

## 10. Climate Change and Pastoral Flexibility: A Norwegian Saami Case<sup>110</sup>

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The Scandinavian Sámi are one of more than twenty circumpolar ethnic groups that traditionally practice reindeer herding. Climate change will likely affect the practice of pastoralism in Sámi areas severely. Winter temperatures may increase significantly, while changes in precipitation and wind will affect snow patterns. Traditional Sámi pastoralism is well adapted to handling rapid change in extreme and often unpredictable environments, and past responses to climatic variability may offer clues as to how long-term and permanent climate change can be successfully managed. The paper argues that the key to successful management lies in maximizing herder flexibility in responding to changing conditions. Between the four nation-states that currently include Sámi pastoralism within their territories – Norway, Sweden, Finland and Russia – have a surprising amount of variety in their systems of governance. Due to limitations of space, our discussion here focuses specifically on the Norwegian case. We propose that in the face of climate change, timely adjustments are made to national governance structures, aimed specifically at maintaining and re-establishing conditions for pastoral flexibility. This will be key to ensuring the survival of Sámi reindeer herding – both as culture and as economic practice.

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## 10.1. Background

Indigenous reindeer pastoralism has been practiced in the Sámi areas of Scandinavia and Russia for centuries. The gradual solidification of national borders in the region – e.g. the border treaty between Norway and Sweden in 1751, and the border closure with Finland in 1852 (Eidheim 1999) – has had a dramatic impact on reindeer herding practices. Increasingly circumscribed by territorial sovereignty claims and the systems of governance established within them, reindeer herding has over time, developed differently within each respective country. (Jernsletten and Klovov 2002). Our discussion in this paper will focus specifically on the case of reindeer herding in Norway, drawing mostly on examples from the district (*fylke*) of Finnmark: the northern-most district of the country. Finnmark is subject to the most extreme climatic conditions as well as being home to the densest concentration of both reindeer and reindeer pastoralists (Reindrifftsforvaltningen 2008).

For most of the last two centuries, the Norwegian state has strongly pursued an assimilationist policy of “Norwegianization” towards the indigenous Sámi population. In recent years, particularly following the large-scale Sámi ethnopolitical mobilization during the second half of the 20th century, “Norwegianization” has generally given way to a more progressive stance on indigenous issues. Norway is today a signatory of ILO Convention 169 concerning indigenous and tribal peoples, and in certain respects – land rights, for example – the situation of the Sámi in Norway compares favorably to those in neighboring countries. All is not well, however – particularly in the case of reindeer pastoralism. Under the guise of “scientific rationalization” and “modernization”, the ongoing reform and restructuring of the reindeer herding sector has often continued along markedly ethnocentric lines; extending, for example, to the legal invisibility of traditional Sámi terminology and the introduction of key terms or concepts derived from sedentary Norwegian agriculture. Over the last two generations, the interventions of the Norwegian state have dramatically rearranged the face of herding itself, in a lasting and mostly irreversible manner. These changes coincide with radical shifts in lifestyle and consumption patterns, the mechanization of herding practice, increasing dependence on the cash market, demographic trends, as well as escalating tourism and other forms of regional development: e.g. road-building,

windmill parks, nature reserves, hydroelectric complexes. The current long-term prospects of reindeer pastoralism look precarious; factor in the likelihood of drastic and permanent climate change in the near future, and the question of sheer *survival* – of the practice, the culture and of the reindeer herding community – becomes pressing.

In the remainder of the report we identify four levels of pastoral flexibility as being particularly significant for meeting and adapting to the effects of long-term and permanent climate change. We also examine some of the principal factors that are currently impacting on this flexibility, including the role of the Norwegian state and its current system of governance. In the closing section, we consider some of the ways in which nation-states may not just hinder but also *assist* indigenous practices – specifically, Scandinavian reindeer pastoralism – in confronting and adapting to climate change.

## 10.2. Spatial flexibility

Reindeer are migratory animals. Herders exercise a distinct but limited degree of control over their movements, or their “territorial bindings” (Magga, Oskal and Sara 2001). The reindeer have a degree of autonomy, and often seek out necessary or favorable conditions on their own – locating grazing grounds, or patches of snow to escape insects for example. Under difficult conditions, this autonomy needs to be complemented by the skilled practice of human herders. The complex landscape of the north offers a plenitude of ecological niches; one of the key skills of herding lies in identifying and making use of these niches to meet the shifting needs and requirements of the herd. This, in turn, requires the ongoing and finely tuned observation of pastures, temperature conditions, ice and snow qualities, weather systems and wind directions: all factors which determine access to pastures and the behavior of the herd (Heikkilä 2006). Such monitoring is particularly important on the winter pastures, where the availability of feed through snow becomes vital and where, under certain circumstances, the ability to rapidly move a herd to appropriate grazing grounds can determine life or death for a large number of animals. Qualities of the snow-cover – such as density, hardness and depth – are key to determining access to forage, and therefore the suitability of winter grazing

grounds (Tyler et al. 2007). These qualities can vary rapidly and over short distances, depending on local landscape features, weather systems and other factors (Sara 2001).

Climate change will likely significantly impact reindeer herding areas (ACIA 2005). The paradox of extreme climates is that often – at least to local users who possess the necessary know-how and familiarity of the landscape – it is precisely the extreme climactic variation, which makes the land habitable (Ingold 2000). This applies to reindeer herding as it does elsewhere. As one herder put it:

“The more landscape types one has – that is, alternatives with which to meet different situations – the more secure reindeer pastoralism will be over a longer period of time. Contrariwise, in a uniform landscape without alternatives one is left helpless when faced with natural changes (within a season, between years) (Mikkel Nils Sara, quoted in Paine 1992).”

Presently, and for the last few decades, the range of spatial options available to Norwegian reindeer herders has been shrinking at an increasingly rapid rate. This is spun on by factors such as escalating motorization, real-estate and infrastructure developments, competing territorial claims by other stakeholders and the exponential growth of the regional tourism industry. Compounding this is a pattern of piecemeal restitutions for territorial losses where the value of an area of land is calculated in isolation without factoring the systemic or aggregated effect of multiple losses on long-term viability (Bjørklund and Brantenberg 1981). This has contributed to placing the spatial economy of reindeer pastoralism, at least in Norway, in a state of acute pressure. The damage caused by progressive loss of spatial options, as ecological niches disappear in the transfer of ownership to other actors, is compounded by structures of spatial governance that are often rigid and inflexible. The system of grazing districts sections off pastoral space, imposing strict timetables for migrations and establishing penalties for infringement. Similarly, national borders divide territories and limit potential access to ecological niches.

At least in Norway, one of the central problems in the state management of reindeer pastoralism has also been the insufficient appreciation, on the part of administrative bodies, of the complexities and unstable character of pastoral space itself. Appropriately, reindeer herders themselves refer to the “barnyard thinking” of the administration; shorthand for the assump-

tion, which often underwrites interventions and policy that the spaces of herding operate as stable, controlled, regulated and predictable environments – similar, in nature, to a barnyard. As we discuss in the next section, key environmental variables that significantly condition pastoral practice in Finnmark – such as predator loss and the loss of animals to extreme climatic conditions – have often been ruled out, explicitly, from the scientific models that underwrote management policy (Lenvik 1988, 1990; see also Reinert 2006). Effectively, the environments of the far north have been assumed to present an environment similar to the more placid south: controlled, offering stable climatic conditions. This has created severe discrepancies between theory and practice.

This “barnyard metaphor” has had serious implications for the relationship between administrative theory and pastoral practice. A successful system of reindeer herding governance must be premised on the assumption of an environment that is not stable and unchanging – but rather *inherently unstable*, and subject to rapid changes that may be cyclical but which are also generally unpredictable in nature. Any strategy at the national level to build climate change sustainability in reindeer pastoralism must urgently take this into account.

### 10.3. Herd structure

Crop diversification is a well-known adaptive strategy, particularly among cultivators in extreme environments (e.g. Bradshaw, Dolan and Smit 2004). By maximizing phenotype variation within their crops, Peruvian potato cultivators create robust crops with a wide spectrum of resistances, thus minimizing the risk of catastrophic crop failure caused by any specific given factor (van der Ploeg 1993). In comparison, mono-crop production produces (potentially) higher yields but requires carefully controlled environments and – due to genetic homogeneity – remains highly vulnerable to specific threats, such as pathogens or weather conditions, which can wipe out entire crops (Scott 1998). In the context of reindeer pastoralism, genetic and morphological variability within the herd – that is, compositional diversity – offers similar advantages. Not coincidentally, traditional definitions of a “beautiful herd” emphasize diversity and the interplay of different traits as an element of aesthetic appreciation (Oskal 2000, Magga 2006).

Conceived as one of the key points for rationalization – and thus, of interventions to raise productivity – the problem of herd structure illustrates succinctly the tricky entanglements of knowledge and power that inform relationships between herders and the state. At the most basic level, the problem concerns gender ratios. In the 1960s, reindeer herds in Finnmark typically comprised a large number of adult males – somewhere between a quarter and half, many of which were castrates (Paine 1994). Large males were required for transportation purposes, to help keep the herd gathered and the general level of activity of the females low. Bulls helped protect the herd from predators, and could more easily break crusted snow and ice, which opened the snow pack and provided access to underlying vegetation for the herd. Although there is considerable variation, today in large part due to efforts to “scientifically” maximize productivity – few herds in Finnmark comprise more than 10% large bulls (Nilsen 1998). The elimination of bulls is a result of incorporating reindeer herding into the output-maximizing mass production paradigm of scientifically rationalized agriculture.

In the name of maximizing meat output, scientific rationalization has shifted the ratios between males and females within herds. For the same reason, it has also tended to reduce and simplify genetic and morphological diversity within the herd. This reduction also reduces complex sets of traits to the simple standard for maximizing meat production. The traditional structural diversity of reindeer herds represents a coping strategy, aimed at reducing their vulnerability to the effects of unfavorable environmental conditions. In a manner analogous to crop diversification, the presence of a wide range of genetic traits and resistances within the herd serves to distribute and offset the risks associated with extreme and unpredictable environments. This principle is alien to the practices and ideologies of modern agricultural mass production (Scott 1998).

The rationalization-driven demand for higher meat yields has led to an overall homogenization of herds, with compositional ratios and animal traits selected to maximize the meat output of individual animals (Reinert 2006). While apparently rational, one danger of this strategy lies in its elimination of *survival value* from the meat output equation. In excluding survivability as a variable, it posits that the herd exists in a safe and perfectly controlled environment. In practice of course, particularly in the far north, this is anything but the case. By ensuring the survival of the herd as a whole and preventing the loss of other animals, reindeer with an *indi-*

*vidually* low meat output may play a vital but indirect role in maximizing the productivity of the herd. Consider an influential statement by the agricultural scientist Dag Lenvik:

“Within normal sheep rearing, meat production based on old uncastrated rams is unthinkable. No sheep farmer would use the winter feed – the marginal factor – on a herd of rams that produce less meat than the ewes can produce through the yield of lambs. Today, the line of thinking should be the same in reindeer herding. Male animals that are superfluous from the point of view of procreation occupy grazing grounds that could be employed, instead, for cows... A herd of male animals larger than what is necessary for good insemination results should in that case be based on factors other than meat production... such as tourism or special management techniques” (Lenvik 1990: 31–32)

To Lenvik, survival simply *does not figure as a variable* – his thinking on herd structure is entirely contained within the “barnyard metaphor”. He assumes that pastoral space operates as a safe, stable and homogeneous space and that herd structure can therefore be reduced to the question of maximized meat output. The article makes no mention of environmental or climatic variations at all, except to exclude them as potential factors to explain differences between herding in Finnmark and Trøndelag, to which Lenvik categorically states are “not due to predators or other natural circumstances” (1990: 34). In the context of our argument, Lenvik approach serves as an example – denoting the problematic relationship between the high-modernist, state-endorsed discourse of scientific agriculture, and the knowledge forms and practices of reindeer pastoralism. Significantly, Lenvik himself is today no longer directly involved in reindeer herding administration, and in recent years there has been a move towards greater recognition of the impact of local environmental variables on reindeer herding practice, particularly in Finnmark. Analogously, forms of indigenous herding knowledge today benefit from a greater degree of recognition, and there are coherent efforts to integrate them in both scientific research and policy.

Of course, simplified herd structures and an increased orientation towards maximizing meat-output have not only been the result of managerial ideology, or state-backed efforts at scientific rationalization; practical factors also play their part. For example, the increasing prevalence of extensive herding methods driven by factors such as the mechanization of herding practice, larger herd sizes and changing demographic patterns (Beach 1981) – have

contributed to a changed relationship between herder and the herd in traditional practices. For example, herders spend less time in close contact with individual animals, and decreased engagement with the herd takes place on different terms (Paine 1994). More and more, herding practices require less knowledge of individual animals for managing the herd as an aggregate. With this change, the complex classificatory taxonomies of traits and characteristics that were relevant two generations have adapted accordingly (Bjørklund 2004). Over the course of the 20th century, herd structures have also changed to meet the changing requirements of herders themselves. This change is exemplified in herd structure's increased integration into the market, and their dependence on commercially available products such as fuel for snowmobiles (Pelto 1973). These factors off-set the significance of state administration and any future policies that address herd structure as being a problem for climate change adaptation.

The consequences of simplified herd structures and reduced heterogeneity remain largely unknown, and circulate at the anecdotal level. For example, some herders say the dispersion pattern of female-dominated herds across the landscape has changed (Reinert et al. in press). According to herders, a herd with few bulls is also far more “nervous” and more exposed to predators than a traditional herd. There is need for further analysis of this – but given, what we know, it seems reasonable to assume, that the effects of altered herd structures on climate change vulnerability will be negative. As part of an overall strategy to ensure adaptive capacity, we would recommend that increased morphological and genetic variation within the herd be encouraged. Despite the increased recognition granted to indigenous herding knowledge, there is still a pressing need to systematically address the problematic relationships between scientific and traditional knowledge in reindeer herding – both in herd structure and elsewhere.

## 10.4. Production

Meat-production has been one of the key areas for state intervention into pastoral practice for the last few decades – certainly, since the first reindeer herding agreement of 1976. Keywords here have been rationalization, industrial mass production, orientation towards mono-crop meat production, regularization of production cycles (that is, stabilizing the meat output of the

industry), centralization of production facilities and the professionalization of the herder community. This is one area, where the environmentally conditioned specificity of pastoral practice manifests in force. Fresh reindeer meat is a seasonal product. Animals are only slaughtered during autumn and winter. Decisions concerning which and how many animals to slaughter are also made, year by year, on the basis of long-term strategies, cash-flow situations, the overall condition of the herd and estimates concerning coming years or market fluctuations. The supply curve for reindeer meat is thus irregular, both within any given year and between years – with production peaking at certain times of the year, and an oscillating annual output that depends on conditions that may range from the overall state of grazing grounds to the degree of financial insecurity perceived within the industry. Traditional models of pastoral accumulation – which emphasized “capital on the hoof” and often minimized its translation, through slaughter, into standard forms of capital – reflected the need to anticipate “bad years” by maximizing the number of animals (Ingold 1980). Environmental irregularity and unpredictability are encoded in traditional herder knowledge – in the form of maxims, proverbs, anecdotes, and folklore (Helander and Mustonen 2004, Nergård 2006). In expressing this unpredictability is the Sámi saying, “One year is not the next year’s brother”. In the face of this, one of the administration goals has been to regularize production in order to stabilize the meat output of the herding industry. As in the case of herd structures, this aim is based on a theoretical misrepresentation of the inherently cyclic or unpredictable aspects of herding practice – ill-informed at best, dangerous at worst.

The pressing demand for a stable and invariable meat output curtails the adaptive flexibility of herders. Ensuring productive flexibility is a complex, composite problem. The demand for stable output is generated not only by the state, but also by the market. This is a common problem. For decades, within the regime of centralization, the marketing of reindeer meat was delegated to outside actors, whose interests were at odds with those of reindeer pastoralists (Reinert 2002). In this sense, the market and the structure of the reindeer-meat commodity chain are both implicated as factors that affect the climate change resilience of reindeer pastoralism. The common practice of establishing reindeer meat as a seasonal or cyclically available commodity, with an irregular supply curve, will likely contribute to easing the impacts of long-term climate change.

It is worth emphasizing again that flexible productivity or, the ability to regulate the out-take of animals through slaughter in response to shifting conditions – is a key adaptive strategy in the pastoral tool-box. Within the traditional subsistence economy, this was made possible in turn by the flexible organization of livelihoods. Reindeer pastoralism represented one of several key economic activities, and, in bad years, it was supplemented by activities such as hunting, fishing and berry harvesting (e.g. Berg et al. 2003). Clearly, conditions have changed and this is no longer the viable strategy, it once was. Reindeer herding remains a seasonal activity however, and there are still traces of this flexible adaptation, that for example is apparent, in the prevalence of multiple-income herder households (Nilsen and Mosli 1994). We would suggest that measures aimed at enabling a more flexible approach to production, and to the practice of pastoralism itself would help increase the adaptive capacity of the industry as a whole. More flexible approaches would include for example, relaxing requirements associated with the loss of herding licenses. An important element of such a strategy might be to devolve a degree of control – e.g. over the issue of herding licenses – to the industry itself. This would relate to the fourth aspect of flexibility that we identify as central to climate change adaptation, namely social organization.

### 10.5. Social organization

Historically, flexibility has played a key role in the social organization of herding labor. Individual herders associated in working within collectives called *siidas*, have a degree of flexibility in moving between them. Extended kinship networks provided recruitment grounds for temporary labor when required (Bjørklund 1991; Paine 1994). The general secretary of World Reindeer Herders' Association has stated that "nothing is liable to arouse more disturbance within reindeer husbandry than encroachments on its internal organisation" (Turi 2002: 71). In the Norwegian case, the Reindeer Herding Act of 1978 introduced a rigid and completely alien organizational structure, built around nuclear family units organized within geographically defined districts. Until relatively recently, the *siida* working collective was made completely invisible within the legal and organization optic of the administration (Jonassen and Kalstad 2003). Reindeer ear-marks – the tradi-

tional, individually held marks of ownership that are assigned at birth, were regulated in new ways that created new distributions of ownership and disrupting relationships between herders and other communities that were mediated through the flow of living reindeer as property (Bjørklund and Eidheim 1999). Such restrictions of traditional forms of pastoral organization represented a serious institutional constraint on the adaptive flexibility of herders. In many ways, this re-structuring of the reindeer herding industry by the administration has been a determining factor in *producing* the so-called “tragedy of the commons” in Norwegian reindeer herding (Hardin 1968). Relevant changes to reindeer herding were characterized by the by disruption of complex networks of social relations, patterns of collaboration and informal codes that regulated pasture ground allocation and resource utilization—the administration created an entirely new world of conflict on the tundra (e.g. Berg 1996; Bjørklund 1999; Paine 1992).

The Norwegian governance system presents a case of very strong bureaucratic centralization – more so, perhaps, than in other Scandinavian countries. To supervise less than 600 individual herding units, the Reindeer Herding Administration employs more than 50 people (Lie and Nygaard 2000; Reindrifftsforvaltningen 2008). In addition to this fifty, there are also people employed in the Ministry of Agriculture. In turn, this extensive administrative structure produces a constant flow of highly detailed, frequently changing regulations. On one level, the extensive bureaucratization does provide a social and economic safety net for herders. These administrative structures are capable of providing support or subsidies in bad years, and mitigating the financial impact of climatic damage. Of course, things are never as simple as that. Incentive structures and subsidy systems create patterns of dependence (Paine 1977). This dependence is evident in Norway, where reindeer pastoralism and Sámi interests have historically been constructed in terms dictated by the shifting interests of central powers (Bjørklund 1995). This has meant that excessive reliance on the state has also left herders at the mercy of unpredictable shifts in policy and public opinion. This unpredictability is evident in a remark made by a herder to one of the authors:

“Before, we were used to working with an unpredictable nature. Now we also have to work with an unpredictable government administration.”

Importantly, the need to navigate extensive regulatory and bureaucratic structures also prevents rapid adjustment, on the part of herders, to emergent situations.

There are signs of a general move towards greater local autonomy. This move is exemplified in the opening of hygiene and food safety regulations to facilitate the establishment of mobile slaughterhouses for reindeer (H. Reinert 2007). Many of the structural changes, that have taken place in the herding industry, are complex and will be extremely difficult to reverse. A significant step towards re-establishing flexibility and local forms of organization would be to down-scale and decentralize the bureaucratic structure, devolving a greater degree of flexibility and control to the herders and the industry itself like for example, in the regulation of herding licenses.

## 10.6. Conclusion

Indigenous production systems in extreme, variable and unpredictable climates are based on risk minimization strategies such as crop diversification, and skilled, flexible utilization of existing ecological and climatic niches. In such areas, long-term climate change will magnify already extreme weather conditions, with unpredictable effects. The variables and the coping mechanisms involved in previous extreme climate events are similar in kind to the skills that will be required to understand, and adjust to permanent climatic change. Adaptive responses to dramatic environmental change are often encoded in traditional knowledge. In Norwegian reindeer pastoralism, dramatic “bad years” have occurred in living memory, and there are reindeer herders today, who have lived through severe but temporary climatic turns. Their knowledge and experience will be a crucial resource in responding to future changes. The aim, in developing robust strategies for adapting to climate change, must be to draw on this knowledge and experience, in order to understand and strengthen the highly efficient coping mechanisms that have made survival already possible for centuries.

Traditionally, the challenges posed to reindeer pastoralism by an unpredictable climate have been met through skilled adaptive practice that fully utilized the options presented by a wide range of ecological niches. Theoretically at least, reindeer herders presently have available to them, a

number of options and strategies by which to counteract and circumvent the negative effects of climatic change. In practice, however, these options are limited by a wide range of factors that reduce adaptive flexibility – *including* systems of herding governance that operate at the nation-state level. Any strategy to build adaptive capacity at the national level will need to consider ways in which to maintain, and where necessary, re-create conditions for the exercise of pastoral flexibility. Given their regulatory functions and the history of herder-state relations, nation-states such as Norway could easily be represented as obstacles to such flexibility. This is a counter-productive approach, however.

Perhaps the key question that our discussion here raises is this: how can national systems of governance be adjusted to *assist* the process of building pastoral adaptive capacity, and increase herder resilience to the potentially devastating effects – short-term and long-term – of climate change? In closing, we suggest four very general avenues of possible action:

- Enabling and facilitating the restructuring of herds to decrease vulnerability to adverse climatic conditions. Diversified herd structures will probably be able to better withstand dramatic climate change and predators.
- Ensuring spatial flexibility and a wide range of adaptive options, primarily by halting the permanent loss of pastoral lands and the destruction of currently accessible ecological niches. This entails halting or limiting the appropriation of current pastoral land for other purposes, such as infrastructure development. This may also include loosening border controls and restrictions on reindeer migration between Scandinavian countries.
- Establishing and maintaining a solid economic base for pastoralists, enabling them to absorb the costs associated with climatic change. In the Norwegian case, this includes specifically facilitating herder ownership and control over the later stages of the commodity chain – including production, marketing and distribution (Reinert 2002, 2006).
- Down-scaling the bureaucratic structure and devolving control to herders and the herding industry itself, both at the local and national level

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