


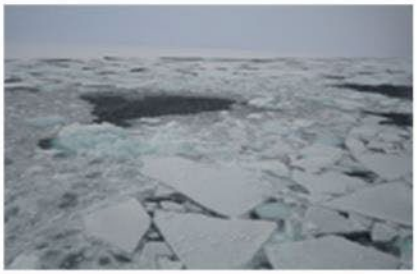


SOCIO-ECONOMIC PROCESSES IN SELECTED COMMUNITIES: THE INTERPLAY OF FORMAL AND INFORMAL INSTITUTIONS AND PRACTICES IN REINDEER HERDING (RUSSIA AND FENNOSCANDIA)

CHARTER Deliverable D3.5

Grant Agreement Number: 869471
Project Acronym: CHARTER
Project title: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity
Starting Date: 01/08/2020
Project Duration: 54 months
Project Officer: Alberto Zocchi
Project Coordinator: Bruce Forbes / LAY
Author: Kirill Istomin / UHAM
Contributing partners: LAY, UHAM, UmU, NINA

Socio-economic processes in selected communities: The interplay of formal and informal institutions and practices in reindeer herding (Russia and Fennoscandia)

Version 1.0

CHARTER Deliverable 3.5

Grant Agreement Number: 869471
Project Acronym: CHARTER
Project title: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity
Starting Date: 01/08/2020
Project Duration: 54 months
Project Officer: Alberto Zocchi
Project Coordinator: Bruce Forbes / LAY
Author(s): Kirill Istomin (UHAM) and the WP3 team (LAY, UHAM, UmU, NINA)

Due Submission Date: 31/07/2023
Actual Submission Date: 29/09/2023

Status	
Draft	
Final	x

Type		
R	Document, report	x
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patent fillings, videos, etc.	
OTHER		

Dissemination level		
PU	Public	x
CO	Confidential, only for members of the consortium (incl. the Commission services)	

Revision history

Date	Lead author(s)	Comments
06.09.23	Kirill Istomin	1st draft version, circulated for comments and case-study design within the CHARTER WP3 group
19.09.22	Kirill Istomin	2nd draft version, circulated for comments within the case-study group
30.09.23	Kirill Istomin	Final version 1.0, submitted

Socio-economic processes in selected communities: The interplay of formal and informal institutions and practices in reindeer herding (Russia and Fennoscandia)

Kirill Istomin, Joachim Otto Habeck, Roza Laptander, Hans Tømmervik, Tim Horstkotte, and Sirpa Rasmus

Introduction: the interplay of formal and informal knowledge and practice

In the last decades, there has been growing interest in management studies and particularly in the field of environmental management to the so-called "traditional" environmental management practices as constituted by "traditional" knowledge and "traditional" institutions.[1] This interest was particularly strengthened since the late 1990s, after the Nobel-Prize winning study by Elinor Ostrom (Ostrom 2015), who relied heavily on the analysis of informal or semi-formal institutions, including those that existed in so-called stateless societies, for finding out how common-pool resources can be managed without state intervention in such a way as to avoid their rapid depletion (the so-called Tragedy of the Commons – see Hardin 1968). "Traditional" practices play a particularly important role for the two arguably most important schools of thought in modern Environmental Management Studies: that of the Socio-Ecological Systems (SES) and the Panarchy Theory. Thus, Fikret Berkes and Carl Folke, the founders of the SES approach (Berkes and Folke 1998) and relevant authors of the Panarchy group, argued (Berkes, Colding, and Folke 2000; Berkes and Folke 2002) that inclusion of "traditional" knowledge and institutions into environmental management was indispensable. The reason was not only that these practices and institutions provided an unique qualitative (as opposite to quantitative, in the case of "conventional" management) monitoring of the resources' dynamics, but also that, due to the long period of institutional learning, they have a capacity of "responding with experience" to crises and breakdowns leading to the system's switching to a new state (representing unavoidable parts of an adaptive cycle from the viewpoint of the Panarchy school), something that the "conventional" management is not able to do, as it is designed exclusively to prevent such crises and to keep the system in a single "equilibrium" (Berkes and Folke 2002).

Although we do not wish to deny the general value of these ideas, we think that they contain at least one important difficulty: they are based, sometimes quite explicitly, on the notion that "traditional" knowledge and institutions exist separately and independently of "non-traditional". Thus, Berkes and Folke contrast "traditional" and what they name "conventional" management practices as having different epistemological foundations (qualitative understanding *vs* quant-itative description and modelling), mode of formation (passive observations and reactions *vs* active professional knowledge seeking), time of formation (long term *vs* relatively short term), structure (particularly that of institutional memory and learning), etc. (Berkes, Colding, and Folke 2000; Berkes and Folke 2002). These contrasts, as it seems, constitute for them the essence of the two types of practices and sometimes make the "traditional" ones more adaptive than the "conventional" ones. However, it seems that for Berkes and Folke as well as for most specialists in environmental management, the "traditional" and "conventional" practices represent alternative and independent

[1] The by now classical definition of these introduced in 1999 by Fikret Berkes refers to "a cumulative body of knowledge and beliefs, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (cited by Berkes and Folke 2002: 123). Importantly for the further discussion, the author adds to that definition that "the word 'traditional' is used to refer to historical and cultural continuity, but at the same time recognizing that societies are in a dynamic process of change, constantly redefining what is considered traditional" (ibid).

ways to adapt to the same environment, which actually makes their "union for enabling resilience" indeed possible.

In our opinion, the important point this position misses is the fact that, with very few exceptions, the practices Berkes and Folke name "traditional" have only rarely been formed independently of and never exist independently of the practices Berkes and Folke name "conventional". At least in the present, the environment – both social and natural – to which these practices adapt their practitioners, is always the one managed by the means of institutions these scholars name "conventional". To put it in a different way, the environment to which people adapt and which they manage using "traditional" knowledge and institutions nowadays unavoidably includes "conventional" institutions based on "conventional" knowledge. It is this environment in which the "traditional" practices as they exist nowadays have developed to work in – and this fact is important to take into account when thinking about the integration of the two kinds of practices.

Let us bring one example to explain better what we mean. It is rather well known that the social change associated with the breakdown of the Soviet Union affected heavily the economies of herding and hunting in the north-east of Russia (Jernsletten and Klokov 2002; Istomin 2020). Thus, Chukchee reindeer herding experienced a seven-fold drop in the number of reindeer, which made it, at least temporarily, devoid of any economic significance even for its practitioners. In order to explain this crisis, Patty Gray, one of the most well-known western specialists on the region, suggested that the "traditional" Chukchee reindeer herding was completely destroyed during collectivization in the 1950s and replaced by a "thing created by the state, a thing which survives only by virtue of the extent to which it is propped up by that state … this is precisely why it is collapsing now that state support has been withdrawn." (Gray 2000: 137). What Gray has in mind here, however, is not that "traditional" management practices in the sense of Berkes and Folke did not exist in Chukchee reindeer herding since the 1950s. Indeed, in her paper she describes many such practices both in the form of institutions and knowledge, which continued to exist even after the collapse of the Soviet Union. These practices were informal, flexible, and based on experience. What Gray has in mind is rather that these practices were designed to work in a particular system of formal institutions and their effectiveness in managing the effective exploitation of resources essentially depended on the existence of this formal institutions' background. The disappearance of this background rendered these practices ineffective.

We would argue that Chukotka is not the only place where such interplay developed. Indeed, we cannot imagine any mechanism whereby a complex of "traditional" practices could develop in a formally managed society (and most so-called "traditional" peoples, including all reindeer herders, live in such societies) and still be adaptive to the "environment minus conventional management". Just on the contrary, we believe that in order for these practices to be adaptive, they should be adaptive to the changes in the formal, conventional practices imposed "from above". This is exactly the reason why we prefer to speak about formal and informal management practices rather than about "conventional" and "traditional" ones. And we believe that it would be much more accurate to think about the two in a more interactionist way than Berkes and Folke implied.

A good example of such thinking in relation to reindeer herding is the book *Conversations with Power* by Yulian Konstantinov (Konstantinov 2015; see also 2023). In this work, the author demonstrates on the example of Kola Peninsula how both formal and informal practices are changed by – indeed created by – a dialogue between reindeer-herding communities and bureaucratic state institutions ending up in a hybrid system, where formal and informal institutions sometimes fit each other as a key and a lock in enabling effective management, but at other times producing a rather ineffective management system with a number of lacunae. In both cases,

however, the result is explained neither by the quality of the two kinds of institutions per se nor by poor planning, but rather by a poor dialogue between them.

It should be particularly stressed here that our approach does not compromise the wisdom of uniting the formal and informal institutions in enabling resilience. Rather, it shows that such uniting cannot be mechanical. Thus, returning to the Chukchee case described above, one important reason of the reindeer herding crisis in Chukotka was that *sovkhoz* system there did not "die the natural death" as it did in many parts of the Soviet Union but rather was intentionally dismantled by the local managers, who, accidentally, believed that reindeer herders had to be given a possibility to live as they "lived for millennia" before the state arrived and started experimenting with them (Turaev 2017). The union Berkes and Folke call for can be effective only if it is achieved with a full understanding of how the state power and authorities, on one hand, and local societies and their "traditions", on the other, worked together in creating and supporting both formal and informal institutions.

The aim of this paper is to make first steps towards this understanding by the means of a comparative study of how reindeer-herding practices and particularly access to natural resources are organized socio-politically and socio-economically in different countries, and inquire about the extent to which these institutions have been produced locally on the one hand and by state authorities on the other hand. In order to do that we wish to use the "conversation" approach as was first introduced by Konstantinov (2015): our particular focus is on how the tensions between formal and informal institutions have been first created and then attempted to be solved by authorities as well as by herders themselves. The examples of this process come from the countries states where reindeer herding mainly takes place: Finland, Sweden, Norway, and Russia.

The material for our study comes from literature and fieldwork interviews and observations by the authors. Field research was performed among reindeer-herding communities of Bol'shezemel'skaia tundra in the north-east of the European Russia (Kirill Istomin, J. Otto Habeck), east of the Northern Urals and on Yamal Peninsula in Western Siberia (Roza Laptander), Sweden (Tim Horstkotte), Norway (Hans Tømmervik) and Finland (Sirpa Rasmus, also drawing on research conducted by Teresa Komu). These fieldworks were performed in different times since 1999 up to the present. Relevant literature and policy documents as well as minutes of discussions during workshops organized in the framework of the CHARTER project (in the case of Finland) have also been used.

Case 1: Institutional changes over the last one hundred years in Komi reindeer husbandry

The first of our examples of "conversations with power" comes from the north-east of European Russia, the Autonomous Region and later Republic of Komi, in the northern part of which reindeer herding has historically been one of the major sources of income. In view of herd size, herd control, and market output, Komi reindeer herders were renowned for their success throughout the late 19th and early 20th century. The conspicuous disparity between rich owners and (often) poor herders could not be tolerated by the early Soviet state. To legitimize collectivization and other forms of institutional change, the Soviet state first had to declare Komi herders to be "backward" and promote its own modernization plans (Habeck 2005: 70). Strangely, though, of all the diverse modes of reindeer husbandry, the Soviet state soon came to espouse the conventional Komi way of practicing migrations and herd control as a blueprint for other reindeer-herding groups throughout the western part of the Soviet North – notably: a specific herd composition with the aim to increase meat output (Istomin et al. 2022); tight herd control throughout most of the year;

and the practice of transhumance, with some household members living in the settlement and others living with the reindeer in the tundra. This blueprint, formulated by scientific experts in the years shortly before and after 1917 and implemented since the early 1930s, was obviously quite acceptable for Komi reindeer herders – it was theirs – but less easy to implement among other ethnic groups of the Russian Far North.[2] Collectivization of reindeer herds took a high toll, especially in the early phase (1928-1932). However, being confronted with the impossibility of full and rapid collectivization, the Communist Party had to strike a compromise with the reindeer herders, for it was they who provided practical knowledge, workforce, and produce. This compromise led to the emergence of the enigmatic category of "personal reindeer" (not quite collective, not quite private), being herded together with collective or state-owned reindeer, as has been documented by Istomin et al. (2022) in line with Konstantinov's (2002: 172-173) concept of crypto-entrepreneurship.

A further episode of "dialogue" was ushered in by the government's attempt of the 1960s and 1970s to introduce a fully industrial mode of production (i.e., meat production in the first line) in the tundra, akin to factory work elsewhere in the country. Productivity indicators became key in this attempt. The central office of each state farm (*sovkhoz*) or collective farm (*kolkhoz*) was to remind herding teams constantly of the necessity to maximize survival of newborn reindeer, to maximize slaughter weight and generally to do everything for the sake of meat production for the Soviet economy. In fact, however, the staff in the office had to accept that it had only partial control over the "grassroots" operations of the herding teams. Telecommunication was limited to (at best, daily) radio talks. The herding teams had a considerable degree of autonomy, up to the moment of "taking stock" in late autumn, when they came under close control by the office. The staff in the office had a symbiotic relationship not only with the herding teams out in the tundra but also with the Ministry of Agriculture and other governmental units. Creative use of reindeer statistics was common at all levels of the chain, from the herding unit (*brigada*) to the state-farm office and through to the Ministry. Since the government put strong emphasis on achieving full sedentarization, the presence of humans in the tundra was supposed to be limited to the actually necessary workforce – also in reindeer herding. The shift-work model depended on fast and regular transport, facilitated by helicopters. Interestingly, helicopters were also used to take school children to the tundra at the beginning of the summer holidays and bring them back to the settlement for the start of the new school year. The practice of "school helicopters" is a clear sign of the state's readiness to find a compromise with the herding households: in terms of economic efficiency, the "school helicopter" was useless; but it was part of the social contract.

Russia's declared transition from a centrally planned to a market economy in the 1990s meant a mortal blow to the collective-farm and state-farm system. However, these two organizational types proved to be of astounding longevity. Many of the Komi reindeer-herding households were reluctant to establish private, commercial enterprises on a market with very volatile conditions. Their interest was to retain the old structure, which allowed them to engage in tax-free informal business under the blanket of state subsidies, low-cost or free services of the erstwhile state farm, and centrally organized transport and infrastructure. They had got accustomed to the private-in-the-collective or "sovkhoism" mode (Istomin 2020). More than elsewhere, in the Komi Republic reindeer herders preferred to continue with the state-farm system because the latter still incorporated key elements of what Komi reindeer herders now believed to be their "traditional" reindeer-herding practice. The government devolved responsibility to the municipalities, which led to the transformation of state farms into municipal unitary enterprises (MUP), commercial

[2] In fact, many groups of Yamal Nenets reindeer herders managed to withstand the pressure of sedentarization and continued a fully nomadic life-way throughout the Soviet era (cf. Donskoi 1987).

agricultural cooperatives (PSK) and occasionally even into stock-share companies. In this transformed manner, the former state farms still survive, despite nearly all of them are heavily dependent on state subsidies. What is most important, however, such partial conservation of the Soviet institutions enabled local reindeer herding to avoid such significant losses as those experienced in Chukchee reindeer herding, as mentioned in the introduction. In sum, the post-Soviet trends of institutional change west of the Urals stand in marked opposition to those east of the Urals, where privatization occurred at much faster pace. The three key moments of institutional change and "dialogue" in Komi reindeer herding are rendered in Table 1.

Period	**Interest of the state government**	**Interest of the reindeer herders**	**Result of the dialogue (negotiation)**
1928-1930s	Full collectivization, reduction of the influence of affluent pastoralists [owners of reindeer herds]	Trying to maximize the rewards of household property; keeping control and de-facto ownership over part of the herd	Collective herds with a higher or lesser percentage of "personal" reindeer
1960s-1970s	Industrial mode of production (of meat) in the tundra; sedentary life-way	Keeping the system of continual control over the herd; "sidelining" part of the produce for household subsistence	*Proizvodstvennoe koche-vanie* (nomadic migration for production purposes) with family members com-muting between settlement and camp
1990s	Transition to market economy; turning state farms and collective farms into (at best) self-sufficient commercial enterprises	Retaining the benefits of the state-farm and collective-farm system: semi-private entrepreneurship with a maximum of subsidies and state-provided services	*Munitsipal'noe unitarnoe predpriiatie* (MUP), *proiz-vodstvenno-sel'skokhoziai-stvennyi kooperativ* (PSK), or stock-share company as an institutional form that combines collective with private property

Table 1: Key periods of institutional change of Komi reindeer husbandry as a result of negotiations between reindeer herders and the Soviet (Russian) government

Case 2: Calf distribution among reindeer herders of Bol'shezemel'skaia tundra and Kola Peninsula

In order to demonstrate how the dialog between the formal and informal management gave rise to management practices on the ground during the transformations described above, let us focus on one just one (but admittedly rather important) aspect of these practices related to reindeer ownership. As it has been mentioned in the previous case, there have been also so-called personal reindeer belonging to reindeer herders who worked for these enterprises as well as to other people related to the enterprises (or to herders working for them) in this or that way. These private reindeer were kept together with the collective/state reindeer in herds entrusted to herding teams (so-called "herding brigades") and differed from the latter by their earmarks. Up to the 1970s, the number of personal reindeer per reindeer herding household was relatively small (in most cases between a dozen and three dozen reindeer) and, at least in Komi households we have ethnographic data on, these animals were used mostly for transport and as the primary source of skins for making clothes and other household items (e.g., fur bags). All these items except outer fur boots (which can be made out of skins taken from legs of a grown-up reindeer) are made exclusively of skins taken from calves slaughtered in August and these calves constituted the largest part of harvest from personal herds. The role of private reindeer as a source of meat was mostly limited to various special occasions (e.g., weddings and funerals) as well as to the August period (the slaughtered and skinned calves had to be eaten).

Aged informants, those who still remember the *kolkhoz* period (1950s – early 1960s), report that despite the level of control over both collective and personal herds was quite high at that time, it was still allowed to exchange calves born by personal female reindeer for those born in the collective herd. The stated reason was that the personal herds were small and personal calves were few, while skins of particular quality and color of fur were often needed for clothes. Since the state did not demand the reindeer herding enterprises to supply fur items, the color and quality of calf furs were not really important for the officials and exchanging calves for the purposes of making clothes was not considered to be a big deal. However, even in that time it was sometimes possible to use these exchanges to improve productivity of one's private herd, for example by exchanging male calves for female ones and not slaughtering them. After *kolkhozes* were re-formed into *sovkhozes*, the control over the herds was further relaxed and the practice of calf exchange developed further. Since the 1970s, it was considered absolutely normal to exchange any personal calf for any sovkhoz calf during the ear-marking corral, which in those years usually took place in July. The property over the calves was considered sealed after the earmark was cut. The further relaxing of the calf property regime came when the timing of reindeer slaughtering eventually was shifted due to logistical reasons from November to December, which caused the change of timing of the summer (ear-marking) corral. Besides that, the corrals started to be used for administrating vaccines to the herd. This increased the work load, while the number of reindeer herders themselves started to decrease. Since approximately the late 1970s or early 1980s, as the herders reported, the *sovkhoz* administrations ceased to take care of noticing which calf follows which female reindeer: it thus ceased to establish the origin of calves, during the corrals. Since that time, reindeer-herding households could get whatever calves they would choose from the joint "calf pool" of the herd in the quantity not exceeding that of female reindeer they possess (Fig. 1). This practice continued in the post-Soviet enterprises, which found it difficult to introduce more strict control over the herds.

Therefore, in modern reindeer herding of Komi of Bol'shezemel'skaia tundra, the distribution of calves looks as follows: during the ear-marking corral, reindeer belonging to the herd of a particular brigade are driven in small groups to the so-called working chamber (*rabochaia kamera*) of the corral, where all calves that happen to be in the group get caught and given over to one of the side chambers, while the rest of the reindeer get inspected, vaccinated, castrated, etc. Meanwhile, in the side chamber, the members of the reindeer herding households which make up the brigade divide the calves between themselves on the basis of their exterior, other qualities as well as their own personal husbandry strategies. Usually, they start by selecting the calves for their own personal reindeer herds, then a few calves can be selected for the personal herds of "side people" (those who do not work as a herder despite having personal reindeer in the herd). The rest are marked as belonging to the enterprise. By the time all the calves are divided and marked accordingly, the next group of calves usually arrives with the next group of reindeer to the working chamber and gets divided accordingly. Among Komi reindeer herders, acting herders usually get as many calves as they have female reindeer, other people three or four calves less than the number of females they have, while the enterprise gets the rest of the calves.

It is not difficult to see that this order significantly favors the herders and disadvantages the enterprise. This can be seen by considering the DVT (*delovoi vykhod teliat*) value, one of the main statistical measures of reindeer herding productivity used in Russia, which indicates the ratio of number of calves born and alive by 1 January to the number of female reindeer. In Bol'shezemel'skaia tundra enterprises, the DVT is usually between 0.65 and 0.68, which means that by 1 January, only 65 to 68 calves are present in the herd for every 100 female reindeer. Arguably, the ratio is better in July (when marking is performed) because calf mortality remains quite high during

each of the first six months of a calf's life. Still, it is significantly less than 1.00, which means that by grabbing a calf for each female reindeer, the herders get more calves than they would get had their herds proliferated "in the natural way". Interestingly, the herders know and consider this fact: in the Murmansk area (Kola Peninsula), calf mortality is significantly higher in comparison to the Bol'shezemel'skaia tundra due to a long period of reindeer free grazing in summer. There, the DVT fluctuates between 3.6 and 3.8 depending on the year. Besides that, due to the same long period of uncontrolled grazing, calf marking occurs late in the autumn, usually in November. The local reindeer herders reported that in their case the distribution norm is one calf for two female reindeer possessed by the owner. Nevertheless, the herders still get more than they "should" while the enterprise gets less. Besides that, the calves the herders get are of better quality than would be otherwise possible, while the enterprise gets calves with poorer body condition and less chances for survival. This fact is one of the reasons reindeer herders would prefer to continue working for enterprises rather than go private as their trans-Ural Nenets colleagues do.

Fig. 1. Earmarking of a calf in a reindeer corral, Kolva-Ty, June 1999. Photo: J.O. Habeck

It can be said, therefore, that the collective reindeer herding management once introduced by the communist reformers by means of cruel force was in the case of reindeer herders of European Russia, creatively adapted to and used for the interest of the "managed".

It is not clear for how long this adaptation is going to survive, however, because most recently, there is a shift in the practice of marking reindeer: while in earlier years, earmarks were used (not rarely in a creative or arbitrary manner) to denote property, since 2016 tagging of reindeer is conducted with the purpose of identifying each animal individually, track the vaccination record, etc. The shift from demarcating different categories of ownership towards ideally identifying each animal individually mirrors the government's attempt to curb epidemics and safeguard hygienic conditions, but it again has to be informally negotiated with the reindeer herders, who represent the main, sometimes even the only workforce during the tagging campaign and, therefore, are able to impose significant influence. Indeed, it is common practice of reindeer herders in the Komi Republic to tag only the reindeer belonging to the enterprise while avoid doing this on their personal reindeer.

Case 3: Marking animals for identification and animal control in contemporary reindeer herding practice of Yamal Nenets

Reindeer marks of Yamal reindeer herders indicate familial and individual ownership, rights, and duties: they are connected to the regulation of property in reindeer. Nenets herders apply special marks on reindeer ears; in addition, they cut family signs on reindeer fur (about reindeer in ownership of enterprises, see below). Earmarks and fur marks thus play an important role in the reindeer herders' economy. *Pidte"mya* is the Nenets word for a mark on a reindeer fur. It comes from the verb *pidna(sy)* – "to shave, to cut". By contrast, an earmark is called *kha* (literally: "ear").

The equivalent words in Russian terminology are *ushnaia metka* (earmark) and *bokovoe tavro* (literally: "flank brand").[3]

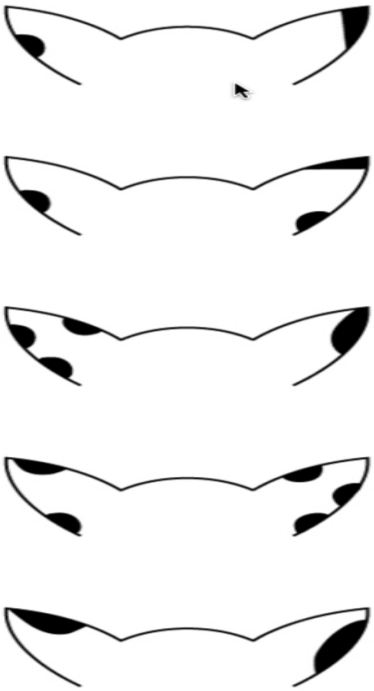

Fig. 2. Reindeer earmarks of five Nenets herders who herd animals together (extract from a photo by Yamal Expedition 2015, www.yamalexpedition.ru).

Both ways of marking the personal or family property of reindeer are connected to the duties and responsibilities in Nenets nomadic society, regarding not only the reindeer but also the reciprocal actions or arrangements about the role of each member of the family and clan. Reindeer fur marks and earmarks play an important symbolic role not only in property relationships: they are an essential part of the nomadic lifestyle of Nenets reindeer herders.

Fur marks are cut by a knife on the flank or the shoulder of the animal in the autumn. After each summer molt, herders renew the fur marks, so that they are visible even from a distance. New-born calves undergo earmarking during the late summer and in autumn.

In the pre-socialist Nenets economy, reindeer were privately owned by nomads. During the early Soviet time, many reindeer were confiscated from their private owners and relocated to other districts, to build up *kolkhoz* and *sovkhoz*-owned herds. Interestingly, even in some *sovkhoz* reindeer herds, the earmarks of former private owners continued to be in use, and this currently applies also to post-*sovkhoz* herds. For reindeer owned by enterprises, fur marks tell the herders from a distance that these animals are not in private property. Earmarks have always been signs of private property in reindeer.

As in previous centuries, patterns of earmarks (Fig. 2) and fur marks are passed from the father to the youngest son, whereas older children had to modify the reindeer earmark and fur mark to make it slightly different from that of the father. Nenets women, too, had reindeer: for these, the earmark owned by the father of the respective woman was used. Moreover, both Nenets male and female reindeer earmarks and family fur marks are officially recognized by the local authorities as marks of ownership. They are accounted by veterinarians during counting reindeer and vaccinations works. Before introduction of plastic ear tags, Nenets private herders were not allowed to sell any reindeer to slaughtering houses if the animals were without personal ear marks and fur marks (without them it was forbidden to slaughter any reindeer of other people).

In 2008, the project of applying plastic ear tags came into being (Yuzhakov 2012). In 2016/17, this project was implemented in the Yamal-Nenets Autonomous Okrug, first in the tundra areas east of the Polar Urals and later in Yamal'skii raion (Yuzhakov 2012; Lubimskaia 2016; Khaimina et al. 2021). These ear tags facilitated control over each single animal, going beyond the older system

[3] In official reindeer accountancy documents, *bokovoe tavro* is used; a more colloquial synonym is *tamga*. However, *tamga* derives from a different regional context: it is regarded to provide insights into relations between families, individuals and ethnic groups in the steppe territories of Kazakhstan and Mongolia. During the Soviet time, the term *tamga* was introduced to identify emblems of particular ethnic subgroups, clans or families among Eurasian nomads.

of dividing groups of animals into distinct property categories. However, these plastic tags appear to be a transitory technology: in 2022, electronic clipping of reindeer started.

Radio Frequency Identification (RFID) consists in the use of microchips and allows wireless recording and reading of information. The electronic clips with the microchips inside are punched into the animal's ear. As with the earlier plastic tags, this allows to identify each single animal via its unique code (Makeeva 2020; Zagorskii 2021), but in digital mode. The electronic tagging system consists of three parts: microchips, scanners, and the overall database. A scanner, when brought to the ear of the respective animal, reads the information from the chip within seconds, and transmits the record, thereby revealing to whom the reindeer belongs (to which enterprise, brigade, private reindeer herder, etc.). The data on the chipped animal is fed into an electronic database, which makes it possible to carry out zootechnical work more accurately, determine the number of animals, and the grazing routes. According to official statements, clips will help solve the issue of counting animals in Yamal. When passing through the gate of the corral, the electronic tag in the reindeer's ear allows veterinarians to determine the animal's weight, age, gender, vaccination history and reproductive status. In particular, the quality of selecting and breeding reindeer can be determined by assessing the health and strength of the non-castrated male reindeer within the herd. Officials expressed their optimism that the new technology will also solve the main problems of zootechnical accounting, tracking the movement of animals between herds, identifying pasture resources in case of icing events, and carrying out anti-epizootic measures, thereby increasing the productivity and economic efficiency of reindeer breeding as a whole.

Thus, reindeer herding is expected to follow the practice of identifying farm and ranch animals by RFID. These days it becomes obligatory for every Yamal herder to put ear tags (plastic tags or electronic clips) on their reindeer. Reindeer herders tried to protest against the new requirement of ear tags (Beznosova 2021). However, a new regional rule says that those reindeer herders who do not accept tagging are not permitted to sell their reindeer to slaughtering houses (Regnum 2019; Makeeva 2020; CNEWS 2022). As informal signs of property, earmarks and fur marks have not ceased to be important; rather, they now exist side by side with the new, state-induced technologies of tagging and chipping.

Case 4: Gradual erosion of the Sámi siida by governmental land appropriation in Sweden

The economic, cultural, and legislative history of reindeer husbandry – from its earliest origin until today – is inseparable from the development of the surrounding society within the nation states that today form Norway, Sweden, and Finland. From the Late Middle Ages onwards, when reindeer husbandry increased in economic and cultural importance, the formation of these states as we know them today is a complex, and at times violent, history. From the perspective of Sámi society, however, these nation states have in common the increasing colonial influence on Sámi livelihood, rights, and culture in their struggle for geopolitical influence in Fennoscandia. These influences on Sámi affairs continue up to the present, albeit with pronounced differences between the three countries (Allard 2015). This includes the disempowerment of reindeer-herding communities in influencing matters that concern internal relationships and dynamics, as well as invalidation of Sámi customary rights and institutions by superimposing conflicting norms with little or no respect for the local context (Labba 2015; Kuokkanen 2023).

This section focuses on the gradual erosion of traditional Sámi governance practices – the siida – in Sweden from the 17th century onwards, as the state increasingly took control of the land, natural resources and finally cultural identities within the reindeer herding area. While the full complexity

of these processes is out of the scope of this section, we will expose how parallel institutions based on Sámi governance and those of the Swedish state at first affirmed Sámi rights, how these rights were dismantled to finally result in dispossession and alienation, and how recent developments reverse some of these events.

The siida as Sámi institution

The siida has been described as the "own and only form of community organization" following the norms of Sámi society (Manker 1953: 16). A siida (Northern Sámi), sijdda (Lule and Pite Sámi), or sijte (South Sámi) is a customary self-organized group of households or families joined to manage the relationship between human-reindeer units according to the spatial and temporal availability of grazing resources within a designated area (Bjørklund 1990; Sara 2009). Even though the siida has undergone changes and transformations in its organization, practices and meaning, its basic principles are still relevant today. The groups are often formed based on kinship, affinity, and trust to ensure successful collaboration between members of a siida, as well as mutual agreements regarding land use with neighboring siidas. The composition and size of a siida, comprising people and reindeer, are flexible and may change with seasons and between years, depending on seasonally changing availability of grazing resources and collective choice arrangements (Bjørklund 1990; Sara 2009). At the same time, siida offer stability – siida borders are clearly delineated between siidas. However, these borders may be permeable due to the customary obligation to grant access to members of other siidas, e.g., during difficult grazing conditions (Marin and Bjørklund 2015).

17th century to 1766: coexistence of governance institutions

From the Middle Ages onwards, the northern area of the Swedish Kingdom, then including Finland, was divided into six "Lapp areas" (lappmarker). Tax records existing from the mid-16th century record the division of these Lapp areas into "Lapp villages" (lappbyar) (Lundmark 2006; Allard and Oskal-Labba 2011). These "Lapp villages" within the Lapp areas were further composed of areas with clear borders (lappskatteland), within which family groups, i.e., siidas, had the sole right to govern the use of the natural resources, including fishing and hunting and paid taxes to the Swedish Crown. From a Sámi perspective, this division and the resulting rights to use the natural resources was clear and contributed to social justice among the Sámi users of these lands (Korpijaakko-Labba 1994; Larsson and Päiviö Sjaunja 2022). The fact that these lands, according to Sámi governance, could be inherited, sold or leased testifies to a clear understanding within the Indigenous Sámi community of private property rights. The Sámi "Lapp villages", composed of different siidas, was governed by a "village court" (byarätt) as body for the administration of justice between the different siidas representing the "village", with only Sámi present in the board (Lundmark 2006). These rights, at least partly, were recognized by the Swedish and Danish/ Norwegian state in the so called "Lapp Codicil" regarding seasonal migration of reindeer herders across newly established national borders in 1751, thus affirming and recognizing that this particular form of Sámi land use had to be protected (Strøm Bull 2015). This document can be invoked today, such as in unresolved disputes on access to summer grazing areas in Norway by herding communities that have their other seasonal grazing grounds in Sweden (Broderstad 2013).

From the start of the 16th century, the property right to these lands with their clearly defined borders were legally protected in the Swedish district court (häradsrätten) by paying taxes to the Crown, as elsewhere in the Swedish Kingdom (Korpijaakko-Labba 1994; Lundmark 2006). Even in these courts, the majority of the board could be Sámi. It was in the interest of the Sámi to maintain these tax responsibilities and to secure these rights, e.g., in court cases involving conflicts with farmers or border conflicts between neighboring siidas (Korpijaakko-Labba 1994). The district courts

based their verdicts concerning the Sámi taxed lands on Sámi customary laws (sedvanerätt), i.e., the siida organization, taking over some responsibilities of the "village courts". However, the influence of the "Lapp village" on the district courts was still high, and they could serve as a higher instance to appeal decisions by the "village courts" (Lundmark 2006).

Even when the Swedish Crown sought to encourage the colonization and cultivation of northern Sweden at the close of the 17th century, the Royal Ordinances of 1673 and 1695 for arriving settlers (Nybggesförordningar) did not grant them rights to hunting and fishing (Lundmark 2006), as these were livelihoods reserved for the Sámi. In 1766, the Lapland border (Lappmarksgränsen) was drawn to protect the reindeer herders' rights and livelihoods, such as fishing and hunting, from ingression by settlers (Lundmark 2006). West of that border, no farms were to be established on the taxed Sámi lands without the consent of the respective Sámi landowner. Despite conflicts arising between settled farmers and reindeer herders from this time, co-existence and reciprocity between these livelihoods also occurred (SOU 2006: 17). Furthermore, Sámi could themselves establish farms on taxed lands, to combine farming with fishing, hunting, and reindeer herding (Kuokkanen 2023).

To summarize the situation until the late 18th century, it is essential to realize that at this time there existed a double system of acceptance and protection of clearly defined property rights and private ownership to land by the Sámi: governance of land and natural resources was rooted and established not only intrinsically in Sámi society according to their traditional customary norms and needs, but also endorsed, accepted and supported by the legal bodies representing the Swedish crown. In other words, informal and formal institutions were closely aligned, and worked well.

1792 to 1889: dismantling Sámi property rights

The influence on Sámi legal matters by the district court, where not unusually Sámi persons had the majority in the board, started to decrease at the end of the 18th century. In 1792, the governor gave the right to the Crown's bailiffs to overrule the local district courts in matters regarding settlements in the privately owned Sámi taxed lands (Lundmark 2006). Despite protest by the district courts, they became increasingly subjected to decisions by formal institutions, in the form of the county administration board. This seems to have been a turning point in the Crown's the view on (Sámi) property rights to land, water and natural resources: increasingly, the taxed Sámi lands were understood by legislative authorities as temporary leases, rather than property, on land owned by the Crown (Lundmark 2006). Gradually, the dual system administering Sámi property rights faded: the local district courts had to accept the loss of their right to make decisions with regard to the taxed Sámi lands, finally resulting in the stance that these taxed lands belong to the jurisdiction under the Crown (kronojord).

Around this time, the idea that nomadic livelihoods, such as reindeer husbandry, were a lower social and cultural development compared to sedentary farming gained momentum (Lantto 2010). Geopolitical conflicts between the Nordic states in the wake of the Napoleonic Wars in central Europe (1803-1815) had significant consequences for reindeer herding Sámi: Russia annexed Finland from Sweden in 1809, and land use conflicts led to the closure of borders between the Nordic states that previously were permeable for Sámi reindeer herders to fulfil their seasonal migrations. In 1852, the border between Norway and Russia-Finland was closed, and in 1889, the border between Russia-Finland and Sweden (Aarseth 1989). In other words, Sámi areas lost the previous status of Sámi land, and instead were considered as part of the respective nation state (Lantto 2010). Norway pursued assimilation policies to integrate the Sámi into Norwegian society with the intention to make space for agricultural practices at the expense of the "primitive"

livelihood of nomadic reindeer husbandry. Contrastingly, reindeer husbandry in Sweden was still seen as an important part in the economy, as it utilized the otherwise unproductive mountains and inland areas (Lantto 2010). Policies thus aimed at protecting the Sámi livelihood: In 1867, a second border additional to the Lapland border, called the Cultivation Border (Odlingsgränsen), was drawn and finalized in 1890. Any land west of this border, separating lands where agriculture was possible from unproductive areas, was reserved for Sámi livelihoods and no new settlements were to be established beyond this border.

The first Swedish Reindeer Husbandry Act was enacted in 1886 and gave the sole privilege of reindeer husbandry to the Sámi. At the same time, however, the Act declared the traditional Sámi lands as property of the Swedish Crown. As shown above, this had no legal support given the previously established Sámi property rights (Lundmark 2006, Össbo and Lantto 2011). The Act established "Lappbyar" (today: sameby), a division of the land particularly reserved for Sámi land use. Abandoning the individual property rights of the customary siida-organization and Sámi taxed lands, the Reindeer Husbandry Act declared that the land use within each lappby be collectivized (SOU 2006; SFS 1886: 38, §5). This was seen as a mere administrative question, without any complications for property laws (Lundmark 2006). One reason to establish these "villages" was to hold reindeer herders liable for damage by reindeer on farmlands (Labba 2015). Furthermore, the Act established the conception of "ideal" reindeer herding practices, i.e., a nomadic livelihood, which was seen as necessary for the cultural survival of the Sámi (Lantto and Mörkenstam 2008). The paternalistic efforts to prohibit Sámi from adopting Swedish culture was seen as a necessary effort for their survival and to protect them from the "degenerative influence" of [Swedish] civilization, known as the "Lapp shall remain Lapp" politics (Lantto 2004). This included the introduction of nomad school for Sámi children, separating them from their families and cultural as well as natural environment.

The result of the development since the 1800s thus was that the Sámi were deprived of access to decision-making processes and had no say in how natural resources should be used, and by whom.

1928 to present: dominance of the state legislation over customary law

In 1928, the Swedish Reindeer Husbandry Act was renewed, and removed the last pieces of earlier rights to land ownership by the Sámi: the taxed lands were abolished, and this removed earlier rights to Sámi land ownership (Lundmark 2006). From now on, all Sámi not owning reindeer were excluded from their Lapp village and lost rights connected to them (Lantto 2004). Contrasting to earlier customary patterns of the siida and its governance of land use, the right to own and herd reindeer was collectivized for the members of a Lapp village (SOU 2006). Furthermore, the option to influence regulations and internal affairs within a Lapp village now were completely in the hands of the Lapp Bailiffs (SFS 1928: 309, §11). The office grew from the 1910 onwards to exercise authority over Sámi affairs (Lantto 2014).

When Sámi resistance gained momentum from the early 20th century onwards, the Lapp Administration was abolished in 1971 (Lantto 2014). Instead, the County Administration Board was made responsible for reindeer husbandry affairs, and in 2007 several tasks were transferred to the Sámi Parliament (Sametinget) (Allard and Labba 2011). The current Swedish Reindeer Husbandry Act (1971) changed the terminology from lappby to sameby, but the rights to use the land within the sameby remains collectivized: the use of the grazing area with a herding district is for "the common needs" of its members (Reindeer Husbandry Act 1971: §15). Thus, there is no legislative recognition of siida customs (Allard 2016), even if the samebyar today have higher independence and became a juridical person (Reindeer Husbandry Act 1971: §10). The responsibility to solve internal conflicts – partly caused by the erosion of customary laws and intrusive state policies in the

preceding centuries – was posed on the samebyar, such as solving issues related to fair access to grazing resources for the individual reindeer herders (Allard and Labba 2011).

Recent court cases have taken into account previously established Sámi property rights that become abolished when the State increasingly took control over the areas and livelihoods in Northern Sweden. In 1993, an amendment to the Reindeer Husbandry Act expressed that the rights of the Sámi people are based on immemorial prescriptive rights – but these rights are usufruct, no rights of land ownership (Strömgren 2015). In 2011, in the Nordmaling case the Swedish Supreme Court ruled that reindeer herders have the right (sedvanerätt) to graze their reindeer also on privately owned land based on customary law (Allard and Brännström 2021). In the Girjas case (2019), the Girjas herding community successfully claimed exclusive hunting and fishing rights on their year-round grazing areas, i.e., west of the cultivation border, as well as control over these rights, such as leasing these rights to others (Allard and Brännström 2021). These developments could be seen as an affirmation that the current Reindeer Husbandry Act fails to sufficiently regulate Sámi property rights, and the right to govern natural resource use on their territory.

Conclusion

Sámi property rights have undergone a shift from a well-working double administration between informal and formal institutions, rooted in Sámi customary law and supported by jurisdiction of the Swedish state, to Sámi law that in Sweden today is subordinate to state-based laws. Sámi scholar Rauna Kuokkanen (2023: 36) points out that the dispossession of the Sámi by invalidation of the siida system and customary rights hinged on the "racialization of the Sámi from propertied individuals into a collective of 'primitive nomads'." That "othering" of formerly well-established networks for trade and taxation to secure property rights signified an important part in the dispossession of the Sámi and the solidification of the colonial property law, where laws and legal institutions are transferred from one society to another (Merry 1991).

As long as reindeer herders' customs do not receive legal recognition or contradict national legislation, their livelihood and culture are vulnerable, may collapse or lead to internal conflict – especially where Sámi law contradicts State law, and different parts of Sámi communities apply different laws (Allard and Labba 2011). Furthermore, the recognition of Sámi law would affirm Sámi self-determination, to which they are entitled according to the UN Declaration of the Rights of the Indigenous Peoples.

Reconciling with the past to amend transgressions into Sámi rights by the State is an ongoing process in Sweden. In the words of sociologist Boaventura de Sousa Santos (2015: 89), such reconciliation processes require the acceptance of past events as "irretrievable loss resulting from human initiatives that had a choice of alternatives, that is a past of empowering memories, one revived for us by the suffering and oppression caused in the presence of other alternatives that could have avoided them". It is a challenge and opportunity alike for present and future Sámi generations to evoke these "empowering memories", including the suffering and oppression of colonial structures, to safeguard the legal recognition of their customary rights.

Case 5: Institutional changes over the last hundred years in the reindeer herding Norway

During the 20th century, reindeer husbandry in Norway went through several transformations (Hovelsrud et al. 2021). Firstly, there was a shift from subsistence economy based on reindeer meat and milk towards a market economy based on meat production. Secondly, a general modernization[5] occurred in the first half of the century, including ordinary schooling for children,

hence families had to change their dwellings from traditional turf huts (*goahti*) and tents (*lávvo*) to wooden houses, resembling those of farmers. Thirdly, a change towards increased motorization with snowmobiles, cars, and ATV commenced in the 1960s. Migration by letting the reindeer swim to the islands near the coast (Vorren 1998) was changed to transport by ferries or trucks; however, such swimming may exist today. In suitable landscapes ATVs, motorbikes, and helicopters were increasingly utilized for gathering the herds and trucks for transportation of animals between seasonal grazing areas. From the 1930s onwards, a change in herd composition and slaughtering strategy in reindeer husbandry occurred (Holand 2007).

Herd composition was traditionally a function of the multipurpose herd, where milking and reproduction of draught power played a major role. The last factor led to a slaughter scheme which was based on adult males, in particular castrates. The herd size represented the owner's capital and was viewed as the best insurance for staying in business. Historically this resulted in rises and falls in reindeer numbers. A new slaughter plan was first introduced in Finland, in the 1960s and 1970s also in Norway and Sweden, and here the highest possible proportion of reproductive females combined with a slaughtering scheme based on calves was tested and recommended for reindeer herding (Skuncke 1969; Lenvik et al. 1988). However, the formal work of refining and testing this new strategy based on modern population theory blended with traditional knowledge. The work started in the Iinnasuolu (Kanstadfjord/Vestre Hinnøy) reindeer herding district in the 1960s (Riseth et al. 2020), and in the Gåbrien sijte (Riast/Hyllingen) reindeer herding district in southern Norway in the early 1970s; it was completed around 1985 (Lenvik et al. 1988). This work was followed up in Ruvhten sitje (Tännäs sameby), a herding community in Sweden adjacent to Gåebrien sijte in Norway. In its simplest form, the modern herd should comprise the highest proportion of reproductive females possible (Holand 2007) and came to be known as the "Røros-modell". The stocking rate should be adjusted to allow females to reproduce early in their life; preferably at an age of 1.5 years, and they should be able to give birth to calves successfully every year. The male segment should be large enough to serve the females during rut. Using 1.5 year old males as breeding bulls means that they can be slaughtered after rut. Only the strongest female and male calves are selected as replacement of the ageing females slaughtered or the culled 1.5 year old males (Lenvik et al. 1988; Holand 2007).

This new form of herding was endorsed by the Ministry of Agriculture and spread as a policy using support and subsidies. Generally, this new policy was successfully introduced and maintained up to the present in South Sápmi and East Finnmark, whereas in other places of Norway, after a short period of testing and failing, a more traditional pattern of herding and herd composition emerged.

Today, slaughtering schemes and herd composition vary a lot and reflect the modifications of the modern strategy adjusted according to natural conditions, predator density, and social settings. However, in many areas the variable grazing pressure, encroachment (i.e., wind-power parks, tourism, infrastructure, agriculture) makes the implementation of the model difficult (Holand 2007; Hovelsrud et al. 2021). This is seen locally where ecological services such as maintenance of the semi-natural landscape (open heaths) come into play, or where reindeer serve as prey for predators (Holand 2007). This may in the future call for different slaughtering strategies and herd composition, but some elements of the "Røros-modell" will still remain (Holand 2007).

Case 6: Earmarking in Norway: the introduction of individual tagging of reindeer

According to the New Norwegian Reindeer Herding Act from 2007 (LMD 2007), which regulates reindeer herding in Norway, only those who have the right to a reindeer earmark can conduct

reindeer husbandry in the Sámi reindeer herding area. The right to a reindeer earmark requires that the person is a Sámi and that they themselves, their parents or their grandparents have or had reindeer herding as their primary occupation.

A reindeer earmark is a combination of cuts in a reindeer's ears which all together tells who the reindeer owner is. There are around 20 different approved cuts and additionally about 30 different combinations of cuts, and all those cuts and combinations have their own name in all Sámi languages. All reindeer in the Sámi reindeer husbandry area shall be marked with the owner's registered earmark by 31 October of the year the calf is born. Before an earmark is implemented, it shall be approved by the earmark committee consisting of 3 to 5 members. After approval the earmark shall be announced.

In the last decade, governmental authorities have attempted to introduce individual earmarking including RFID of the reindeer (e.g. different tags of plastic and electronic tags, as in the Yamal case described above) in order to enhance control over herd structure, composition and the numbers within the herd, and finally, in order to avoid wrong identification in corrals. The reindeer herders were sceptical about such control and afraid that the authorities would remove the old earmarking system whereby every new-born member of the siida/group receives a special and lifelong gift from their parents. The Sámi parliament and Sámi Reindeer Herders Association of Norway were against the proposition in the Norwegian Parliament (Stortinget). However, the Norwegian Parliament voted for an amendment of the Reindeer Herding Act, to the effect that that the old earmarking system should continue, simultaneously stipulating that each reindeer should have an individual plastic tag for enhanced identification (change of paragraph 33 in the Reindeer Herding Act). But the law is written in such a way that the authorities may introduce RFID later for eventual digital control by the authorities.

Case 7: Use of slaughtering knives in Norway stopped by an EU Directive

Originally developed by scientific activists in the 1920s, curved knives were designed to combine efficiency and ease of use with the elimination of visible animal pain, thus bringing Indigenous slaughter practices in line with the political and moral concerns of the time (Reinert 2012). After few years, the innovation was highly successful, and the knives rapidly adopted as essential tools in reindeer herding. In 2003, the authorities in Norway found that the use of curved knife was in direct contradiction to the EU Council Directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing. The use of curved knives was forbidden by law the same year. This was also followed up by animal welfare activists who decried these knives as barbaric tools, while herders defended them as a part of their cultural heritage. But the reindeer herders, supported by Sámi politicians in the Sami Parliament, did not give up the struggle. They were backed by scientists that declared the knives as very safe and giving the reindeer less pain than other slaughtering methods. Finally, followed by a scientific and public hearing, a new directive on curved-knife stunning was introduced on 30 July 2008 (LMD 2008). "According to the opening paragraph, its aim is to open for the [...] defensible use of curved knife as a stunning method outside slaughterhouses [...] and thereby preserve opportunities for traditional reindeer slaughter in the exercise of Sámi culture" (§1). One of the aspects that led to the change of the law in 2003 became emergent: back then, a directive exemption could have been negotiated, considering the cultural aspects of the practice, similar to bullfighting in Spain or other cases (Reinert 2012).

Case 8: Formal and informal aspects of reindeer pasture management and land-use planning in northern Finland

Planning the reindeer pasture use in Finland is a good example of the complex interaction of local reindeer herding practices and state authorities' regulations. Debates on competing forms of land use and attempts to find solutions illustrate the current tensions between formal and informal institutions in reindeer husbandry. This case study is based on literature and fieldwork interviews and workshops with reindeer herders and experts in state agencies in Finland.

The Reindeer Management Area (RMA) covers the northernmost third (36%) of Finland's territory. In this area, semi-domesticated reindeer have a free grazing right which is not dependent on land ownership, with certain limitations. Of the 54 reindeer herding districts (paliskunta, plural: paliskunnat, henceforward: RHD) the 20 northernmost districts belong to the area specifically intended for reindeer husbandry (ASR), and the 13 northernmost belong to the Sámi Homeland Area (SHA). Each RHD constitutes an official actor governed by legislation (Löf et al. 2022). Informally, however, the decision making related to pasture use and practical work arrangements and scheduling is often handled at lower level: in Sámi RHDs this is the siida (family group/kinship; see Case 4); outside the Sámi area in Finland, similar types of long-term arrangements exist, known as työporukat or tokkakunnat, for example. Relationships between various sub-groups within a given RHD may vary; there are cases when internal conflicts practically mean that certain herds can use only parts of the herding district land area for grazing. Sometimes pasture use can be flexibly negotiated not only within the own district, but also with neighboring districts.

Interacting with many state authorities, the Reindeer Herders' Association (Paliskuntain yhdistys), based in Rovaniemi, has thus far been representing the interests of all reindeer herders in Finland. However, this has been recently challenged by most of the RHDs in the SHA, and at the moment it is difficult to say which actor is accepted to represent whom in Finland. There is an association of Sámi herding districts (Saamelaispaliskunnat ry) which represents the voices of most of the districts situated in the SHA.

Even though the nomadic way of reindeer herding was discontinued already more than 100 years ago in Finland, and herding cooperatives need to herd their animals within rather small herding district areas, seasonal pasture rotation is nevertheless practiced in most of the districts at least to certain extent. Herders determine the quality of the pasture by vegetation, connectedness and peacefulness, diversity, and accessibility (Kitti, Gunslay, and Forbes 2006). During recent decades, the supplementary winter feeding (in the forest or in home enclosures) has become common in many herding districts, especially in the southern part of the RMA. This has led to even more granular decision-making related to pasture use and supplementary feeding. Supplementary feeding is a somewhat contested practice; often it occurs out of sheer necessity, partly due to extreme weather situations in line with environmental change, partly due to competing forms of land use, such as felling of old-growth forests (see below).

Planning the seasonal pasture use within the herding district is one important task of all herding cooperatives. This may mean simply following the animals and guiding their movement only when necessary (for example, to avoid grazing on agricultural fields, to protect reindeer from predation, to move them to another pasture area with easier snow conditions), taking care of seasonal pasture rotation between separate summer and winter areas, and/or keeping certain pastures un-grazed for several years, to enhance the lichen growth, and/or saving certain pastures for extremely difficult winters as refuges. If winter pastures are not good enough to sustain the herd, which is case in many areas in the RMA in Finland, or if winter conditions require feeding (deep or icy snow cover

and no accessible old-growth forests with arboreal lichen), decisions whether or not to feed, and how, are also part of this planning.

National legislation has long been interested in the "status of reindeer pastures". In particular, there is the worry of potential overgrazing, degradation of lichen pastures, and potential damage to forests caused by reindeer. Winter stock should not exceed the sustainable productivity of winter pastures. The idea about the Tragedy of the Commons (Autto 2014; cf. Hardin 1968) and the need to control the reindeer number can be seen in the legislation. Limiting the number of reindeer is considered necessary also to safeguard the agriculture lands and alleviate potential conflicts with other land-users and residents within the reindeer herding area (Sarkki et al. 2022). The maximum allowed number of reindeer per district is determined once per decade by a working group nominated by the Ministry of Agriculture and Forestry. To evaluate the current state of pastures, the Natural Resources Institute (Luonnonvarakeskus) collects pasture inventory data. According to the pasture inventories, the condition of lichen pastures (winter pastures) has been decreasing during the past decades (Kumpula et al. 2019).

At the moment, a new formal tool is being developed: pasture management plans (PMP) for each RHD. Districts are obliged to choose two of these actions: decrease their winter stock by 7% of the maximum allowed number; slaughter the reindeer early in the autumn; take actions to enhance the lichen pastures; develop summer pasture rotation; and/or combine districts (MMM 2023). The aim behind these options is to induce RHDs to organize pasture use within their borders, to minimize the harmful impacts of reindeer grazing to ecosystems, and to reduce conflicts between herders and other land users. Whether these stipulations improve the welfare of reindeer and wellbeing of herders needs to be seen: some fear that these regulations have been introduced for the sake of other forms of land use.

The PMP pilot phase is starting in several RHDs in autumn 2023. How soon this operational model will be applied in all RHDs (and how formally binding and official the documents will be) remains to be seen. In any case, the development of PMPs is a telling example of top-down governance tools. It derives from the formal concept of paliskunnat and the slightly utopist idea that RHDs have the potential to enhance pasture use and pasture state (lichen cover, biodiversity). However, this assumption is no without problems. True, grazing affects the vegetation in many ways, and very low or very high grazing pressure can degrade biodiversity (Stark et al. 2023). But to fully understand the position and practical possibilities of herders and herding communities to improve pasture quality and management within their district borders, other types of land use need to be considered too: forestry, hunting, agriculture, mining, the "green energy" sector (wind parks), along with tourism. These types of land use have been intensifying within the RMA during the past decades (Kumpula and Siitari 2020; Rasmus et al. 2021; Horstkotte et al. 2022). In sum, they have caused a decrease in the range of undisrupted pastures.

At a CHARTER workshop organized in Finland in 2022, land-use planning was seen as the most critical factor, thinking about future aims of the livelihood (Rasmus et al. 2023). Almost all RHDs have experienced challenges and conflicts with one or several land-use types. In the southern and mid-Lapland districts, forestry and agriculture were most often mentioned – and in some districts, participants explicitly mentioned mining, wind power, traffic, peat production and predation (often linked to nature conservation areas, although these are considered to be good for the livelihood otherwise). In the Sámi region, gold mining, tourism and the plans of constructing the Arctic Railway were mentioned in addition to forestry, traffic and predation. Thus, pastureland is impacted by not only reindeer grazing, but also those multiple other activities. Consequently,

the grazing pressure increases on the few remaining undisturbed pastures (Jaakkola et al. 2013; Kumpula and Siitari 2020; see also Pape and Löffler 2012; Pettersson et al. 2017).

Land use planning in Finland is based on the Land Use and Building Act. National land use guidelines (prepared by the Ministry of the Environment) direct the regional and municipal planning; these are specific and concrete plans. The land use planning system includes also regional schemes and programs, regional and municipal strategies and municipalities' land policy and building ordinances. Within the ASR, however, state-owned land cannot be used for activities causing "significant harm" to reindeer husbandry. One aim mentioned in the national land use guidelines is to "safeguard the land-use related prerequisites of reindeer husbandry".

Metsähallitus administers the state-owned land in Finland. Over 80% of these lands are within the RMA. Almost half of the state-owned land in Lapland are wilderness areas, protected areas, and national parks. While Metsähallitus is responsible for supervising land-use management (based on management plans), it also has a stake in forestry: its name translates as Forest Authority, and it authorizes forest-cutting activities. Forestry has been practiced for decades within the RMA. Forestry measures have decreased the number, surface area and/or the quality of reindeer pastures, particularly in the southern and eastern areas of the RMA. Forestry has led to changes in practices in the livelihood (Jaakkola et al. 2013; Kumpula et al. 2014; Kivinen 2015; Turunen et al. 2020).

Understandably, reindeer herders were dissatisfied with the power of Metsähallitus. However, in spite of long-standing conflicts, the relationship between RHDs and Metsähallitus has improved. A comprehensive agreement has been negotiated, spelling out collaboration methods, restrictions and procedures of communication. Within the SHA, a separate collaboration agreement has been negotiated. Metsähallitus works also towards reconciling increasing tourism with herding, for example by consulting districts about new snowmobile routes. Local participation is to be facilitated through public hearings and meetings of stakeholder groups. Moreover, Metsähallitus has obliged itself to follow the Akwé: Kon Guidelines in all land-use and management plans in Sápmi (a protocol developed for cultural, environmental, and social impact assessment to be applied in regions inhabited or used by Indigenous peoples; Markkula et al. 2019). Arguably, the confrontation between reindeer herding and forestry is less tense than it used to be. Some other land-use types may be nowadays much more problematic and less regulated (for example, hunting).

Representatives from RHDs and the Paliskuntain yhdistys actively participate in land-use planning negotiations, Environmental Impact Assessment procedures, management planning for protected areas, mining related processes, and traffic planning. But even though herders are consulted during the planning of land-use projects affecting their livelihood, they do not necessarily have enough leverage to affect decision-making processes (Landauer and Komendantova 2018).

Moreover, RHDs are not congruent with municipalities. Some herding districts make only part of one municipality (or parts of several districts make the area of one municipality), and many districts comprise territories of more than one municipality. Therefore, it is easy to understand that negotiations about land-use on reindeer pastures are carried out between many sectors and actors with heterogenous agenda, and in varying power relationships. Often herding communities feel that the negotiations take place "above their heads". There is potential to have a say in the negotiations, but keeping up and participating is also burdensome to cooperatives.

Against this backdrop, the formal idea of PMPs, of the reindeer herding districts as actors responsible for the quality of pastures within their borders, and as actors with power to decide on pasture use and reindeer grazing within its area, sounds very different from the informal reality that unfolds in and around the herding cooperatives from one season to the next.

Discussion

On the first sight, the eight cases of interactions between formal and informal institutions and practices of going about the reindeer-herding business look very different. Indeed, they refer to different levels of organization, the practices they describe serve different purposes, and they exist in different cultural and political settings. Still, behind their different façades, all the cases described have certain common traits, which can reveal a lot about how the interaction between formal and informal ways to do things actually works.

The first common trait is that all the cases describe a certain tension between the formal and informal practices and institutions. The magnitude of the tension can vary from a relatively insignificant divergence to open conflict. Still, even in the least severe cases, there is always a moment when the practitioner – in our case a reindeer herder – has to choose between following either the one or the other. This is probably not surprising because, whatever lawyers have to say about tradition as a source of law, formal regulations are introduced by relevant authorities to amend or at least stabilize and fulfill existing informal practices and hence they are most often in tension and in a dialogue with the latter.

Second, the cases described show generally three ways of how the relations between the formal and informal practices and institutions can develop, depending mainly on the strategies formal managers can choose or are willing to design and enforce the formal practices: there can be an attempt to subdue and replace the informal ways to do things with the formal ones; there can be an attempt to incorporate the informal ways into the formal procedures usually by codifying and stabilizing the former; there can be an attempt to design the formal practices in such a way as to co-exist with the informal ones by delimiting the spheres of application for each.

Note that although the first model can look authoritarian and brute, its use is not restricted to authoritarian administrative regimes such as those of the Soviet Union and contemporary Russia or early modern Sweden, although these regimes, as the historical overviews above suggest, indeed made numerous attempts to force new ways and practices on reindeer herders instead of those the herders already had without the state's administrative control. However, as the cases of slaughtering practices and imposing particular economic models in modern Norway suggest, democratic regimes not infrequently do the same. What is more interesting and important, however, these attempts, as it seems, almost never work the way the administrators expect them to: the informal practices do not disappear to give place to the formal ones. Rather they get transformed and adapted, either to be enacted as a "hidden transcript" (see Scott 1990) outside the sight of the authorities or even to abuse the formal practices and institutes to the herders' advantage (as exemplified by the case of calf distribution among Komi reindeer herders). This result is problematic rather than optimistic: as James Scott (1990) noted, hidden transcripts, whatever is their origin, tend to develop into practices with a specific purpose – to mock the "system" – and therefore they become useless in the best case and maladaptive and dangerous in the worst case once the "system" changes.

In accordance to Yulian Konstantinov (2015), one of the most important reasons the large semi-state reindeer herding enterprises – the descendants of the Soviet *sovkhozes* – still exist in the western part of Russian Arctic despite their obvious economic inefficiency and chronic dependence on State subsidies is that local herders are both unable and unwilling to change their way of life which is essentially based on informally abusing these enterprises (the way of life Konstantinov calls "sovkhoism"). The obvious failure of the Eastern Siberian reindeer herding to

adapt to the market economy, which was mentioned in the introduction to this paper, could be explained in a similar way: the "hidden transcripts" on which the life of the local herders was based (despite looking like "traditional herding practices" that survived under the Soviet oppression) in fact could not work without the formal practices and institutions within which they took shape and which they were designed to mock and abuse. Regardless of the greater or lesser efficacy of any one "hidden transcript", the lesson all the cases in our paper teach is quite clear: whatever amount of power the managing administrations can have and whatever brutal and uncontrolled can be their use of this power, they cannot turn the dialogue between formal and informal into a monologue of orders. Rather an attempt to do that would simply degrade enormously the quality of the dialogue.

The strategy of incorporating informal practices and elements into a formal system of management by formalizing them and giving them an official status looks much more democratic. It is noticeable, therefore, that this strategy, as it seems, has been used more or less equally by authoritarian and democratic management regimes. The examples include the land-use arrangements of early modern Sweden (before the late 18th century) and earmarking practices in modern Russia and Norway (interestingly, the same earmarking practices were widely used in the Soviet Union, and no attempt to formalize them was undertaken to the best of our knowledge). Our cases suggest two things to be noted in relation to this strategy. First of all, the informal practices and institutions cannot stay the same after being incorporated into the formal settings – and the same can be said about the formal settings themselves after incorporating the informal practices and institutions. Indeed, their formalization in most cases deprives them of their probably the most important asset: their flexibility and adaptability.

Thus, the informal early siida-based land-use arrangement could change depending on the main economic occupation of siida members: those communities and households that specialized on fishing could arrange better access to fishing resources in exchange for access to other resources on which their neighbors could specialize. The formalization of land access by the means of law, even if it reflected well the informal land use in some particular moment of time, could become a problem after the economic specialization of the local population changed, as was the case in Sweden in the late 16th and 17th century after the transition of the local Sámi to full-fledged reindeer pastoralism (Larsson and Päiviö Sjaunja 2022). Similarly, among reindeer herders in Russia, it was not uncommon to change private earmarks depending on the earmarks and the sizes of herds of one's neighbors in order to make them more visible (and, sometimes, to allow for appropriation of reindeer from *sovkhoz* herds by changing their earmarks). The formalization of earmarks made this impossible. Second, even if the informal practices are not too much modified in the process of their formalization, their further existence and application becomes dependent not only and even not so much on the needs of the people "on the ground", as it is the case with the informal practices and institutions, but on the logic of the formal management system, which is often inattentive to and even ignorant of these needs. The replacement of traditional earmarks with tags in the Yamal-Nenets Autonomous Okrug and using the latter for vaccination and other kinds of control is a good example.

Note, however, that we do not wish to criticize incorporating informal institutions and practices into the formal management systems per se. Indeed, whatever can be said about the Sámi land-use arrangement of early modern Sweden, it seems to have obvious advantages in comparison to the authoritarian systems that replaced it since the late 18th century. The only thing we wish to demonstrate is that the strategy has its limitations and these should be kept in mind.

Finally, our set of cases contains one example from northern Finland reflecting an attempt to make formal practices co-exist with the informal ones by delineating the spheres of their application. In

accordance to this strategy, the formal management produces certain tasks (including keeping reindeer numbers to certain limits, ensuring a certain degree of renewal of grazing resources, etc.) and mostly leaves it to the reindeer-herding cooperatives to solve these tasks by whatever informal means and practices they have. This approach aims at a dialogue – it may even leave the last word to the informal side. One can expect, therefore, that if the arrangement would work as planned, then the very flexibility and adaptability of the informal institutions and arrangements would work for it and the new institutions and informal practices could develop to make the whole management structure more effective. The only thing which is still to be seen is if the arrangement will indeed work as planned. As it was said in the description of this case, this is a rather big "if".

Conclusions

Since the role of the so-called "traditional" institutions and practices had been finally appreciated by management sciences, it became a common trope to call for incorporating them into management arrangements and/or engaging in a dialogue with them in a different form, in order to "join forces" for better management leading to a better world. Of course, little can be said against such a call in principle, and the authors of this paper do not disagree with it. However, it seems to us that some aspects of this call need to be further clarified in order for the claim itself to make sense. In this paper we used our knowledge and data on reindeer herding communities to make the following arguments-as-clarifications:

First, we submit that the call to start a dialogue between the "traditional" and "conventional" management institutions and practices is more than a bit belated. Such a dialogue has been going on probably as long as the so-called "conventional" practices came to existence and certainly as long as they have spread globally. Furthermore, this dialogue has made an impact on both the "conventional" and "traditional" practices as we know them now. For this reason, we prefer to name them formal and informal rather than conventional and traditional. It would be also worth adding that in most of the places and in most of the time periods the quality of the dialogue was rather poor. This has had damaging consequences, up to turning the informal institutions and practices into "hidden transcripts", thereby making them dependent on dominating scripts for their meaning, effectiveness and very existence. This fact should be taken into account when planning future dialogue.

Second, although incorporating the informal practices into the formal arrangements is generally a sound solution, it is not without certain traps. Thus, the informal practices and institutions owe a large part of their so much prized effectiveness to their flexibility and adaptability. However, these are exactly the traits which most often fall victim to their formalization and inclusion into formal arrangements. Furthermore, they usually come to be replaced by rigidness and control as the main elements of the formal management logic. Due to this logic, the informal practices themselves can easily be turned into devices of tight supervision and consequently become avoided by their former practitioners.

It looks like a better solution, therefore, to keep informal practices and institutions informal, to delineate a sphere of their application vis-à-vis the sphere of formal practices and to organize a proper exchange of inputs and outputs between these spheres. In theory, this decision is not only the most democratic but also the most effective because it allows to keep the advantages of the informal practices (their flexibility and adaptability) intact. However, it remains to be seen if such an arrangement can be realized in practice.

References

Internet resources:

Beznosova, K. (2021). Aborigeny Iamala gotoviatsia k protestam [Yamal natives are preparing for protests (press release, 26 March 2021)]. https://ura.news/news/1052477676 (accessed 27 September 2023).

CNEWS (2022). RFID schityvateli Chainway ispol'zuiutsia dlia ucheta pogolov'ia olenei na Iamale [RFID readers Chainway are used for counting reindeer in Yamal (press release, 10 October 2022)]. https://www.cnews.ru/news/line/2022-10-10_rfid_schityvateli_chainway_ispolzuyutsya (accessed 27 September 2023).

LMD (Landbruks- og matdepartementet 2007). Lov om reindriften [Reindeer Herding Act]. LOV-2007-06-15-40. https://lovdata.no/dokument/NL/lov/2007-06-15-40/ (accessed 27 September 2023).

LMD (Landbruks- og matdepartementet 2008). Forskrift om bruk av krumkniv. Directive [Regulations on the use of the curved knife]. FOR 2008-07-30-866. https://lovdata.no/dokument/SF/forskrift/2008-07-30-866 (accessed 27 September 2023).

Lubimskaia, E. (2016). Roga i kopyta pod kontrolem. Kodirovannyi chip – novoe ukrashenie dlia olenei Priural'skoi tundry [Reindeer antlers and hooves are under control. The coded chip – a new decoration for reindeer of the Polar Ural tundra (press release, 16 November 2016)]. https://vesti-yamal.ru/ru/vjesti_jamal/roga_i_kopyita_pod_kontrolem_kodirovannyiy_chip_-_novoe_ukrashenie_dlya_oleney_priuralskoy_tundryi158446/ (accessed 27 September 2023).

Makeeva, Iuliia (2020). Kak markiruiut olenei v Iamalo-Nenetskom avtonomnom okruge [How reindeer in the Yamalo-Nenets Autonomous Okrug are marked (interview with Evgenii Popov, 12 August 2020)]. https://vetandlife.ru/mneniya/kak-markiruyut-olenej-v-yamalo-neneckom-avtonomnom-okruge/ (accessed 27 September 2023).

MMM (Maa- ja metsätalousministeriö 2023). Porotalouden tulevaisuus [The future of reindeer herding (report)]. https://mmm.fi/hanke2?tunnus=MMM040:00/2021 (accessed 27 September 2023).

Regnum (2019). Birka na iamal'skom olene kak propusk na uboi [Ear tag on the Yamal reindeer as a passport for slaughter (press release, 1 August 2019)]. https://regnum.ru/news/2678441 (accessed 27 September 2023).

SOU (Statens Offentliga Utredningar 2006). Samernas sedvanemarker: Betänkande av Gränsdragningskommissionen för renskötselområdet [The customary lands of the Sami: Report of the Boundary Drawing Commission for the Reindeer Management Area]. Stockholm: Regeringskansliet. https://www.regeringen.se/rattsliga-dokument/statens-offentliga-utredningar/2006/02/sou-200614/ (accessed 27 September 2023).

Yamal Expedition (2015). Ovody, griby i metki na olenikh ushkakh [Gadflies, mushrooms and reindeer earmarks (report, 15 July 2015)]. http://www.yamalexpedition.ru/ru/blog-ru/ovody-griby-i-metki-na-olenikh-ushkakh-prodolzhaem-letnie-rasskazy (accessed 27 September 2023).

Zagorskii, V. (2021). Tsifrovizatsiia olenevodstva: o novykh tekhnologiiakh v birokovanii rogachei na Iamale [Digitalization of reindeer herding: new technologies in tagging reindeer in Yamal (press release, 7 July 2021)]. https://vesti-yamal.ru/ru/vjesti_jamal/cifrovizaciya_olenevodstva_o_novykh_tekhnologiyakh_v_birkovanii_rogachei_na_yamale/ (accessed 27 September 2023).

Literature:

Aarseth, B. (1989). Grenseoppgjørene og konsekvensene av disse for den nordsamiske bosetting i Norge [The border settlements and their consequences for the Northern Sami settlement in Norway]. In: *Grenser i Sameland*, ed. B. Aarseth (pp. 43-82). Oslo: Samiske samlinger, 13.

Allard, C., & Brännström, M. (2021). Girjas Reindeer Herding Community v. Sweden: analysing the merits of the Girjas Case. *Arctic Review*, 12: 56-79.

Allard, C., & Oskal-Labba, K. (2011). Samebyns interna organisation [The internal organisation of samebyar]. *Förvaltningsrättslig Tidskrift*, 2011 (2): 197-236.

Allard, C. (2015). Some characteristic features of Scandinavian law and their influence on Sámi matters. In: *Indigenous rights in Scandinavia,* ed. C. Allard & S.F. Skogvang (pp. 49-64). New York: Routledge.

Autto, H. (2014). *Collective action in commons: its diverse ends and consequences*. Doctoral thesis. Political Science Department of Political Science and Contemporary History. University of Turku.

Berkes, F., & Folke, C., eds (1998). *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge: Cambridge University Press.

Berkes, F., & Folke, C. (2002). Back to the future: ecosystem dynamics and local knowledge. In: *Panarchy: understanding transformations in human and natural systems*, ed. L.H. Gunderson & C.S. Holling (pp. 121-146). London: Island Press.

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of Traditional Ecological Knowledge as adaptive management. *Ecological Applications* 10, (5): 1251-1262

Bjørklund, I. (1990). Sami reindeer pastoralism as an indigenous resource management system in northern Norway: a contribution to the common property debate. *Development and Change*, 21 (1): 75-86.

Broderstad, E. G. (2013). Cross-border reindeer husbandry: between ancient usage rights and state sovereignty. In: *The proposed Nordic Saami Convention: national and international dimensions of Indigenous property rights*, ed. N. Bankes & T. Koivurova (pp. 149-174). Oxford: Hart Publishing.

de Sousa Santos, B. (2015). *Epistemologies of the South: justice against epistemicide*. New York: Routledge.

Donskoi, F.S. (1987). Puti zaversheniia perevoda kochevogo naseleniia severa Tiumenskoi oblasti na osedlyi obraz zhizni [Ways to complete the transfer of nomadic population in the north of Tiumenskaia Oblast' to a sedentary way of life]. *Regional'nye problem sotsial'no-demograficheskogo razvitiia*, ed. B.B. Prokhorov, pp. 71-85. Moskva: Institut sotsiologicheskikh issledovanii Akademii Nauk SSSR.

Gray, P. A. (2000). Chukotkan reindeer husbandry in the post-socialist transition. *Polar Research*, 19 (1): 31-37. https://doi.org/10.3402/polar.v19i1.6527

Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162 (3859): 1243-1248. https://doi.org/10.1126/science.162.3859.1243

Holand, Ø. (2007). Herd composition and slaughtering strategy in reindeer husbandry – revisited. *Rangifer Report*, 12: 21-33.

Horstkotte, T., Kumpula, J., Sandström, P., Tømmervik, H., Kivinen, S., Skarin, A., Moen, J., & Sandström, S. (2022). Pastures under pressure: effects of other land users and the environment. In: *Reindeer husbandry and global environmental change: pastoralism in Fennoscandia*, ed. T. Horstkotte, Ø. Holand, J. Kumpula, & J. Moen (pp. 173-187). New York: Routledge. DOI: 10.4324/9781003118565-13

Hovelsrud, G.K., Risvoll, C., Riseth, J.Å., Tømmervik, H., Omazic, A. & Albihn, A. (2021). Reindeer herding and coastal pastures: adaptation to multiple stressors and cumulative effects. In: *Nordic perspectives on the responsible development of the Arctic: pathways to action*, ed. D. C. Nord (pp. 113-134). Cham: Springer. https://doi.org/10.1007/978-3-030-52324-4_6

Istomin, K.V. (2020). Post-Soviet reindeer herders: between family and collective herding. *Region: Regional Studies of Russia, Eastern Europe, and Central Asia* 9 (1), 25-52. https://doi.org/10.1353/reg.2020.0005.

Jaakkola, L.M., Heiskanen, M.M., Lensu, A.M., & Kuitunen, M. (2013). Consequences of forest landscape changes for the availability of winter pastures to reindeer (Rangifer tarandus tarandus) from 1953 to 2003 in Kuusamo, Northeast Finland. *Boreal Environmental Research*, 18: 459-472.

Jernsletten, J.-L., & Klokov, K.B. (2002). *Sustainable reindeer husbandry*. Tromsø: University of Tromsø.

Khaimina, L.E., Zelenina, L.I., Khaimin, E.S., & Antufyev, D.I. (2021). Reindeer Tracking Technologies in the Russian Federation. *Arktika i Sever*, 45: 48-60. DOI: 10.37482/issn2221-2698.2021.45.48

Kitti, H., Gunslay, N., & Forbes, B. (2006). Defining the quality of reindeer pastures: the perspectives of Sámi reindeer herders. In: *Reindeer management in northernmost Europe: linking practical and scientific knowledge in social-ecological systems*, ed. B.C. Forbes, M. Bölter, L. Müller-Wille, J. Hukkinen, F. Müller, N. Gunslay & Y. Konstantinov (pp. 141-165). Berlin: Springer.

Kivinen, S. (2015). Many a little makes a mickle: cumulative land cover changes and traditional land use in the Kyrö reindeer herding district, northern Finland. *Applied Geography*, 63: 204-211.

Konstantinov, Y. (2015). *Conversations with power: Soviet and post-Soviet developments in the reindeer husbandry part of the Kola Peninsula*. Uppsala: Uppsala Universitet.

Konstantinov, Y. (2023). *Power and the People*. Cham: Palgrave Macmillan. https://doi.org/10.1007/978-3-031-38306-9.

Korpijaakko-Labba, K. (1994). *Om samernas rättsliga ställning i Sverige-Finland: en rättshistorisk utredning av markanvändningsförhållanden och-rättigheter i Västerbottens lappmark före mitten av 1700-talet* [On the legal status of the Sami in Sweden-Finland: a legal historical investigation of land use conditions and rights in the Västerbotten Lapland before the middle of the 18th century]. Helsinki: Juristförbundets förlag.

Kumpula, J., & Siitari, S., eds (2020). Kestävä biotalous porolaitumilla -hankkeen osaraportit, johtopäätökset ja toimenpide-ehdotukset [Partial reports, conclusions and action proposals of the sustainable bioeconomy in reindeer pastures project]. *Luonnonvara- ja biotalouden tutkimus 4/2020*. Helsinki: Luonnonvarakeskus.

Kumpula, J., Kurkilahti, M., Helle, T., & Colpaert, A. (2014). Both reindeer management and several other land use factors explain the reduction in ground lichens (Cladonia spp.) in pastures grazed by semi-domesticated reindeer in Finland. *Regional Environmental Change*, 14: 541-559.

Kumpula, J., Siitari, J., Siitari, S., Kurkilahti, M., Heikkinen, J., Oinonen, K. (2019). Poronhoitoalueen talvilaitumet vuosien 2016-2018 laiduninventoinnissa: Talvilaidunten tilan muutokset ja muutosten syyt [Winter pastures in the reindeer husbandry area in the 2016-2018 pasture inventory: Changes in the state of winter pastures and the reasons for the changes]. *Luonnonvara- ja biotalouden tutkimus 29/2019*. Helsinki: Luonnonvarakeskus.

Kuokkanen, R. (2023). From Indigenous private property to full dispossession – the peculiar case of Sápmi. *Comparative Legal History*, 11 (1): 23-44.

Labba, K. (2015). The Legal organization of Sami reindeer herding and the role of the siida. In: *Indigenous Rights in Scandinavia*, ed. C. Allard & S. F. Skogvang (pp. 141-154). New York: Routledge.

Landauer, M., & Komendantova, N. (2018). Participatory environmental governance of infrastructure projects affecting reindeer husbandry in the Arctic. *Journal of Environmental Management*, 223: 385-395.

Lantto, P., & Mörkenstam, U. (2008). Sami rights and Sami challenges: The modernization process and the Swedish Sami movement, 1886-2006. *Scandinavian Journal of History*, 33 (1): 26-51.

Lantto, P. (2004). Nationell symbol, etnisk markör eller utdöende näring? Bilden av renskötseln och dess betydelse inom samerörelsen i Sverige 1900–1960 [National symbol, ethnic marker or dying industry? The image of reindeer husbandry and its significance within the Sami movement in Sweden 1900–1960]. In: *Befolkning och bosättning i norr: etnicitet, identitet och gränser i historiens sken*, ed. P. Lantto & P. Sköld (pp. 279-297). Umeå: Centrum för samisk forskning, Umeå universitet.

Lantto, P. (2010). Borders, citizenship and change: the case of the Sami people, 1751-2008. *Citizenship Studies*, 14 (5): 543-556.

Lantto, P. (2014). The consequences of state intervention: forced relocations and Sámi rights in Sweden, 1919-2012. *Journal of Ethnology and Folkloristics*, 8 (2): 53-73.

Larsson, J., & Päiviö Sjaunja, E.L. (2022). *Self-governance and Sami communities: transitions in early modern natural resource management*. Cham: Palgrave Macmillan.

Lenvik, D., Bø, E., & Fjellheim, A. (1988). Utvalgsstrategi i reinflokken. 3. Reinkalvens høstvekt relatert til mødrenes vekt og alder [Selection strategy in the reindeer herd, part 3: The autumn weight of the reindeer calf related to the mothers' weight and age]. *Norsk landbruksforskning*, 2: 65-69.

Löf, A., Raitio, K., Forbes, B.C., Labba, K., Landauer, M., Risvoll, C., & Sarkki, S. (2022). Unpacking reindeer husbandry governance in Sweden, Norway and Finland: a political discursive perspective. In: *Reindeer husbandry and global environmental change: pastoralism in Fennoscandia*, ed. T. Horstkotte, Ø. Holand, J. Kumpula, & J. Moen (pp. 173-187). New York: Routledge. DOI: 10.4324/9781003118565-13.

Lundmark, L. (2006). *Samernas skatteland i Norr- och Västerbotten under 300 år* [Sámi tax land in Norrbotten and Västerbotten in the course of 300 years]. Stockholm: Institutet för rättshistorisk forskning.

Manker, E.M. (1953). *The nomadism of the Swedish Mountain Lapps: the Siidas and their migratory routes in 1945*. Stockholm: Acta Lapponica/Nordiska museet.

Marin, A., & Bjørklund, I. (2015). A tragedy of errors? Institutional dynamics and land tenure in Finnmark, Norway. *International Journal of the Commons*, 9 (1): 19-40.

Markkula, I., Turunen, M., & Kantola, S. (2019). Traditional and local knowledge in land use planning: insights into the use of the Akwé: Kon Guidelines in Eanodat, Finnish Sápmi. *Ecology and Society*, 24 (1): 20. https://doi.org/10.5751/ES-10735-240120

Merry, S.E. (1991). Law and colonialism. *Law and Society Review*, 25 (4): 889-922.

Össbo, Å., & Lantto, P. (2011). Colonial tutelage and industrial colonialism: reindeer husbandry and early 20th-century hydroelectric development in Sweden. *Scandinavian Journal of History*, 36 (3): 324-348.

Ostrom, E. (2015). *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press.

Pape, R., & Löffler, J. (2012). Climate change, land use conflicts, predation and ecological degradation as challenges for reindeer husbandry in northern Europe: what do we really know after half a century of research? *Ambio*, 41 (5): 421-434. doi: 10.1007/s13280-012-0257-6

Pettersson, S., Hallikainen, V., Naskali, A., Rovanperä, S., & Tuulentie, S. (2017). Ympäristökonfliktit Suomessa: mistä on kiistelty ja miksi? [Environmental conflicts in Finland: what issues have been disputed over and why?]. *Terra*, 129 (2): 87-107.

Rasmus, S., Sarkki, S., Pekkarinen, A.-J., Jokinen, M., Mettiäinen, I., Post, L., Rikkonen, T., Sorvali, J., & Väärälä, T. (2023). The future of reindeer husbandry: surprises and dreams – a workshop summary report. CHARTER Working Paper 3. https://www.charter-arctic.org/wp-content/uploads/2023/02/Reindeer-husbandry-dreams-and-surprises-report.pdf

Rasmus, S., Wallen, H., Turunen, M., Landauer, M., Tahkola, J., Jokinen, M., & Laaksonen, S. (2021). Land-use and climate related drivers of change in the reindeer management system in Finland: geography of perceptions. *Applied Geography*, 134: 102501. https://doi.org/10.1016/j.apgeog.2021.102501

Reinert, H. (2012). Knives for the slaughter: notes on the reform and governance of Indigenous reindeer slaughter in Norway. *Acta Borealia*, 29 (1): 35-55. DOI: 10.1080/08003831.2012.678719

Riseth, J.Å., Tømmervik, H., & Tryland, M. (2020). Spreading or gathering? Can traditional knowledge be a resource to tackle reindeer diseases associated with climate change? *International Journal of Environmental Research and Public Health*, 17: 6002. doi:10.3390/ijerph17166002.

Sara, M.N. (2009). Siida and traditional Sámi reindeer herding knowledge. *Northern Review*, 30: 153-178.

Sarkki, S., Ivsett Johnsen, K., Löf, A., Pekkarinen, A.-J., Kumpula, J., Rasmus, S., Landauer, M., & Åhman, B. (2022). Governing maximum reindeer numbers in Fennoscandia. In: *Reindeer husbandry and global environmental change: pastoralism in Fennoscandia*, ed. T. Horstkotte, Ø. Holand, J. Kumpula, & J. Moen (pp. 173-187). New York: Routledge. DOI: 10.4324/9781003118565-13.

Scott, J.C. (1990). *Domination and the arts of resistance: hidden transcripts*. New Haven and London: Yale University Press.

SFS (Svensk Författningssamling 1886: 38). Lagar, angående de svenska lapparnas rätt till renbete i Sverige och angående renmärken [Law regarding the Swedish Lapps' right to reindeer grazing in Sweden and reindeer earmarks]. Issued on 4 June 1886 (published by Luleå Boktryckeri-Aktiebolag, 1887).

SFS (Svensk Författningssamling 1928: 309). Lagen om de svenska lapparnas rätt till renbete i Sverige (renbeteslagen) [Law on the right of the Swedish Lapps to reindeer herding in Sweden (Reindeer Herding Act)]. Issued on 17 February 1928.

Skuncke, F. (1969). Reindeer ecology and management in Sweden. *Biological Papers of the University of Alaska*, 8: 1-78.

Stark, S., Horstkotte, T., Kumpula, J., Olofsson, J., Tømmervik, H., & Turunen, M. (2023). The ecosystem effects of reindeer (Rangifer tarandus) in northern Fennoscandia: past, present and future. *Perspectives in Plant Ecology, Evolution and Systematics*, 58: 125716. https://doi.org/10.1016/j.ppees.2022.125716

Strøm Bull, K. (2015). Sami reindeer herders' herding rights in Norway from the nineteenth century to the present day. In: *Indigenous Rights in Scandinavia,* ed. C. Allard & S.F. Skogvang (pp. 79-94). New York: Routledge.

Strömgren, J. (2015). The Swedish state's legacy of Sami rights codified in 1886. In: *Indigenous Rights in Scandinavia*, ed. C. Allard & S.F. Skogvang (pp. 95-110). New York: Routledge.

Turaev, V. A. (2017). Olenevodcheskoe khoziaistvo korennykh narodov Dal'nego vostoka v sovremennykh usloviiakh [The reindeer-herding economy of the Indigenous peoples of the Far East under contemporary conditions]. *Izvestiia Irkutskogo gosudarstvennogo universiteta: geoarkheologiia, etnologiia, antropologiia*, 19: 195-216.

Turunen, M., Rasmus, S., Järvenpää, J., & Kivinen, S. (2020). Relations between forestry and reindeer husbandry in northern Finland: Perspectives of science and practice. *Forest Ecology and Management* 457, 117677. https://doi.org/10.1016/j.foreco.2019.117677

Yuzhakov, A.A. (2012). Opyt avtomatizatsii zootekhnicheskogo ucheta v olenevodcheskom predpriiatii Krainego Severa [Experience of automatizing the zootechnical accounting in a reindeer-herding enterprise of the Far North]. *Agrarnaia Rossia*, 9: 2-5.