1919 and 1972. Figure 6.11 shows the current convention areas for Swedish herders (marked in hatched lines).

Despite limitations throughout the 1900s, this industry is still several times bigger in terms of number of reindeer than the Norwegian Samis' full-year herding industry (see figure 6.12).

Figure 6.12 Reindeer Numbers for Nordland and Troms by County. Swedish reindeer in Nordland indicates reindeer numbers in Sami villages which have grazing rights on the Norwegian side of the border (convention areas) (Tømmervik og Riseth 2011:17)



The following presents statistics for Norwegian Sami reindeer herding in the area. The Nordland grazing area has twelve¹³ reindeer grazing districts.

Table 6.7 Nordland. People, Reindeer Numbers, Herd Structure and Loss (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	Limit	1981	1991	2001	2005	2010	2013
Siidaandeler	-	46	44	43	43	44	39
People	-	133	164	199	215	227	234
Reindeer Numbers	18200	8925	11580	11433	13774	15667	14318
Females (%)	-	53	66	69	63	67	70
Calf supply (%)	-	-	66	49	60	46	40
Percentage loss adults	-	-	-	12	12	13	15
Percentage loss calves ¹	-	-	-	46	-	47	59

¹³ A number of these formally comprise of several districts operated together as a unit.

Table 6.7 shows that the area is at the same level in terms of number of siidaandeler as Nord-Trøndelag, but that the area has a larger number of people. Reindeer numbers are stable. Herd structure is somewhat less productive than in Nord-Trøndelag, but the supply of calves is low and decreasing because losses are high and increasing.

Table 6.8 Slaughter Yield, Productivity and Slaughter Weights. Nordland
(Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Slaughter Percentage	14	34	21	19	14	13
Slaughter yield, kg per live reindeer	-	-	6,3	8,5	3,6	4,1
Production, kg per live reindeer	-	10,2	6,9	7,2	4,3	3,0
Average slaughter weight, kg						
– females (> 2 years)	-	-	36,6	34,4	35,7	35,1
– bulls 1–2 years	-	-	36,3	32,2	32,9	33,0
– calves	-	-	22,4	21,1	21,6	21,1

Table 6.8 shows that percentage slaughter is relatively low and decreasing. Productivity is decreasing and has become very low. This is due to high losses, especially of calves. Animals killed in traffic (especially on *Nordlandsbanen*) constitute a significant portion of these losses. Slaughter weights, however, are very high, clearly above the norms in textbox 2. This conforms to reindeer in these areas developing a more robust body size and higher tolerance for difficult winters (Tveraa et al. 2007).

Figure 6.13 Income in Nordland 2003–2013
(Økonomisk utvalg 2013:126)

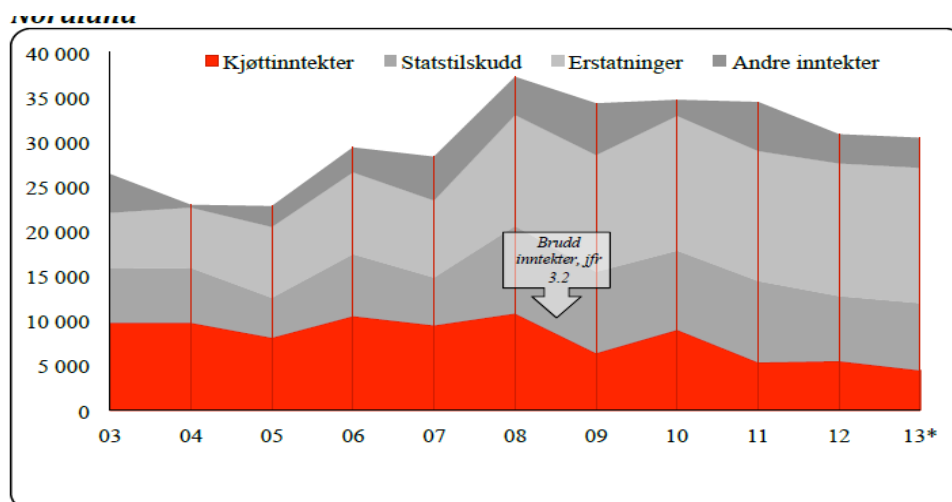


Figure 6.13 shows the same pattern as in Nord-Trøndelag: reduced meat income and increased disbursement of compensation. Over the last few years, compensation has become substantially higher than meat income.

Figure 6.14 Income, Costs and Profits in Nordland 2003–2013

(Økonomisk utvalg 2013:127)

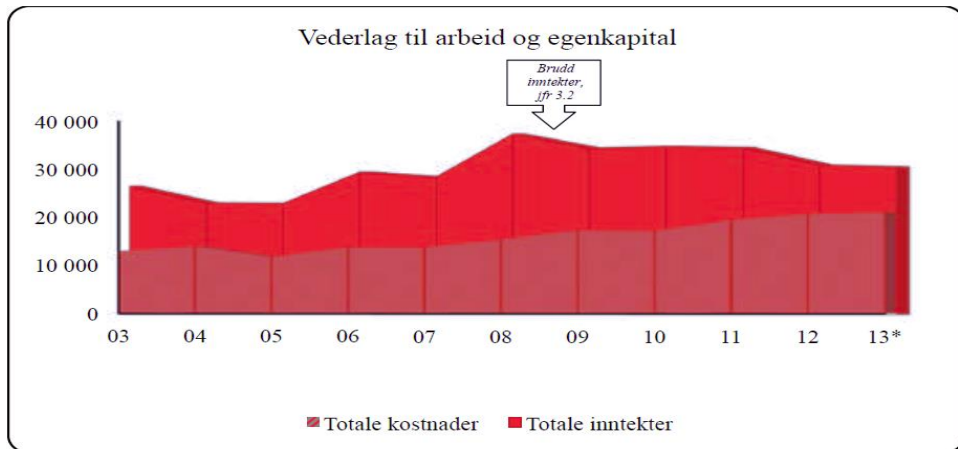


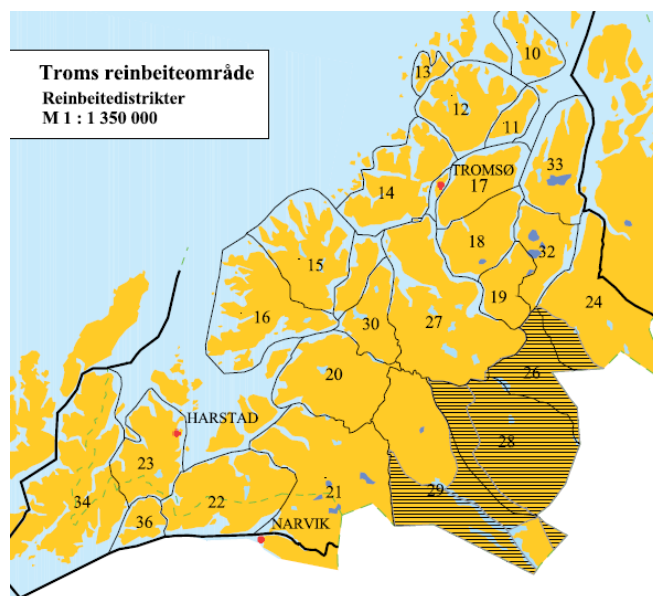
Figure 6.14 shows that the area has increasingly higher costs. *Økonomisk utvalg* (2014) points out that the costs are significantly higher than meat income. The increased costs result in decreasing profits.

6.3.2.5 Troms Reindeer Herding Area

The area for reindeer herding in Troms includes most of Troms, northward to Lyngen as well as parts of Nordland, north of Vestfjorden and west to Hinnøya (see figure 6.15).

Figure 6.15 Reindeer Herding in Troms. Grazing Districts and Convention

Areas (Statens reindrifstforvaltning 2014: attachment not page numbered)



Swedish Sami reindeer herders' convention areas lie in inner Troms with the central point in Bardu and Målselv. There are many geographical and historical similarities between this area and grazing land in Nordland. As figure 6.12 shows, both areas have a surplus of summer grazing resources and continue to have extensive summer grazing of Swedish Samis' reindeer. Prior to the first Norwegian-Swedish reindeer grazing convention in 1923, Swedish Samis practiced reindeer herding on most of the islands.

Troms reindeer grazing area has 14¹⁴ districts with North Sami reindeer. Three districts are convention areas for Swedish Samis and one district is unused. Three of the districts have winter grazing in Vest-Finnmark and are included in statistics for the area.

Table 6.9 Troms. People, Reindeer Numbers, Herd Structure and Loss
(Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Siidaandeler	66	44	48	50	47	48
People	192	164	183	160	166	170
Reindeer Numbers	15421	11267	7939	11260	12820	12955
Females (%)	-	75	66	63	68	68
Calf supply (%)	-	59	39	53	42	38
Percentage loss – adults	-	-	22	12	13	15
Percentage loss - calves	-	-	51	-	52	56

Table 6.9 shows that the portion of female reindeer is somewhat lower than in Nordland, while calf supply is low and fluctuating.

Table 6.10 Slaughter Yield, Productivity and Slaughter Weight. Nordland
(Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

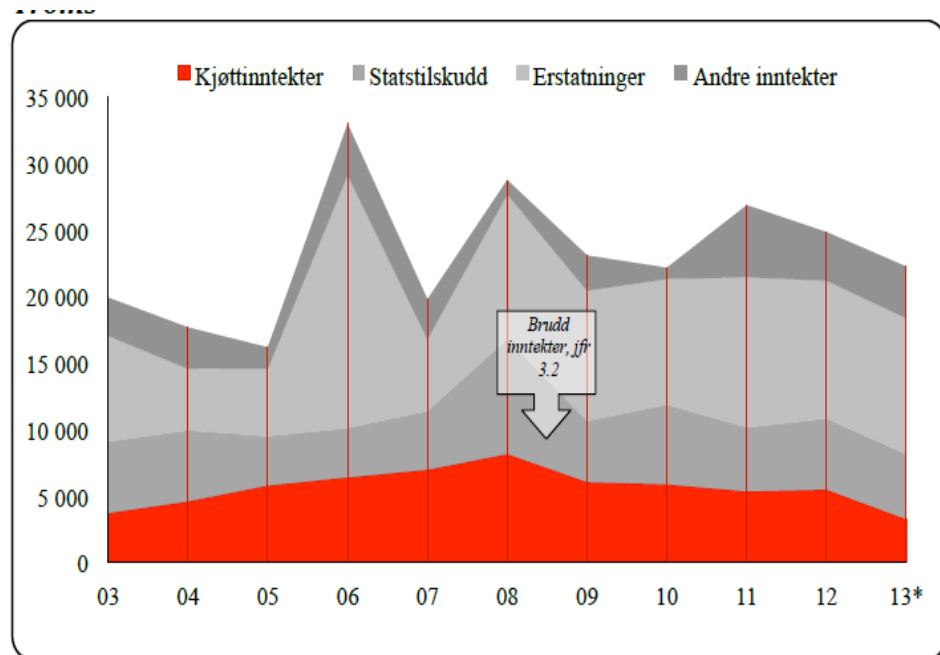
	1981	1991	2001	2005	2010	2013
Slaughter percent	14	19	8	15	14	12
Slaughter yield, kg per live reindeer	-	-	2,4	4,7	3,8	3,1
Production, kg per live reindeer	-	5,4	0,0	6,9	3,9	2,7
Average Slaughter Weight, kg						
– females (> 2 years)	-	-	41,4	35,2	34,6	36,4
– bulls 1–2 years	-	-	35,3	33,3	30,1	35,9
– calves	-	22,1	22,9	22,4	21,7	22,1

The slaughter percentage is extremely low. *Ressursregnskapet* explains it as such: “This is the result of a challenging winter grazing situation and loss to predation” (Statens reindriftsforvaltning 2014:28). Production is low and variable but the average slaughter weight is high.

¹⁴ A portion of these formally comprise of several districts operated together as a unit.

Figure 6.16 Income in Troms 2003–2013

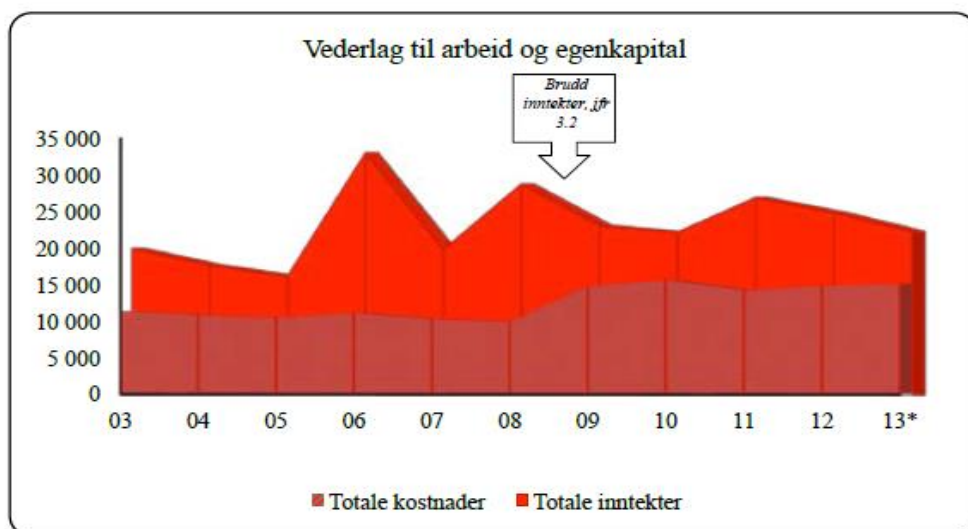
(Økonomisk utvalg 2013:123)



We notice in figure 6.16 that income from compensation is clearly higher than meat income, but rather variable.

Figure 6.17 Income, Costs and Profits in Troms 2003–2013

(Økonomiskutvalg 2013:124)



Figures 6.16 and 6.17 show that, as in Nordland, costs in Troms are significantly higher than meat income.

6.3.2.6 Reindeer Herding in Vest-Finnmark

Because of size and scale, Finnmark was gradually divided into sub regions. Such divisions have however only been used in the last few years so older statistics are less complete.

Figure 6.18 Overview of regions in Finnmark
(Økonomisk utvalg 2013:151)

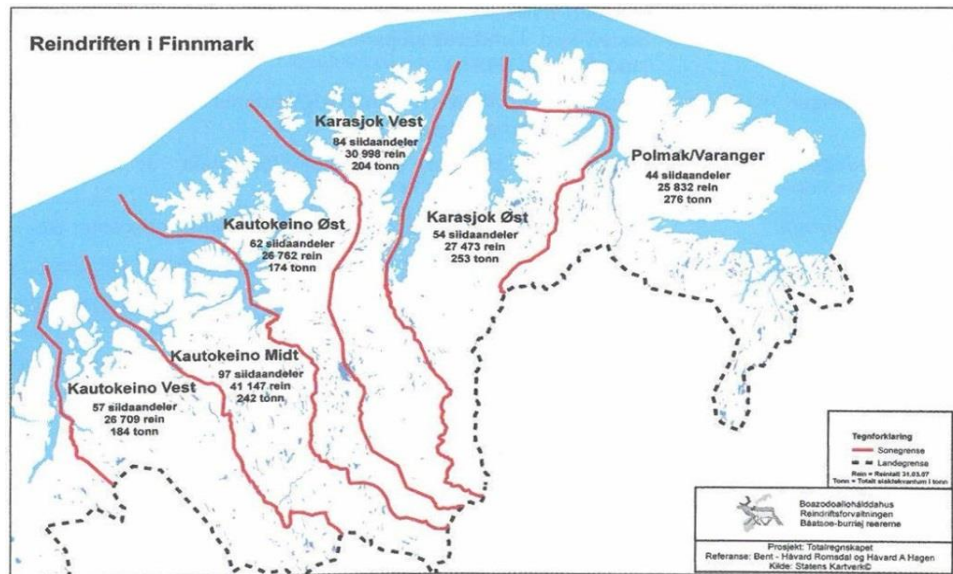


Figure 6.18 shows that each of the sub regions in Finnmark are significantly larger than the areas further south. The Vest-Finnmark reindeer grazing region has 25 summer grazing districts which are divided into three zones, eastern, central and western, with 7, 12 and 6 districts respectively. Each of the zones has one spring/autumn and winter grazing district. Figure 6.19 shows the development of reindeer numbers for each of the three zones in Vest-Finnmark.

Figure 6.19 Reindeer Numbers. Zones in Vest-Finnmark

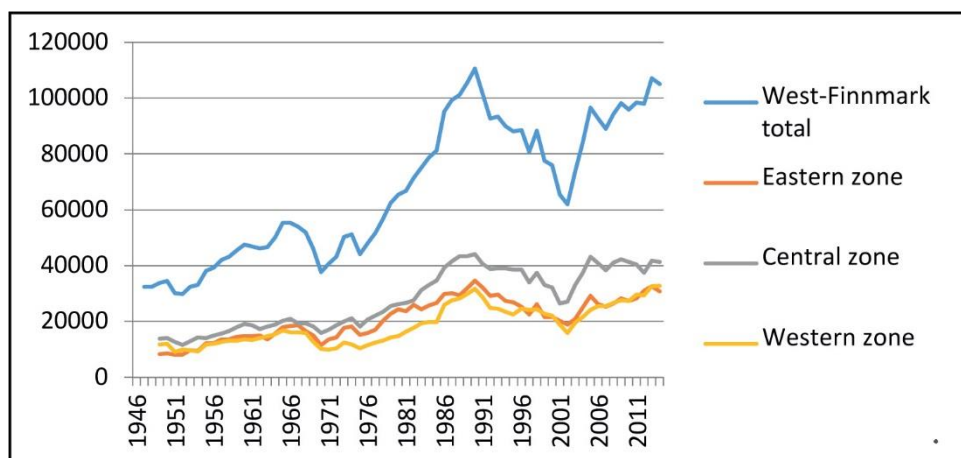


Figure 6.19 shows that the development of reindeer numbers is approximately the same for all three zones.

Figure 6.20 shows another division. The ten inner districts¹⁵ are the summer grazing districts in direct contact with autumn grazing areas. They therefore allow early residence because they are the closest. Reports from the administration also confirm how a number of siidas have taken advantage of this location (Riseth 2000, 2009). The 15 outer districts¹⁶ lie on islands or further out on peninsulas and are consequently furthest away.

Figure 6.20 Reindeer Numbers in Inner and Outer Districts in Vest-Finnmark

(own compilation based on data from *Ressursregnskap*)

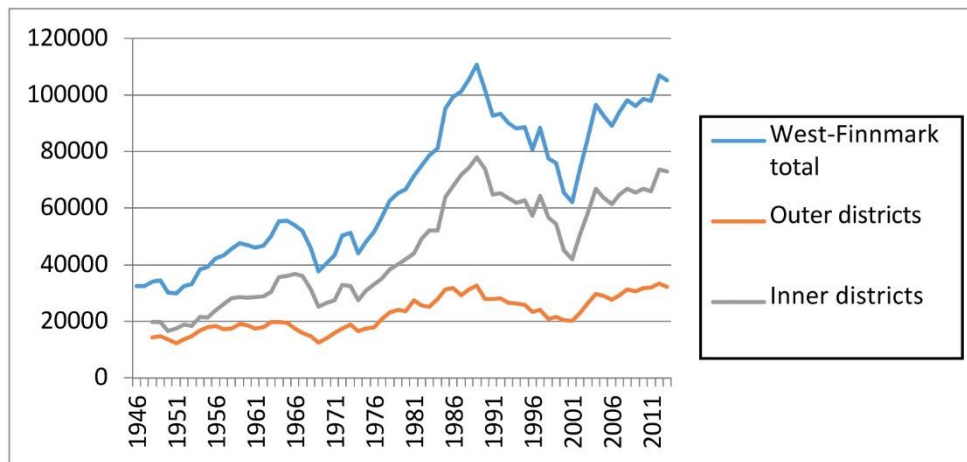


Figure 6.20 shows that the outer districts are losing the internal competition in reindeer herding in Vest-Finnmark. As we see in the figure, the differences between the two groups was probably 5000 reindeer in 1948. Within 65 years, however, reindeer numbers have more than doubled for the outer districts while quadrupling for the inner districts. The 15 outer districts are also the source of the dramatic variation in reindeer numbers in Vest-Finnmark.

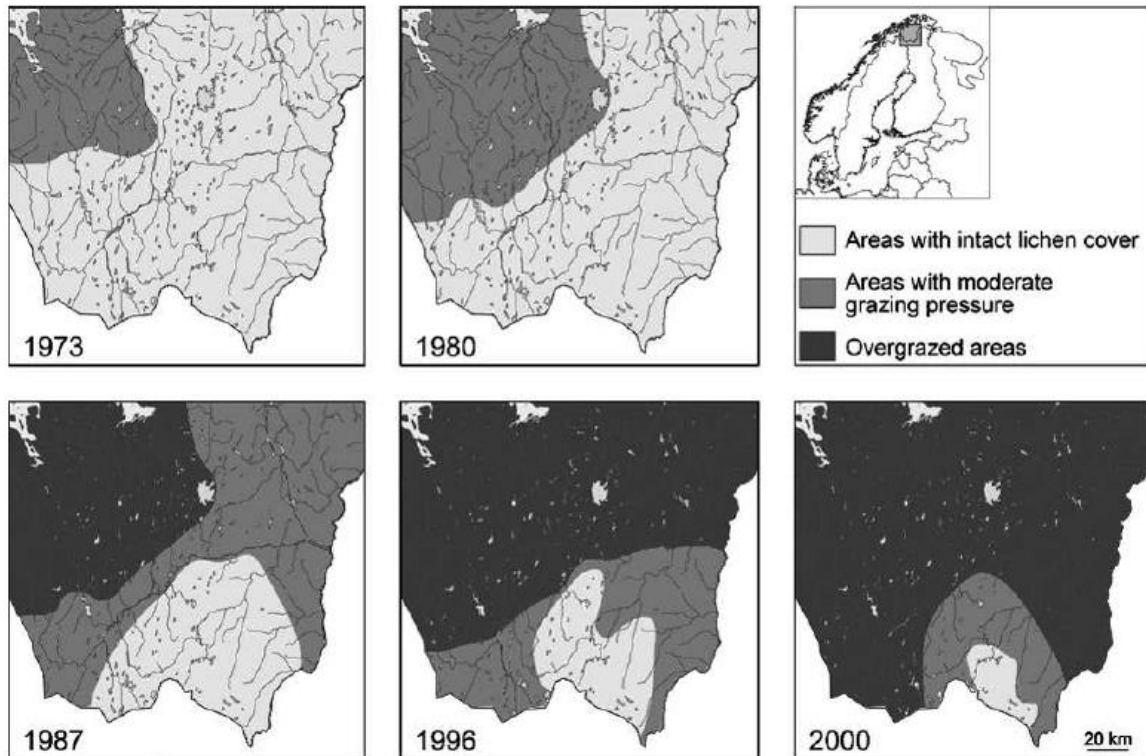
How this turns manifests itself on the ground proceeds from figure 6.21.

¹⁵ Seainnus/ Návvgastat, Lákkonjårga, Joahkonjårga, Spalca, Orda, Beaskádas, Ábborašša, Fávrossorda, Cohkolat og Beahcegealli.

¹⁶ Sállan, Fála, Gearretnjårga, Fiettar, Oarje-Sievju, Nuorta-Sievju, Stierdna, Cuokcavuotna, Seakkesnjarga ja Silda, Silvvetnjarga, Ráidna, Ittunjarga, Ivgoláhku, Skárfvaggi og Árdni/Gávvir.

Figure 6.21 Gradual Overgrazing of Spring/Autumn and Winter Pasture in Kautokeino and Karasjok

(Riseth og Vatn 2009:99 citing Johansen og Karlsen 2002)



The figure shows that overgrazing started in the northwest, in parts of spring and autumn grazing land and continued inland towards winter grazing land. The pattern was the same in Karasjok, but started later. As illustrated in figure 6.20, reindeer numbers reached a low point in 2001, but have since reached the same level as in 1990, around 2010. In the first part of the 2000s, while reindeer numbers were still low, a remarkably rapid regrowth of lichen took place:

“The investigations in 2005 showed that lichen cover had had a significant and rapid increase (up to 8.6-fold per year). Mean relative growth rate of lichen biomass was 0.083 ± 0.011 per year in open plots, which is considered very rapid recovery compared to previous studies. Lichen recovery was significantly faster on leeward ridges than on exposed ridges, and fencing alone did not have any significant effects on lichen recovery, but in interaction with time, fencing contributed to increasing recovery rates. The lichen heath recovery was reciprocally correlated with reindeer density. In addition, lichen recovery was probably facilitated by recent climate changes, viz. shallower snow depths which made leeward tundra and forest floor vegetation accessible for reindeer, and increased summer precipitation rates which improved growth rates. The results from this study show that in a very short time there was a transition from an overexploited depauperate vegetation and barren ground state to a flourishing lichen-dominated vegetation state, suggesting that the injuries were repairable. The vegetation transitions which have taken place in the study area are considered to be reversible with fewer persistent effects” (Tømmervik mfl. 2012:3).

Regrowth was therefore much more vigorous than expected. Both in public and political debates frequent dramatic statements have appeared about the catastrophic conditions on *Finnmarksvidda* (the Finnmark plain). Experts have also laid the foundation for oversimplified news items:

Sami reindeer herding damages the biological diversity of Finnmarksvidda. The problem is the size of reindeer herds. Winter grazing areas in all of inner Finnmark are nearly ruined. The only option to save Finnmarksvidda is to stop reindeer herding for 50 to 100 years. But that is probably not politically possible.¹⁷

This was also used in the Odelsting debate of the Reindeer Herding Act on May 31, 2007. A speaker from *Fremskrittspartiet* (the Progress Party) took up the question of whether the state was tough enough to adopt measures to reduce reindeer numbers to those stated above, with reference to this being said by “one of the country’s foremost experts”¹⁸. Further investigation shows something completely different but, as the article’s authors also point out, this improvement is not considered permanent. Later studies have also confirmed that as reindeer numbers increase, grazing land will decrease once more (Hans Tømmervik, et al). These studies however are not yet published. I will come back to other aspects of this development pattern later, in the summary for all of Finnmark, but will first present industry statistics.

Table 6.11 Vest-Finnmark. People, Reindeer Numbers, Herd Structure and Loss (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	Limit	1981	1991	2001	2005	2010	2013
Siidaandeler	-	243	288	236	227	209	209
People	-	1207	1402	1310	1297	1410	1467
Reindeer Numbers	78150	71333	91178	57318	90983	97013	105092
Herd Structure – percentage females							
Eastern zone	-	-	-	-	-	72	76
Central zone	-	-	-	-	-	74	74
Western zone	-	-	-	-	-	75	73
Vest-Finnmark	-	-	68	72	66	74	74
Calf Supply (%)							
Eastern zone	-	-	-	-	-	60	36
Central zone	-	-	-	-	-	48	45
Western zone	-	-	-	-	-	56	39
Vest-Finnmark	-	-	75	28	64	54	40
Percentage Loss - adults							
Eastern zone	-	-	-	-	-	8	10
Central zone	-	-	-	-	-	8	8
Western zone	-	-	-	-	-	8	9
Vest-Finnmark	-	-	-	18	10	8	9
Percentage Loss - calves							
Eastern zone	-	-	-	-	-	33	55
Central zone	-	-	-	-	-	44	48
Western zone	-	-	-	-	-	48	54
Vest-Finnmark	-	19	-	66	-	39	52

¹⁷ <http://www.apollon.uio.no/artikler/2007/reindrifft.html>

¹⁸ As far as I know, the professor in question has not personally worked with reindeer pasture.

Table 6.11 shows that Vest-Finnmark has gradually acquired a high percentage of female reindeer but that the supply of calves, roughly speaking, has fluctuated in relation to fluctuations in reindeer numbers and is now very poor.

Table 6.12 Slaughter Yield, Productivity and Slaughter Weights. Vest-Finnmark (Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Slaughter percentage						
Eastern zone	-	-	-	-	33	21
Central zone	-	-	-	-	30	26
Western zone	-	-	-	-	34	18
Vest-Finnmark	24	29	15	35	32	22
Slaughter yield, kg per live reindeer						
Eastern zone	-	-	-	-	7,2	4,4
Central zone	-	-	-	-	6,6	5,3
Western zone	-	-	-	-	7,1	3,9
Vest-Finnmark	-	-	4,2	8,0	6,9	4,6
Production, kg per live reindeer						
Eastern zone	-	-	-	-	7,7	3,2
Central zone	-	-	-	-	6,9	5,1
Western zone	-	-	-	-	7,4	4,3
Vest-Finnmark	-	6,7	1,2	8,0	7,3	4,2
Average slaughter weight, kg						
female (>2 years)						
Eastern zone	-	-	-	-	28,3	27,4
Central zone	-	-	-	-	26,2	24,1
Western zone	-	-	-	-	27,6	26,5
Vest-Finnmark	-	-	29,1	25,8	27,0	25,6
– bull 1–2 years (várit)						
Eastern zone	-	-	-	-	26,0	22,7
Central zone	-	-	-	-	23,6	23,3
Western zone	-	-	-	-	25,5	22,7
Vest-Finnmark	-	-	24,7	25,0	24,7	22,9
– calf						
Eastern zone	-	-	-	-	18,1	17,1
Central zone	-	-	-	-	16,8	15,7
Western zone	-	-	-	-	16,9	16,5
Vest-Finnmark	-	17,8	17,7	16,5	17,3	16,3

Table 6.12 shows that even though slaughter percentage varies (and they are low throughout) and production has decreased over the last few years, it is still lower than production. This is related to increasing pasture cover. This is confirmed by slaughter weights which are also decreasing and (with little exception) are clearly under the preferred numbers and lower than in all the areas south of Finnmark.

Figure 6.22 Income in Vest-Finnmark 2003–2013

(Økonomisk utvalg 2013:120)

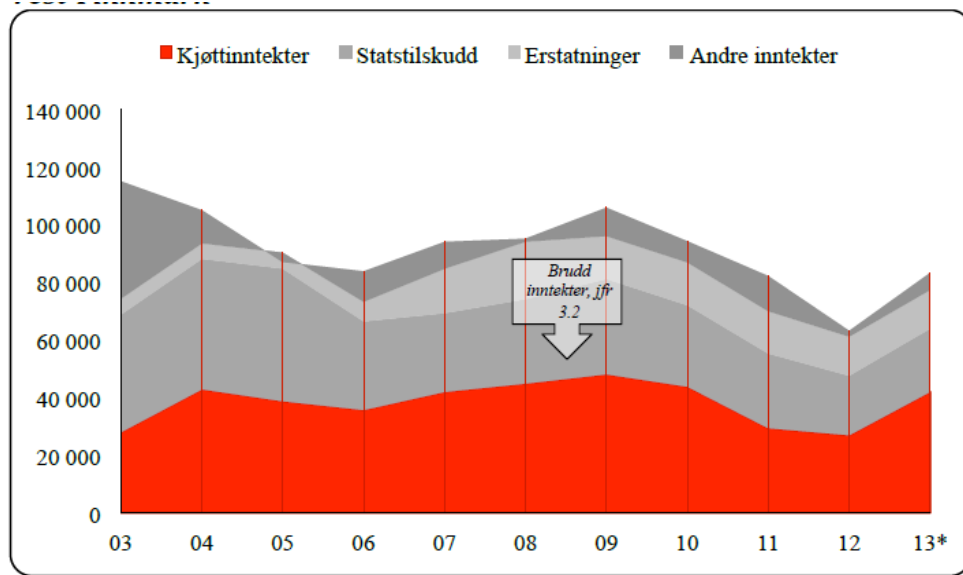


Figure 6.22 shows that incomes are relatively unstable and have decreased over time. State subsidies have decreased in the period because of more rigorous requirements to receiving subsidies.

Figure 6.23 Income, Costs and Profits in Vest-Finnmark 2003–2013

(Økonomisk utvalg 2013:121)

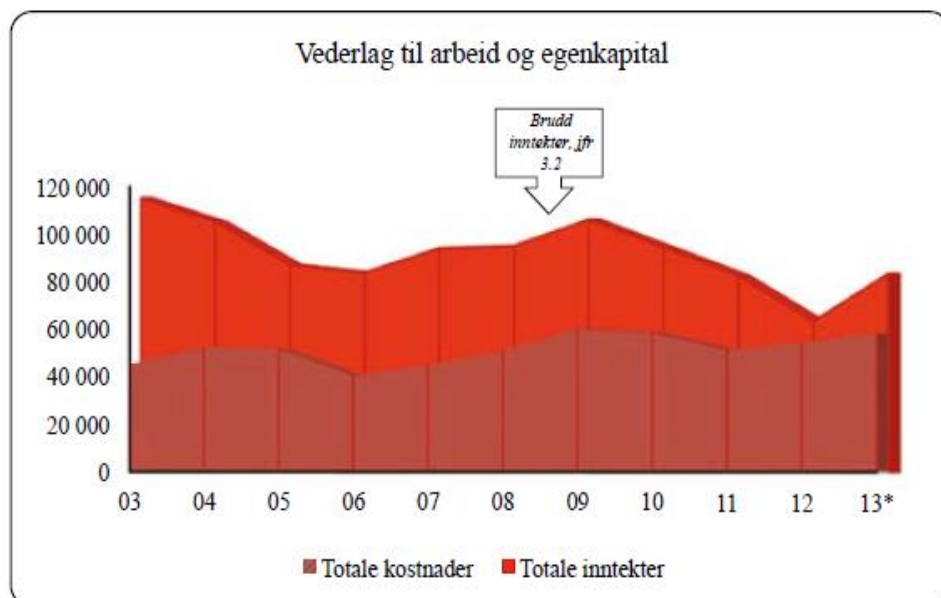


Figure 6.23 shows that profits are minimal and decreasing over time. In figures 6.21 and 6.22, we see that costs are higher than meat income.

6.3.2.7 Øst-Finnmark Reindeer Herding Area

In table 6.13, Øst-Finnmark is divided into three areas, with Karasjok divided by the Porsanger fjord into two zones. See also figure 6.18.

Table 6.13 Øst-Finnmark. People, Reindeer Numbers, Herd Structure and Loss (Reindrifstadministrasjonen 1981–1991, Reindrifstforvaltningen 2001–2014)

	1981	1991	2001	2005	2010	2013
Siidaandeler	203	213	219	188	179	168
People	777	739	749	858	955	903
Reindeer Numbers	56064	68797	46014	77616	87067	74454
Herd Structure – percentage female						
Polmak/Varanger	-	-	74	76	79	84
Karasjok – eastern zone	-	-			76	84
Karasjok – western zone	-	-	71	63	70	72
Øst-Finnmark	57	72	72	67	75	79
Calf Supply (%)						
Polmak/Varanger	-	-	52	74	56	75
Karasjok – eastern zone	-	-			56	30
Karasjok – western zone	-	-	34	72	49	39
Øst-Finnmark	.	78	41	72	54	49
Percentage Loss - adults						
Polmak/Varanger	-	-	8	7	8	10
Karasjok – eastern zone	-	-			8	20
Karasjok – western zone	-	-	14	7	8	9
Øst-Finnmark			12	7	8	12
Percentage Loss - calves						
Polmak/Varanger	-	-	38	-	20	17
Karasjok – eastern zone	-	-		-	30	58
Karasjok – western zone	-	-	60	-	43	52
Øst-Finnmark	-		51	-	31	40

Polmak/Varanger stands out with an extremely productive herd structure, good calf supply and limited losses. Karasjok also has a relatively high percentage of female reindeer but, as in Kautokeino, we see that loss and calf supply vary with reindeer numbers. Numbers for the last few years are very weak.

Table 6.14 Slaughter Yield, Productivity and Slaughter Weights. Øst-Finnmark

(Reindriftsadministrasjonen 1981–1991, Reindriftsforvaltningen 2001–2014)

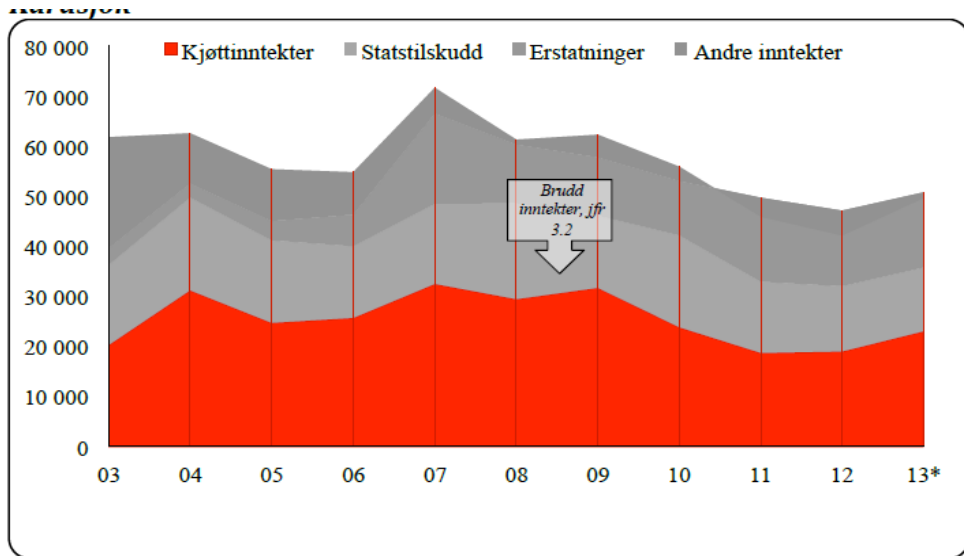
	1981	1991	2001	2005	2010	2013
Slaughter Percentage						
Polmak/Varanger	-	-	34	55	49	65
Karasjok – eastern zone	-	-			36	27
Karasjok – western zone	-	-	13	30	24	20
Øst-Finnmark	22	44	21	39	35	37
Slaughter Yield, kg per live reindeer						
Polmak/Varanger	-	-	8,4	12,1	10,6	13,1
Karasjok – eastern zone	-	-			7,5	5,9
Karasjok – western zone	-	-	3,7	7,6	5,5	4,5
Øst-Finnmark	-	-	5,5	9,1	7,7	7,7
Produksjon, kg per live reindeer						
Polmak/Varanger	-	-	7,2	12,4	9,3	8,8
Karasjok – eastern zone	-	-			7,2	-0,3
Karasjok – western zone	-	-	2,8	9,7	5,2	4,5
Øst-Finnmark	-	9,8	4,5	9,1	7,1	4,4
Average Slaughter Weight, kg						
– female (>2 years)						
Polmak/Varanger	-	-	31,2	29,8	30,5	28,3
Karasjok – eastern zone	-	-			29,0	29,8
Karasjok – western zone	-	-	30,5	27,2	25,8	26,2
Øst-Finnmark	-	-	31,2	28,0	28,1	28,1
– ox 1–2 years (várit)						
Polmak/Varanger	-	-	28,2	32,1	30,9	26,2
Karasjok – eastern zone	-	-			27,3	26,1
Karasjok – western zone	-	-	27,7	29,5	25,4	23,5
Øst-Finnmark	-	-	28,2	30,0	26,9	25,1
-calf						
Polmak/Varanger	-	-	18,9	19,4	19,6	17,8
Karasjok – eastern zone	-	-			17,6	16,9
Karasjok – western zone	-	-	17,8	18,4	16,3	15,7
Øst-Finnmark	-	18,0	18,9	19,0	18,4	17,4

In table 4.14, Polmak/Varanger stands out with very high and high slaughter yield per living reindeer, and a production and slaughter weight in accordance to the standards. Karasjok has low slaughter percentages and a production which varies with reindeer numbers. We will note that the numbers were usefull in 2005, after many years with more limited reindeer numbers. Slaughter weights are also, for the most part, under the standards.

The next two figures present the economic situation for Karasjok.

Figure 6.25 Income in Karasjok 2003–2013

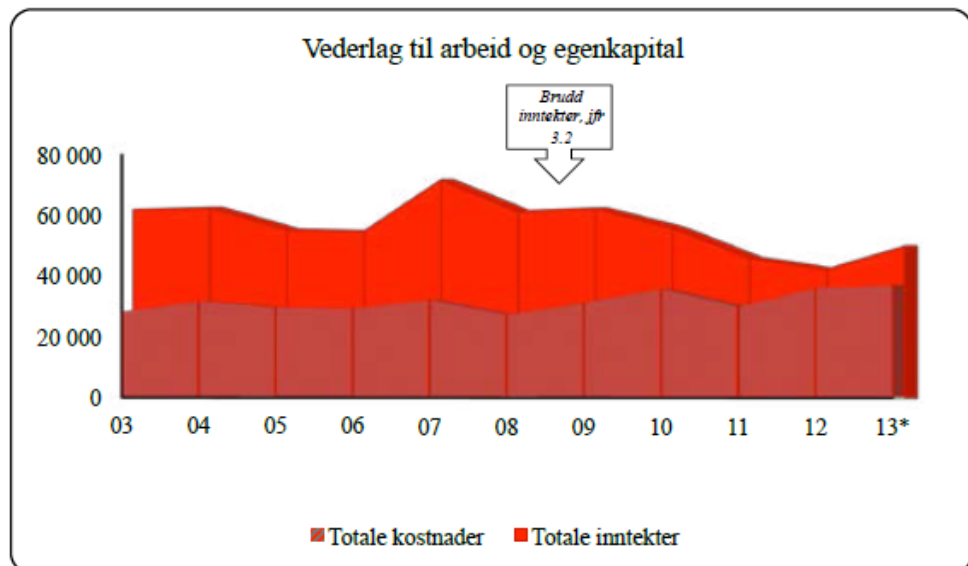
(Økonomisk utvalg 2013:117)



Meat income in Karasjok has been variable and is also reduced because of lower slaughter weights. This leads to reduced state subsidies.

Figure 6.26 Income, Costs and Profits in Karasjok 2003-2013

(Økonomisk utvalg 2013:118)



The combination of reduced income and gradually increasing costs leads to reduced profits. The following two figures present the economic situation for Varanger/Polmak.

Figure 6.27 Income in Polmak/Varanger 2003–2013

(Økonomisk utvalg 2013:114)

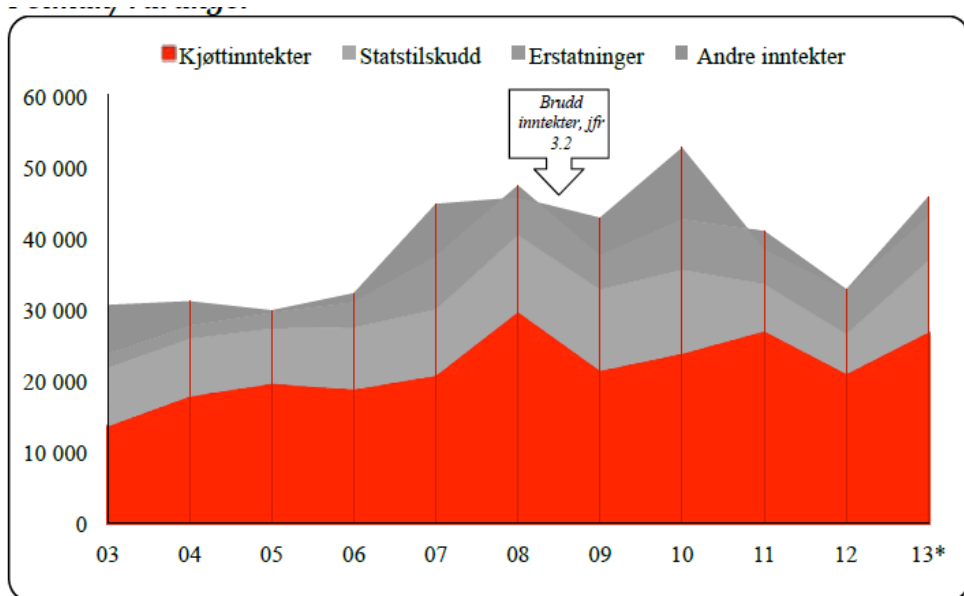
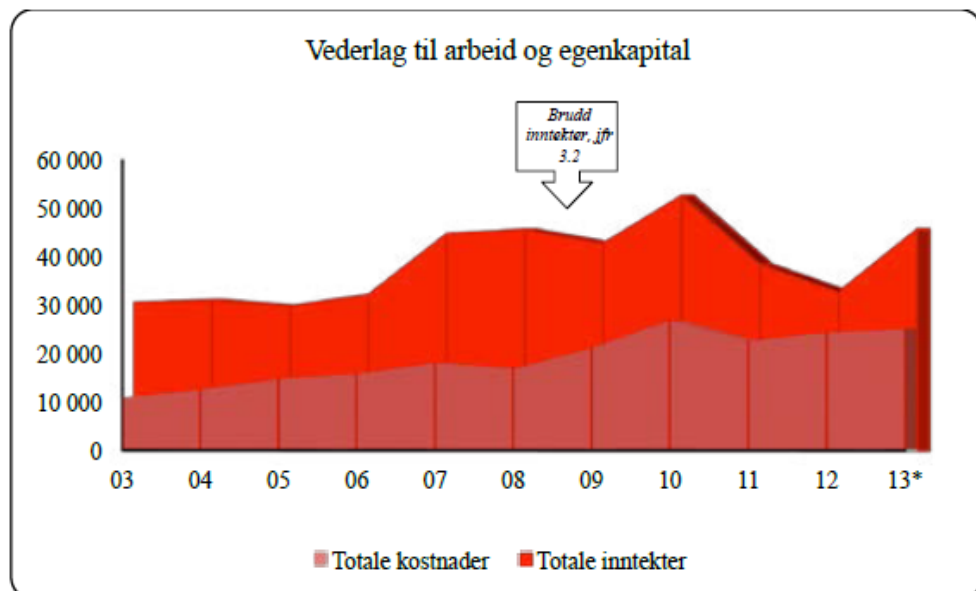


Figure 6.27 shows evenly increasing meat incomes for Polmak/Varanger.

Figure 6.28 Income, Costs and Profits in Polmak/Varanger 2003–2013

(Økonomisk utvalg 2013:115)



A comparison of figures 4.27 and 4.28 shows that Varanger/Polmak has a significantly better financial situation than the other areas in Finnmark.

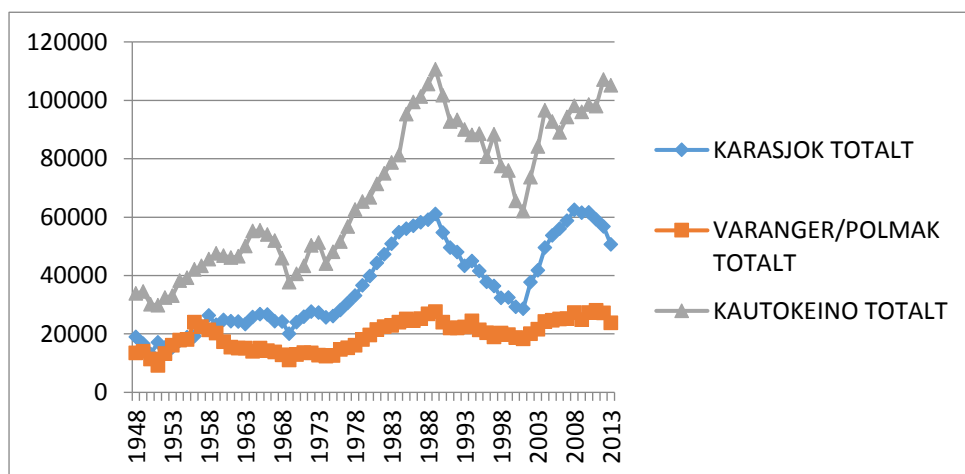
6.3.2.8 Finnmark Summary

As mentioned, Finnmark clearly has the best natural conditions for reindeer herding in Norway. Poor bedrock with good lichen pasture, and a dry and cold winter climate with little snow, provide stable and secure winter grazing inland. Nutritious bedrock in the mountain areas on islands and peninsulas provide lush summer grazing land.

Paradoxically, over the last forty years, this has spawned a considerable problem. In the 1960s, there was a clear surplus of winter pasture on the Finnmark plain. Large areas along the Finnish border were unused, and there was good space between the winter siidas (see also figure 6.21 and further developments until the turn of the millennia).

Figure 6.29 shows regional reindeer numbers for Finnmark for the post war period. We see that even though reindeer numbers in Polmak/Varanger have varied significantly, the fluctuations are much more dramatic in Karasjok and Kautokeino. In both, reindeer numbers have doubled in the course of a 25-year period and reached historic peak levels around 1990. Then, the numbers quickly decreased and halve in the course of a 10 to 12-year period. Reindeer herds have since grown quickly and approached the same peak levels.

Figure 6.29 Spring Herd Reindeer Numbers 1946–2012. Varanger/Polmak, Karasjok og Kautokeino (Own compilation based on data from ressursregnskap.)



The noteworthy thing about the development patterns in Karasjok and Kautokeino, and therefore on the Finnmark plain, is not that reindeer numbers are going up and down in long cycles, but (1) the unusually large variation, and (2) the low point in 2001¹⁹ which is actually higher than earlier peak values.²⁰ *This indicates that reindeer stability on the Finnmark plain now varies around double the levels of before.* To compare, the highest reindeer numbers in Polmak/Varanger²¹ are not much higher than the highest numbers in the 1950s²² (Tømmervik

¹⁹ Karasjok 28600, Kautokeino 62061

²⁰ Karasjok 27596 in 1972, Kautokeino 55455 in 1965

²¹ 28078 in 2011, 27608 in 1989

²² 24000 in 1956

et al. 2009). A historical change has therefore taken place, involving more intensive use of pasture land. The obvious explanation for this is the technological revolution that began in the 1960s, with muscle power – from reindeer and people – replaced by engine power from snowmobiles and helicopters. Simultaneously as motor vehicles allowed for both increased mobility and increased control of reindeer herds, they led to a cost explosion (Tømmervik et al. 2009, Riseth 2000, 2009).

The same revolution permeated all of reindeer herding in the course of a couple of decades, but remarkably enough it has not acquired corresponding consequences for grazing adaptations in other parts of Norway. Polmak/Varanger and South Sami areas represent the clearest contrasts to Karasjok and Kautokeino. There, limitations on reindeer numbers and modified herd structures formed the basis for stable finances, despite losses due to predation dating from the 1990s. It is clear that reindeer owners in these areas have chosen other strategies to meet the new cost pressures. The contrasts appear as we have seen earlier, in the condition of grazing land, slaughter weights, production, losses and finances. As reindeer numbers have increased, slaughter weights have decreased in both Kautokieno and Karasjok, and in the last few years are under the prescribed levels for sustainability. The losses, especially of calves, have also been high for the last few years. Reindeer density in various part of Finnmark are presented in figure 6.30.

Figure 6.30 Reindeer Density in Finnmark

(Statens reindriftsforvaltning 2014:18)

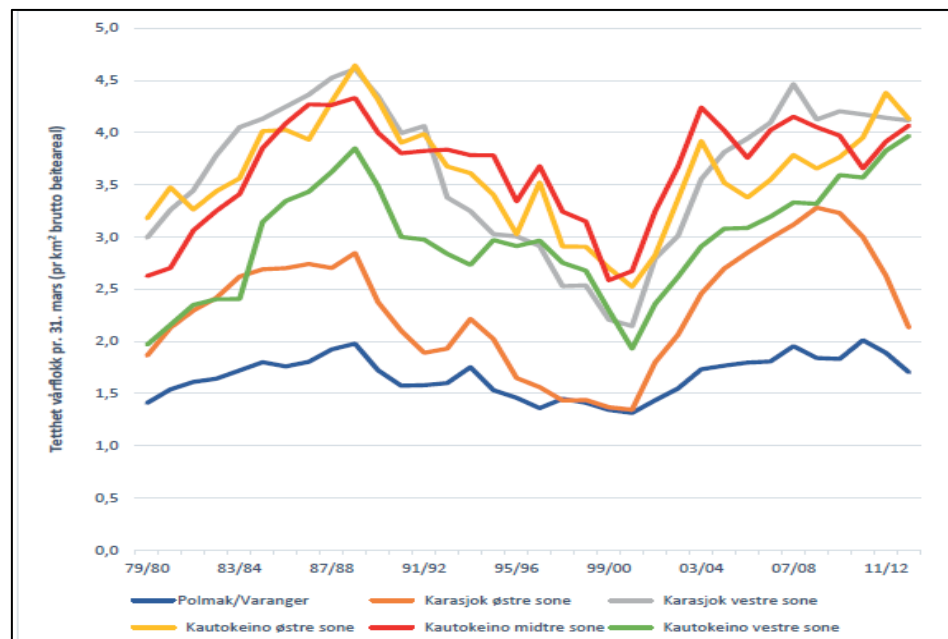


Figure 6.30 confirms that the reindeer density in Polmak/Varanger is more stable than in the other subregions.

The pressure on reindeer pasture in Finnmark is big, especially in areas used by several reindeer grazing districts while migrating between winter and summer grazing lands. In figure 6.20, I have shown that in Vest-Finnmark, the inland districts, which are the closest to winter grazing areas, have the highest reindeer density and the lowest slaughter weights. Coastal districts have

lower reindeer density and higher slaughter weights. I have not been able to uncover a similar pattern for Karasjok.

As previously shown, however, slaughter weights in Varanger/Polmak have held within the standards and production has been at a reasonably high level.

6.3.2.9 Overall Summary

This section summarizes the most important points in the regional reviews above.

Figure 6.31 Development of Reindeer Numbers – Areas South of Finnmark
(Statens reindriftsforvaltning 2014:20)

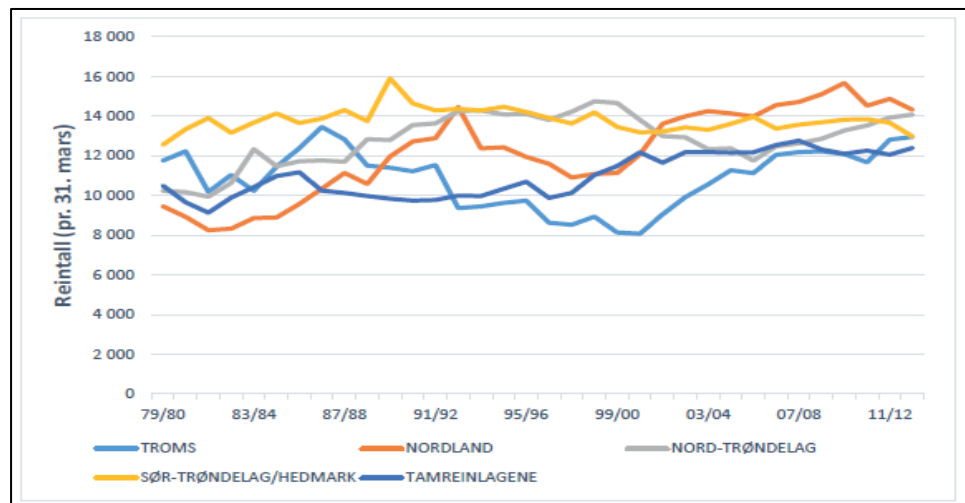


Figure 6.31 shows that the reindeer numbers in Sør-Trøndelag/Hedmark are fairly stable while somewhat fluctuating in Nord-Trøndelag. They fluctuate quite a bit in Troms and Nordland.

Figure 6.32 Average Meat Income per Reindeer. Production per Reindeer
(Økonomisk utvalg 2013:22)

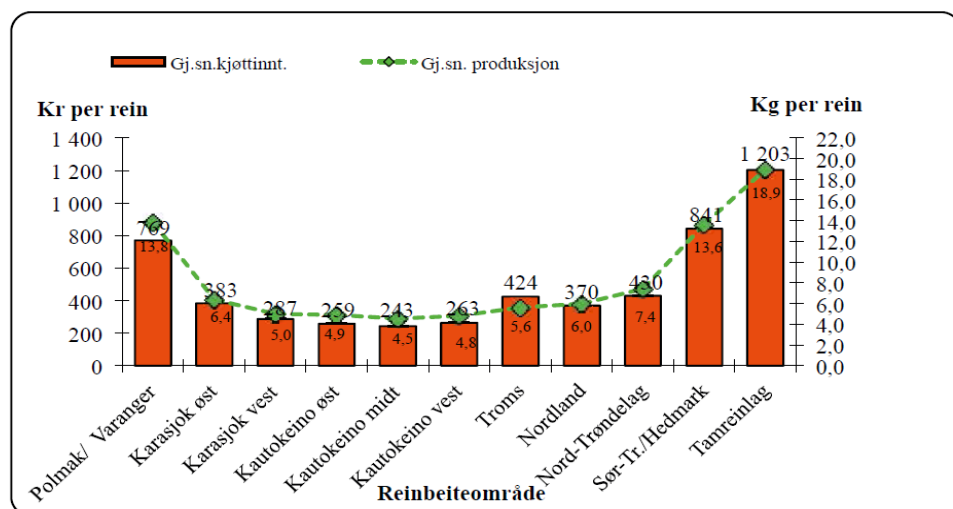


Figure 6.32 shows that there are major differences in productivity and meat income per reindeer in Norway. Semi-domesticated reindeer herds are in an exceptional position. Polmak/Varanger and Sør-Trøndelag/Hedmark are also at a high level. Further, Nord-Trøndelag numbers lie below standard. Troms, Nordland and Karasjok are even lower, while the rest of the zones in Finnmark are very much lower.

Figure 6.33 Average Meat Income per Siidaandel. Average Number of Reindeer per Siidaandel (Økonomisk utvalg 2013:21)

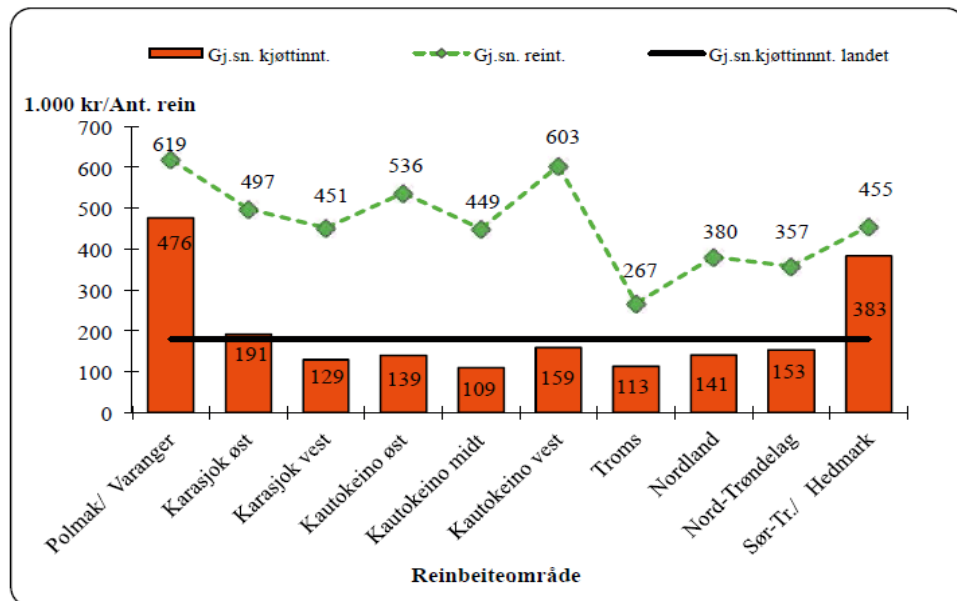


Figure 6.33 shows that meat income per siidaandel is high only in Polmak/Varanger and Sør-Trøndelag/Hedmark. We see that some of the Finnmark zones are close to the national average because of a relatively high number of reindeer in siidaandelen.

Figure 6.34 Income and Costs per Reindeer (Økonomisk utvalg 2013:54)

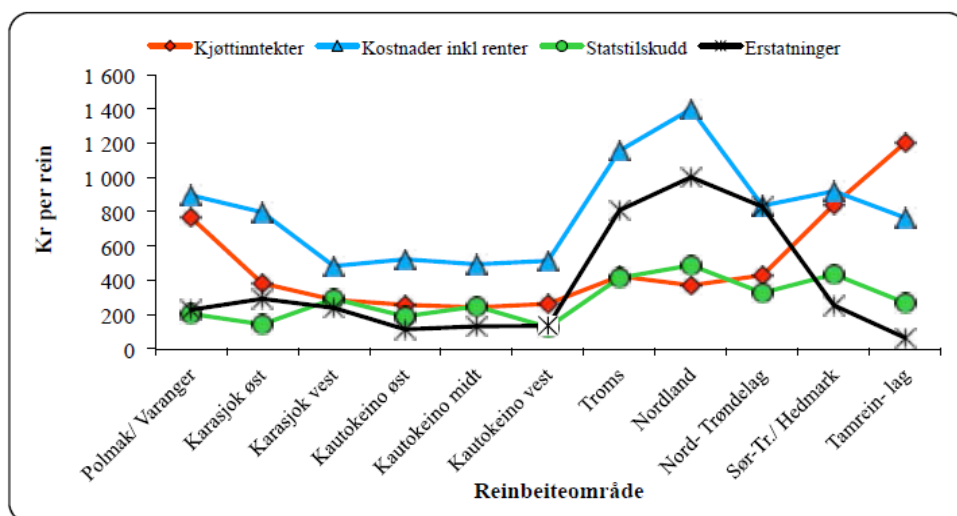


Figure 6.34 shows that only semi-domesticated reindeer herds, in Polmak/Varanger and Sør-Trøndelag/Hedmark, cover, or are close to covering, their costs with meat income, and that compensation plays a very important role in Nord-Tøndelag, Nordland and Troms.

Figure 6.35 Total Income and Costs per Siidaandel (Økonomisk utvalg 2013:56)

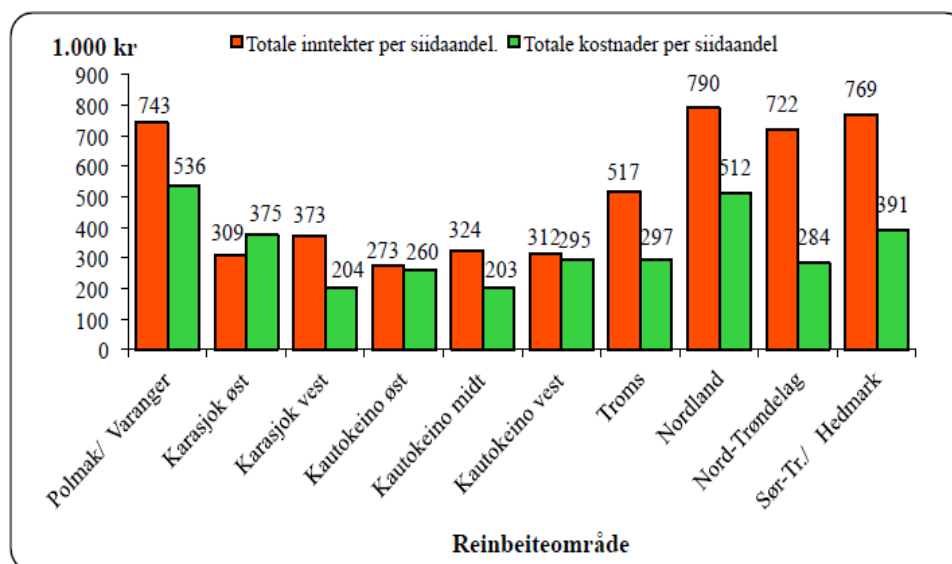


Figure 6.35 shows that most Finnmark zones have a small profit or a negative result per siidaandel, while Polmak/Varanger and areas south of Finnmark have a medium or large profit.

After this discussion, I will attempt to compare the results with theoretical approaches and incorporate ecological and historical factors to explain the findings.

6.4 Analysis and Evaluation

As figure 1 illustrates, sustainability in reindeer husbandry is dependent on both critical individual factors and the balance between the production and institutional systems. On the side of the production system, natural resources, primarily grazing capacity, are central. On the institutional side, one is dependent on both internal and external institutions and the balance between them.

6.4.1 Areas South of Finnmark

Semi-domesticated reindeer herding districts in Sør-Trøndelag have a relatively secure winter grazing situation, while Nord-Trøndelag is more influenced by the coastal climate. As the data shows, reindeer herding in the southernmost areas are, at the outset, well suited to the production with both optimized reindeer numbers and herd structure, cf. Figure 6.2. Semi-domesticated reindeer herding districts represent lengthy traditions in mountain villages in southern Norway. Many of the groups have had Sami herders as master teachers and acquired important inspiration from Sami culture (Bitustøyl 2013). Section 8 of the Reindeer Herding

Act allows for semi-domesticated reindeer districts as long as they do not conflict with wild reindeer areas. Semi-domesticated reindeer groups achieve high productivity and experience low losses.

Reindeer herding in Trollheimen is at peak levels within Sami reindeer herding. It is very productive with high slaughter weights. Within Sami reindeer herding areas, Sør-Trøndelag/Hedmark, along with Rias/Hylling, were the driving forces behind the productivity revolution in the industry around 1980 (Riseth 2000, 2009). This area, as we see in the discussion, still has good results but now has reduced productivity compared to earlier periods because of increased loss due to predation.

South Sami reindeer herding, south of Stjørdalen has had an especially difficult history. The political setbacks at the end of the 1800s had severe consequences here. For parts of this region, this was because use of land was not as continuous as in many other areas. However, the most important reason was that farming communities were expanding up towards the mountain, and that the 1800s was an especially nationalistic era where farmer conditions has big political support.

Samis in Trollheimen were especially hard hit when Trollheimen did not become a reindeer-grazing district according to the *felleslappeloven* and subsequently hit by a ban on semi-domesticated reindeer around the turn of the last century. Trollheim Samis therefore had the longest period and highest level of uncertainty. In the 1970s, owners interested in wild reindeer sued the local industry regarding grazing land. The Supreme Court pronounced judgement in 1981 and said that reindeer owners in Trollheimen did not have the individual right to practice reindeer herding on foreign soil. In 1984, the government announced a separate law (the Trollheimen Law) which was passed by parliament. The Ministry of Agriculture then started to grant licenses for reindeer herding. Even though this solved the problem of legitimacy, based on expert assessment, the formal framework for this reindeer herding industry is still too narrow and not secure enough. Reindeer herding in Trollheimen is well run and should have the opportunity to expand to include a higher number of reindeer than determined by the collective agreement of the last 30 years (Danielsen and Riseth 2010).

Felleslappeloven and investigation from the so called “Fjeldfinnkommissjoner” (Berg 1990), supported by “scientific” theories which made Samis into late immigrants in these areas (Jünge 2005), made it very difficult for reindeer herders within reindeer grazing districts to defend their interests against farmers who were expanding and constructing homesteads on reindeer herding’s most intensively used summer areas (melketrøer). This led to the industry’s decline around the last century (Fjellheim 2012). Reorganization and reorientation of reindeer herding in the Røros area, after the war until the 1980s, led to large production-related and economic progress from around the 1980s. South Samis were also leading the Norske Reindrifsamers Landsforbund (NRL – the National Federation of Norwegian Reindeer Samis) in this decisive époque, setting the foundations for the new reindeer herding policies with both the General Agreement on Reindeer Husbandry (1976) and the new Reindeer Herding Act (1978). This meant that they acquired a reindeer herding policy which fit their operational plans (Riseth 2000, 2009).

Especially throughout the 1990s, we see that even though reindeer herding policies, as sector policies, were successful in South Sami areas, the protection of reindeer herding areas were still too weak. In the Røros region, landowners started a succession of lawsuits in the 1980s and 1990s. The reindeer industry lost many of these with the Supreme Court deciding against it

citing arguments that undermined the industry's legal status within reindeer grazing districts. One change in the Reindeer Herding Act in 1996 strengthened the industry's position somewhat, but more important was a plenary judgement in the Supreme Court (Selbuddommen). It established that the industry's rights should be evaluated based on its own conditions. The pressure from the recreational community is significant and is increasing with time, especially in areas close to cities (Lie et al. 2006).

Until the beginning of the 1990s, the Nord-Trøndelag reindeer grazing area also had very favourable productivity numbers. Because of increasing numbers of predatory animals, the districts are now experiencing high to quite high losses. This means that production has decreased from very high to middling range.

Norway's implementation of the Bern Convention on the protection of wild animals and plants happened also without the industry's influence. Increasing numbers of predators has brought about significant loss to predation. This has affected Nord-Trøndelag the most and led to a marked decrease in productivity over the last two decades. Predatory animal statistics are not so simple to compile and documentation requirements are also difficult to fulfil, but the industry's expert assessments indicate that reindeer herding may be in danger of collapsing in some districts because too many production animals are being lost (Danell 2010).

Nordland and Troms constitute the central area in the region with an unfavourable winter climate (Tveraa et al. 2007). Slaughter weight data in the industry overview confirms the summary of Tveraa et al. that reindeer in these areas develop more robust body size and higher tolerance of difficult winters. The discussion also shows that both areas have reduced calf growth and productivity as a consequence of increased predation.

Both areas also have a surplus of bare or snow free areas (Reinbeitekommissjon 1967, Reinbeitekommissjon 2001). The industry overview shows that at least one district is not being used for herding. The current situation for cross border herding between Norway and Sweden has been unclear for many years. The Norwegian-Swedish reindeer grazing convention of 1972 expired in 2002 and was routinely extended by five years pending negotiations. In 2001, an expert committee presented their recommendations for a new convention that laid the groundwork for ecologically, economically and culturally sustainable cross-border reindeer herding. The commission's starting point was that in the case of intersecting interests across borders, Sami reindeer herders themselves should enter into local agreements, while the states should contribute with legislation that makes this possible (Pavall 2007). After this, two rounds of hearings and negotiations between the states have been carried out; the last concluded in 2009. The convention was signed by both states in 2009, but was not ratified. The process around the new convention recommendations has been very difficult.

Pending a new convention, Norway adopted a new law in 2005 which entailed the unilateral extension of the 1972 convention, while Sweden has maintained that without a convention, the *Lappekodusillen* applies. Absence of a valid convention has therefore acquired different consequences for Norwegian and Swedish reindeer herders. Swedish reindeer herders deny the legitimacy of the 2005 Norwegian law and have taken up residence in Troms, contrary to this law. Norwegian authorities have carried out forced expulsions, even from areas not used by Norwegian reindeer herders (Lenvikhalvøya). It could seem that Swedish authorities support "their" Samis by citing legitimacy of the *Lappekodusillen*, but Sweden's main negotiator from 2003 to 2005, Lars Norberg, has revealed a less flattering picture. In the convention negotiations in 2004, Swedish reindeer herders were asked for their opinion for the first time. The question

was whether they would accept further extensions of the 1972 convention. The answer was a unanimous no.

After Sweden said no to an extension, Norberg presented a strategy so that Sweden could demand that Swedish reindeer herders got back the areas they lost in 1972. A short time after this, the experienced diplomat was released from his duties (Norberg 2007). In September 2012, the Sami Parliaments in Norway and Sweden, along with *Svenska Samernas Ridsforbund* and *Norske Reindriftssamers Landsforbund*, received the task of developing a new Norwegian-Swedish reindeer grazing convention which would accommodate all partners' rights and interests. A transnational Sami working group, led by the Sami Parliament of Norway, presented the proposal new version in March, 2014²³. It is now up to the two states to make sure that 42 reindeer grazing districts and Sami communities finally get proper cross border access.

6.4.2 Finnmark

As of 2013, Finnmark comprises as much as 73% of all semi-domesticated reindeer herds owned by Norwegian citizens and has received the most public attention, including government attention.

As also shown in the last section, the state's policies regarding regulation of reindeer numbers in Karasjok and Kautokeino have failed completely. The reasons for this are complex. A basic problem is that there was no overall analysis of the special adaptations this type of reindeer herding required when the reforms from the end of the 1970s were put into effect. In practice, measures were taken which were essentially developed in dialogue with the South Sami reindeer industry, which happens on a much smaller scale and has another political history (Riseth 2000, 2009). The situation in Varanger/Polmak resembles the South Sami situation both in terms of fewer reindeer owners and in terms of the earlier development strategies focusing on calf slaughter and economic profits.

An institutional analysis emphasizes that the changes from the 1960s and 70s, both the technological revolution and the greater integration into wider society, created management needs that the industry's own institutions were not strong enough to look after. Summer pasture limitations, and an open landscape with few natural borders and a large number of reindeer households and siidas, also made these areas extra vulnerable to expansion (Riseth & Vatn 2009).

When it comes to Karasjok and Kautokeino, the grant schemes stimulated an investment in increased reindeer numbers (Riseth 2000, 2009, Hausner et al. 2012). Local and industry administrators, both made up of majority reindeer owners, set such high limits on reindeer numbers that the Reindeer Herding Act did not at all contribute to restricting the size of herds on the Finnmark plain in the 1980s. This is also part of the reason many large reindeer owners and siidas do not want restrictions (Karlstad 1998). The eventual halving of reindeer numbers in the 1990s was mainly the result of some very difficult winters.

The parliamentary report *En bærekraftig reindrift* (St. meld 28, 1991-1992) evaluated reindeer herding policies and set the stage for increased autonomy in the industry. At the end of the

²³ <http://www.regjeringen.no/nb/dep/lmd/aktuelt/nyheter/2014/mars-14/Norsk-svensk-reinbeitekonvensjon.html?id=753732>

1990s, NRL demanded that a new reindeer herding law be drawn up in keeping with the industry's own needs. The authorities complied with this demand. The committee investigating the new law consisted of a majority of Sami reindeer herders and had a leader who was widely supported by them. The investigation (NOU 2001:35) gave *siidas*, overlooked by the Reindeer Herding Act of 1978, a central place. As a starting point, the reindeer grazing districts got responsibility to regulate reindeer numbers by making *rules of use*. This agrees with modern common resources research, which (cf. textbox 1) advises the highest possible level of autonomy and limited government intervention. Further, there was comprehensive contact and dialogue between the department, the Sami Parliament and NRL in the period between fact-finding and the bill's passage in 2007. There seems to have been a reasonable amount of general agreement that the new reindeer herding act was serviceable (Gundersen & Riseth, 2013).

The new growth in reindeer numbers, however, added fuel to old frustrations for central authorities, especially the expert committee in the national parliament. Reindeer numbers in Finnmark have been pointed to in repeated parliamentary debates ever since the 1980s. Two cabinet ministers, Sponheim (in 2005) and Brekk (in 2011), went to the media with talk of compulsory measures to reduce reindeer numbers. In all likelihood, they needed to protect themselves against criticism from parliament. Nevertheless, the Office of the Auditor General drew up a report which led to central authorities changing their political line from dialogue to confrontation. The Office of the Auditor General has released two reports on sustainable reindeer herding in Finnmark. The first (from 2003) is about the management of the new reindeer herding act, while the second (Riksrevisjonen 2012) came after the new law was put into effect, after a rapid increase in reindeer numbers throughout the 2000s and insufficient follow-up of new decisions on maximum reindeer numbers. Following the parliament's handling of the report in January, 2013, the department gained the responsibility of requiring Reindrifststyret to impose proportional reductions of reindeer numbers on a series of districts and *siidas* which had not already developed statutory reduction plans. This has been faithfully followed up by the department and *Statens reindrifstforvaltning*.

I will use the last report of the Office of the Auditor General as a starting point here. The main findings in this report are as follows:

- 1) The goal of ecologically sustainable reindeer herding is still not realised. Large parts of *Finnmarksvidda* are overgrazed because of too many reindeer.
- 2) There are still some significant weaknesses in the Ministry of Agriculture and Food's management of the goal of sustainable reindeer herding, even though administration has improved. The sub goal of ecological sustainability is operationalised, while the sub goals of economic and cultural sustainability are not sufficiently operationalised.
- 3) Weaknesses have been uncovered in the use of the Reindeer Herding Act and Reindeer Herding Agreement to ensure sustainable reindeer herding.

(Riksrevisjonen 2012:9)

In its remarks, the audit first goes over the scale of overgrazing. Later, it points out that the average slaughter weights and meat yields are not within the limits of ecological sustainability, and points out that reindeer numbers must be reduced by 20%. The audit considers the parliament's goals as not being realized and points out that the economic situation for reindeer owners in Finnmark has worsened. Further, the audit says that it is not "possible to evaluate

whether reindeer herding is economically and culturally sustainable because the goals are not sufficiently operationalized”.

In its comments about the weaknesses in management, the audit point to missing explanations on how international obligations shall be taken care of, and how consultation agreements can be better used. It also states that it is unfortunate that the department has not made sure to realize *Reindriftssytrets* decision on maximum reindeer numbers.

Regarding the *Reindriftsavtalen*, the audit point to insufficient information on grant schemes' effects on reaching goals of sustainable reindeer herding. The Office of the Auditor General thinks that the process to pass rules of use, which should clarify use of grazing land and determine upper limit on reindeer numbers, has taken too long, and also stresses the importance of specifying rules of use for maximum number of reindeer in winter grazing districts. In addition, it points out that the department must take clearer responsibility for developing and implementing reduction plans.

The auditor general's recommendations were also in line with the comments, and, as mentioned, the ministry and parliament have followed up the case according to the auditor general's report.

My comments to the auditor general's assessment and the government's follow-up are many-sided. There is no doubt that the auditor general's description of the grazing situation and industry economics are correct. It is of course also very unfortunate that the authorities have not been able to follow up their own decisions and that decisions about upper limits on reindeer numbers in the most vulnerable areas, winter grazing lands, have not been decided. My agreement, however, stops here.

I claim that (1) the assessments and recommendations of the Office of the Auditor General are *inconsistent*, and that (2) both the audit's recommendations and the central authorities' follow-up are conspicuously permeated by an *instrumental thinking*. I will comment on this in detail.

First, the Office of the Auditor General is inconsistent when (a) criticizing the authorities for not having operationalized sub goals on economic and cultural sustainability, and therefore lacking the necessary control information, and then (b) recommending more effective administration and putting more power in accomplishing these decision. How is this to be understood? As long as the goal of ecological sustainability is superior to the goals of economic and cultural sustainability, why is it so important to have control information with relation to these criteria?

Secondly, it is conspicuous that the Office of the Auditor General sets up, and the ministry and parliament adopts without further ado, a change to a one-sided top down administration system:

“According to the Reindeer Herding Act, reindeer grazing districts, through rules of use, shall clarify use of grazing land and specify the upper limits of reindeer numbers. Rules of use are a prerequisite to reaching the goal of an ecologically sustainable reindeer herding industry. Despite the urgency in passing rules of use regarding maximum reindeer numbers to achieve an ecologically sustainable level, the process has taken four and a half years. The Office of the Auditor General deems this too long” (Riksrevisjonen 2012:9).

The authorities are then impatient because the processes between the industry and authorities are moving too slowly. This is not new. This was also a common theme in parliamentary debates on the reindeer herding act, and a repetition of earlier parliamentary debates all the way back to the 1980s (Gundersen and Riseth 2013). It may seem that the reason one is deciding now, is that one has bigger confidence in the authority of the new law than in the law of 1978.

Seen in a wider perspective, it is common for central authorities to be characterized as ruling from above. The conspicuous aspect here is that the central authorities have suddenly become impatient. Since the 1980s, these same authorities have failed to adopt resolutions and administer from above. In 2007, having passed a new reindeer herding act which, through districts and *siidas*, gives increased authority to the reindeer herding industry itself, the same authorities are impatient to let the new institutions become operational before intervening and overriding the whole process. One can rhetorically ask: what are four and a half years compared to over 30 years without positive results?

Even if there is a unanimous parliament behind this, I am worried about how the government's new attempt at control affects a possible solution. In the worst case, it can contribute to ruining and delaying it. Proportional reduction (with, if necessary, compulsory implementation) will clearly strike youth (with few reindeer) and others who have adapted by reducing, mostly, while the larger owners will once again emerge relatively unscathed. In other words, there is indication that the measures will have little legitimacy within the industry and that they would actually intensify internal conflicts rather than solve them. The most important is maybe that *an immediate reduction in reindeer numbers will be of little help as long as stable solutions, which hinder reindeer numbers from growing again, are not established. At a minimum, this will require internal agreement between the parties involved.*

Moreover, there is every reason to expect that with the great pressure on grazing land that there is now, nature itself, sooner or later, will make arrange a reduction, as happened in the 1990s. Due to both animal protection and economic considerations, affected reindeer owners should take responsibility for slaughtering before this happens.

We can nonetheless note that so far, reindeer owners in Kautokeino and Karasjok, or not enough of them, have not yet managed, or wished to, cooperate so that they maintain the industry's sustainability. Even though the high number of reindeer is a significant problem, I will point out that the authorities are ignoring one of the most important lessons from common resources research: *Successful resource administration is dependent on resource users themselves, in this case Sami reindeer herders, being responsible for solving their own problems. As mentioned, this was also the main intension of the new law.*

Research on common resources (see textbox 1) concludes that institutional systems where users have control over rules and conflict solving mechanisms should be established. These systems are the ones that become robust and can function for many generations. (Ostrom 1990). It is clear that there is a significant imbalance in the interaction between the production system and the institutional system in Kautokeino and Karasjok (see figure 1). There is a need to strengthen the capacity for institutional change. The Reindeer Herding Act of 2007 is fundamental to this.

6.5 Summary and Conclusion

In the introduction, I pointed out that sustainability is a very relevant theme for both international environmental policy and reindeer herding policy for over 20 years. I also emphasized that, seen in a historical light, sustainability as a goal in reindeer herding policy is not a given.

The Reindeer Herding Act of 2007 sets the ground for an ecologically, economically and culturally sustainable reindeer herding industry. I have pointed out that in order to assess whether these intensions are actually realized, one must be able to say which factors affect sustainability and how they work together. We must also be able to assess or measure how good sustainability is, or how it is developing.

At a primary level, I have used my own framework based on approaches from common resources research. This considers the interaction between the production and institutional systems to be crucial for sustainability. I have further drawn in the so-called design principles for robust common resources institutions and said that they should be able to give directives on how socio-ecological systems based on common resources can be administered in a sustainable manner.

6.5.1 Sustainability in Several Dimension

The Reindeer Herding Act of 2007 does not elaborate on what the various concepts of sustainability mean and the relationships between them. As mentioned above, ecological sustainability is fundamental for a natural resource based industry. Ecological sustainability therefore, centres around taking the best possible care of the natural foundation. Economics is often defined as stewardship of scarce resources. Cultural sustainability, in the Reindeer Herding Act as well as in §110a of the Constitution of Norway, refers to international law and to Norway's obligation to Samis as indigenous peoples.

For the time being, ecological sustainability has been put into operation only through the LMD establishment of indicators of ecologically sustainable reindeer numbers (2008). These criteria do not include the industry's contribution to biological diversity or how external threats to the industry, such as loss of grazing land, affect sustainability. Protection of resources, in a broader sense than protection of pastureland, is not included in the criteria.

Reindeer herding production theory (Lenvik 1989, Kosmo and Lenvik 1985) establishes a connection between ecology and economy. They established criteria for sustainability that as a first step optimize pasture cover. The second step, optimization of herd structure, is an element of economic sustainability, in the form of productivity. Other important elements in economic sustainability are levels of loss and cost, but one must also consider other economic factors.

Cultural sustainability is about the reindeer herding industry's value above the production of reindeer products for its own consumption and goods which can be traded for profit. As mentioned, it must include a connection to Sami and local mountain village traditions, respect for and valuation of Sami reindeer herders' inherited knowledge and problem solving strategies,

as well as maintenance of the reindeer herding industry to the extent that it gives grounds for an active local Sami community.

For the present, no political discussions have addressed what kind of balance there should be between these dimensions. Reindeer herding can, for example, be ecologically sustainable and have a few elements that are economically sustainable, while cultural sustainability can be weak because little consideration is given to inherited traditions, or the reindeer herding community is too small or attachment to Sami society too weak.

6.5.2 Evaluation

Seen in a larger context, reindeer herding's natural foundation is threatened by encroachment which represents the fragmentation and disruption of both grazing land and areas of operations. Because of politics regarding the north and authorities' support of the mining industry, there is reason to expect increasing pressure on land used by the reindeer herding industry in the future. This affects all reindeer herding in Norway. I therefore consider it worrisome that the authorities have discontinued area controls. The industry now lacks a regional political sector organ. Connection to both the county authority and the Sami Parliament is consequently obviously weakened (Riseth 2014).

Ongoing climate changes cause many challenges for the reindeer herding industry (Riseth et al 2009), not least of which is the expansion of forest areas in, for example, *Finnmarksvidda*, contributing to significant reduction of winter grazing capacity (Karlsen et al 2012). In bare ground (snow free) areas, reindeer herding will be an important contributor to curbing incrustation by maintaining sufficient pressure on grazing land. Herder et al (2004) showed that a reindeer density higher than 3-4 reindeer/km² holds back willow thicket in northern Finland. This study was carried out in areas with poor vegetation. On richer bedrock, significantly higher reindeer numbers were possible (Olofsson & Oksanen 2005, Riseth & Oksanen 2007, Tømmervik et al 2010) before biological diversity was reduced. At the same time, reindeer grazing is important for the survival of many vulnerable mountain plants (Olofsson & Oksanen 2005).

Considering the primary threats that I have outlined above, reindeer herding's overgrazing of lichen in Karasjok and Kautokeino is a limited problem. There is also reason to remember the unexpected positive results of the monitoring program for these lichen pastures: *Regrowth was much faster than earlier studies indicated* (Tømmervik et al 2012). Nonetheless, there is reason to emphasize that *large portions of reindeer herding in Karasjok and Kautokeino are neither ecologically nor economically sustainable*. The greatly reduced lichen pastures also lead (as in Finland) to additional feedings, sometimes using silos, which has received media attention as an incipient environmental problem. In addition, it is a big extra cost, and it brings reindeer herding out of the advantageous adaptation of only being dependent on natural pastures.

I have also presented a worry that the authorities' eagerness to manage can cause a derailment from the necessary processes of determining and reducing reindeer numbers. The spotlight should instead be directed to finding trustworthy methods of reduction where all involved can be positively affected. Moreover, one should further study winter grazing areas.

Nordland and Troms have three big problems. The first is difficult winters. One thing that can be done here is to get increased access to secure winter grazing in Sweden through the Norwegian-Swedish reindeer grazing convention. The second problem is too little utilization

of summer grazing resources. This can also be solved through increasing Swedish reindeer herders' use of summer areas, also through the Norwegian-Swedish reindeer grazing convention. It is therefore very important that the authorities follow up the work of the Sami working group, led by the Sami Parliament in Norway, and ratify the convention that the Sami partners agreed on.

The third problem is the increase in the number of predators. This problem is even greater in Nord-Trøndelag than in Nordland and Troms, and is also a clear problem in Sør-Trøndelag/Hedmark. It is necessary to significantly reduce the number of predatory animals in order to regain sustainability possible in these areas.

Reindeer herding in Trollheimen needs a more liberal framework (Danielsen and Riseth 2010). Data has not brought forth any sustainability problems in the semi-domesticated reindeer herding industry.

6.5.3 Conclusion and Recommendations

I consider the reindeer herding industry's sustainability problems to be due mostly to external conditions such as increased pressure on herding areas and a predatory animal policy that does not consider nature based industries. Large parts of the industry in Kautokeino and Karasjok are in ecological and economic imbalance, but adjustment of reindeer numbers cannot happen in an adequate and effective way without the authorities respecting Sami reindeer herders' culture and self-determination as per Norway's international commitments. Closing down regional administrations happened despite obvious protest from both NRL and the Sami Parliament.

To strengthen sustainability in reindeer herding, I recommend the following:

- 1) Authorities must use the upcoming parliamentary report on sustainability in reindeer herding to develop a policy for strengthening the protection of the industry's range of operations. Authorities must also emphasize reindeer herding's contribution to sustaining an open landscape and biodiversity.
- 2) The consultation agreement that was established in 2005 must be used more actively to develop a binding dialogue between Sami reindeer herders, NRL and the Sami Parliament. This will be more in accordance with the government's international obligations.
- 3) The authorities must give reindeer herding in Finnmark and industry organs peace to determine rules of use and subsequent reduction of reindeer numbers. Dialogue promotes mutual trust and it develops good attitudes.
- 4) The new reindeer grazing convention with Sweden, proposed by the Sami working group led by the Sami Parliament in Norway, must be ratified and implemented as soon as possible.
- 5) The authorities must develop a predatory animal policy which takes clearer consideration of the reindeer herding industry and other pastureland users.

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