



Collaborative foundations of herding: The formation of cooperative groups among Tibetan pastoralists

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ABSTRACT

The pastoral literature place little emphasis on the cooperative aspect of being a pastoralist. Part of the neglect stems from conflating the livestock owning unit, i.e. the household, with the herding group. Among Tibetan pastoralists, the herding group consist of people and animals from one or several households. They herd in groups because there is an optimal size of the herd concerning daily herding: too few animals and the animals disperse while too many negatively affect grazing efficiency and subsequently livestock survival during winter. The individual household also frees up members for e.g. selling or trading livestock products. Furthermore, group formation makes it possible to split herds into smaller sub-herds that consider differing needs for varying livestock species and age-categories. While herding groups can change both seasonally and annually, they are a fundamental unit for pastoral social organisation because they are concerned with daily cooperation.

1. Introduction

In general, cooperation entails that individuals pay a cost to the benefit of others (Fotouhi et al., 2018) and cooperative group formation is a widespread phenomenon that entails both benefits and costs (Mendl and Held, 2001). For nomadic pastoralists, cooperation allows herders to pool risk, defend herds from raiders or predators, protect pastureland, share knowledge and information, loaning or gifting animals to those in need, and exchange labour (Næss, 2012; Thomas et al., 2015). Exchanging gifts of livestock has been shown to boost long-term herd survival (Aktipis et al., 2011), and cooperation provides an essential social safety net for impoverished households, e.g. through loaning and exchanging of food and livestock (Cooper, 1993). By exchanging labour herders also reap economies of scale, i.e. reducing within-household costs of labour investment through cooperation (Næss, 2012).

Saami reindeer herders in Norway and Mongolian pastoralists, for example, form groups, called *siida* and *khot ail*, where members combine individually owned herds of livestock with the overall goal of sharing labour in connection to day-to-day herding (Næss, 2012). In general, a cooperative herding group is a social unit consisting of independent households related by blood and that flexibly form and reform according to both external (e.g. pasture) and internal (e.g. population growth) factors. Kinship is somewhat subordinate to the contractual aspect of being a group member: members often consider themselves as equal partners. Composition and size changes according to the season and

members are free to join and leave groups as they see fit. The formation of herding groups thus underscores an essential fact of pastoral life: it is almost impossible for nomadic households to maintain production without cooperative labour investment and other forms of mutual help (Khazanov, 1994; see also Næss, 2012).

Nevertheless, cooperation entails costs. For example, while exchanging and sharing labour may reap economies of scale, there is an upper limit as to how many households should cooperate. Increasing the number of co-operators might result in higher levels of conflicts or increased grazing pressure (more households with separate herds within a limited area will increase the total number of animals within the same area and thus increase grazing pressure, cf. Næss, 2012). Although essential, this study mainly deals with the why and how of pastoral herding groups, i.e. the benefits.

While cooperative herding has been documented in many pastoral societies (cf. Næss, 2012), details surrounding the why and how is under-researched (Khazanov, 1994). Herding groups have been given too little weight: Tapper (1979), for example, argues that in almost any pastoral society, territorial holding units (e.g. tribe) subdivides into smaller groups for camping or herding purposes. Nevertheless, he argues that since herding associations are both economic and unstable, they are of minor importance compared to more extensive—and political—groupings (Tapper, 1979).

In contrast, my point of departure is that despite the instability of herding units, they represent an essential building block of nomadic

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societies because they are concerned with daily cooperation. The significant contribution of this paper is thus to elicit strengths and weaknesses in our current understanding of pastoral cooperation through a detailed case-based study of herding group formation among nomadic pastoralists in the Aru Basin in Tibet Autonomous Region (TAR), China (Fig. 1). This material will be analysed by comparing and contrasting it with patterns of cooperation and group formation among pastoralists in the traditional Tibetan Amdo region (Fig. 1, in present-day Sichuan, Qinghai, and Gansu provinces, Yeh, 2003) as well other pastoral groups around the world.

2. Methods

The research reported here is based on a combination of informal in-depth interviews, by the use of translators, and participant observation during three different fieldwork periods (ranging from 2 to 6 weeks) in the Aru Basin in TAR between 2000 and 2001 (Fig. 1). The informal interviews were mainly concerned with the economics of pastoralism, i. e. information about herd size and composition; organisation of herding; subsistence (use of milk, meat and wool); diversification (like hunting, Næss and Bårdsen, 2016); seasonal land use and mobility (Næss, 2013); and the effect of environmental hazards, like snowstorms and poisonous grass. Moreover, I tried to be present at every aspect of their life that was open for me, such as meals, shearing of wool, slaughtering and herd splitting. Observations and participation form the background for this study: individual household almost never herded their animals alone. Households split their herds into a male and female segment and herded them separately but, more often than not, it was not individual households that did this; rather several households pooled their herds together and took turns herding. I thus became concerned with the relationship between pastoral labour and social organisation during interviews.

Ten households were interviewed in June 2000 ($n = 36$), fifteen households in September/October 2000 ($n = 28$), and fifteen households in May–June 2001 ($n = 24$, see also Næss, 2013).

2.1. The Aru nomads on the Qinghai–Tibetan Plateau

The Qinghai-Tibetan Plateau (QTP) reaches around 1500 km North-South and around 3000 km east-west and is around 2.5 million km². It is a high-altitude plateau with over 80% located above 3000 m, and about 50% above 4500 m (Schaller, 1998). The rangeland used by the Tibetan nomads includes all of Tibet Autonomous Region (TAR) and Qinghai, most of the rangeland area of Gansu and Sichuan, and parts of southern Xinjiang; an estimated 1.6 million km² (Miller, 2000). Rugged mountain ranges, deep river valleys, and large lake basins divide grazing lands; giving rise to diversity in topography, climate, and rangeland types (Miller, 1998). Environments too cold for crop cultivation supports extensive, productive rangelands where nomads continue to thrive (Goldstein and Beall, 1990; Næss, 2013). Around five million pastoralists and agropastoralists, keeping an estimated twelve million yaks and thirty million sheep and goats, inhabit the Tibetan Plateau (Sheehy et al., 2006).

The Aru Basin is approximately 2300-km² with most of its area lying above 5000 m. The basin is northwest-southeast trending, encompassing two lakes, Aru Co and Memar Co. The 6000 m permanently snow-covered mountains along the western edge of the basin create a moist and productive environment and are making the basin an attractive place for both wild herbivores and nomadic pastoralists (for more details, see Næss, 2013; Næss and Bårdsen, 2016). Livestock provides the Aru nomads with food, shelter, and clothing: the coarse belly hair of the yak is, for example, spun and woven into tent material. The nomads make ropes and blankets from the finer ‘down hair’ (shorter soft fine undercoat), and, traditionally, they made soles for shoes or boots from the yaks’ hides. Yaks also provide the nomads with meat, and the female yak can provide large quantities of milk throughout the year. In the Aru Basin, both goats and sheep are milked, providing the nomads with

yoghurt, butter and cheese. While goats produce more milk than sheep, and for longer periods, the Aru nomads prefer milk and meat from sheep (goats have, however, increased in importance during recent years due to an increased demand for the fine cashmere wool, cf. Næss, 2013).

Two counties, or *xians*, namely Rutok and Gertse, share administrative responsibilities for the basin (Næss, 2013). Around 222 nomads, with 10000 sheep and goats, 500 yaks inhabit the basin during summer, as well as 127 nomads with 7000 sheep and goats, and 330 yaks during autumn and winter (see Næss, 2013 for details). Consequently, the use of the basin changes seasonally, with summer having the highest density of livestock and people.

We can distinguish between three different levels of social organisation: 1) *tsho chung*¹ (‘small group’); 2) ‘herding group’; and 3) *sbra* (tent or household). Although households have control over their production, they share grazing rights with other households. In effect, *tsho chung*s are considered as groups because members share grazing rights to a specific area. Groups are therefore separated geographically and are recognized as distinct groups by the local government. The members of *tsho chung*s also perceive themselves as a group because all the members share kinship ties. During fieldwork, I observed three different *tsho chung*s; one in Rutok² *xian* and two in Gertse *xian*.

Small groups have connections to other groups from which they can recruit suitable marriage partners. There were only three marriages between the group from Rutok (Kontrok *tsho chung*) and the two groups from Gertse *xian*. One reason is that the groups relatively recently arrived in the basin,³ another being that members from Kontrok *tsho chung* have kin in other groups outside the basin, and who also provide help with finding suitable marriage partners. However, the extent of the kin relations reaching outside the basin is unknown.

Each *tsho chung* has a leader, which is selected by group members. The leader is, for example, responsible for informing the nomads about new political ideas. Thus, he (no women held this position) function as a link between the nomads and the local authorities. Moreover, he makes sure that the nomads comply with local regulations as well as dealing with whatever problem the nomads face, e.g. reporting problems with livestock losses due to predation and poisonous grass. Previously, the leader was also responsible for reporting livestock numbers to the *xiang* (township). However, this practice seems to have changed: now representatives from the *xiang* come out to do the count, probably because of fear of underreporting.

3. Results

Eleven households from Kontrok *tsho chung* resided together in September 2000.⁴ Rather than herding alone, the nomads formed six herding groups (Table 1 & Fig. 2). **Herding Group 1** consists of individuals and animals from three independent households. It consists of individuals from a natal household together with the households of one son and one daughter of the natal household (Fig. 2). Consequently, close kinship ties, i.e. it is based on a mother/father-son/daughter constellations, make up **Herding Group 1**. Moreover, two of the households are relatively newly established: one son and one daughter from the natal household has been married for only a few years and have

¹ Tibetan terms are transliterated according to the Wylie (1959) spelling if known. Alternative spelling and pronounciations are provided in footnotes.

² Two additional groups use the Rutok side of the basin for around 3 months each summer.

³ A small number pastoralists and hunters have used the Aru Basin for several thousand years. But during the Cultural Revolution, nomads in the Aru Basin were relocated and the area was left uninhabited for around 15–20 years. From the early 1990’s and onwards, pastoralists moved back into the basin (Næss, 2013).

⁴ Since two households that were part of this small group were living at the Gertse side of the basin they are not included here.

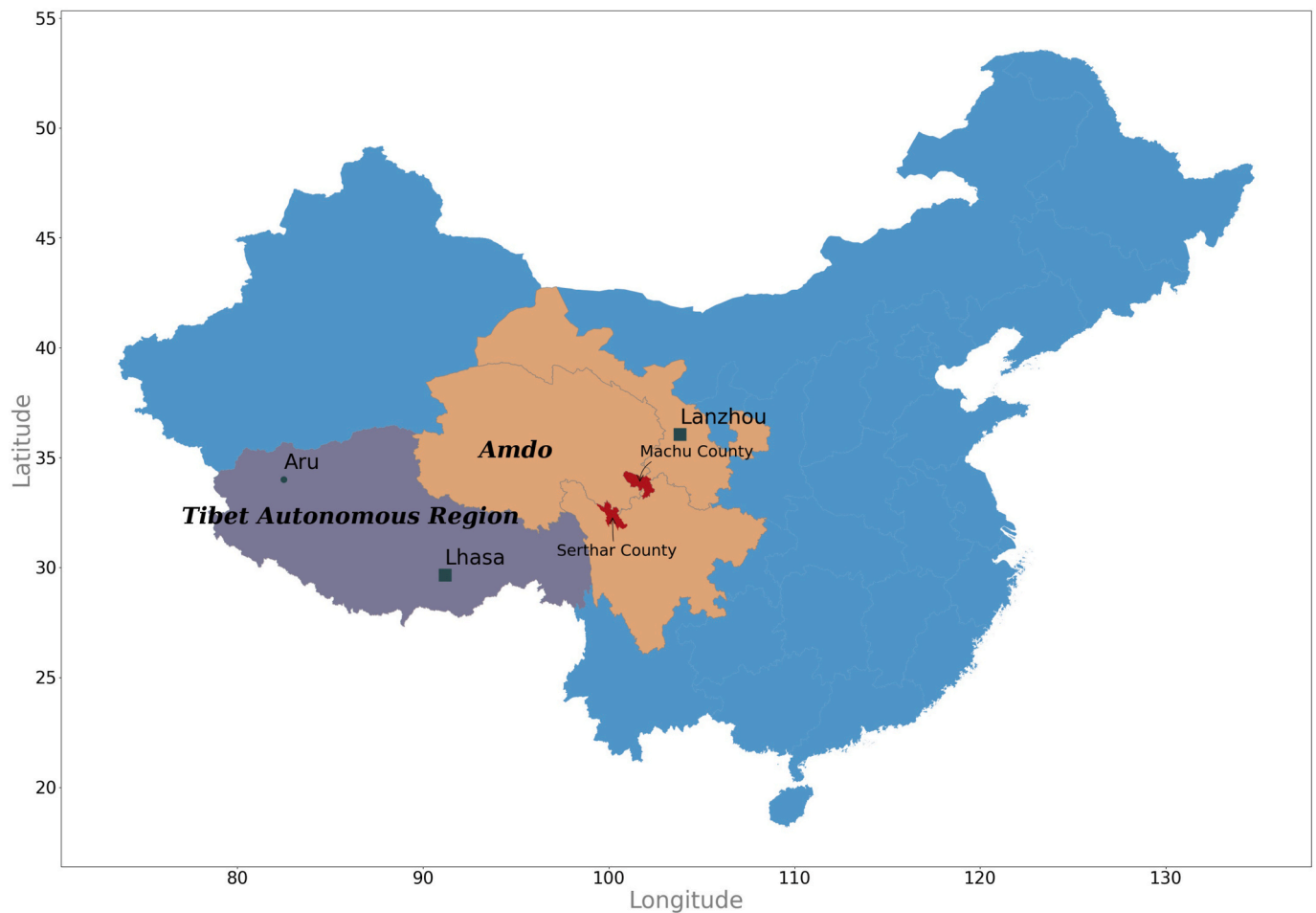


Fig. 1. Map of pastoral areas on the Qinghai-Tibetan Plateau discussed in the main text: the Aru nomads (Tibetan Autonomous Region) and nomads in Serthar and Machu County, marked in red (Amdo). While Amdo historically only referred to parts of present-day Sichuan, Qinghai, and Gansu provinces, all the provinces are highlighted. Map created in Python 3.6.1 (<https://www.python.org/>) with background map from GADM (<https://gadm.org/maps/CHN.html>). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Table 1
Distribution of people and animals into different herding groups, Kontrok *tsho chung*, Rutok *xian*, September/October 2000.

GROUP	SHEEP & GOATS	HOUSEHOLDS	PEOPLE	PEOPLE IN WORKABLE AGE
1	698	3	14	11
2	220	2	7	6
3	266	1	6	4
4	325	2	5	4
5	475	2	8	6
6	431	1	9	7

very young children. Consequently, these households have few animals and a low workforce since children usually start to herd when they are 7–8 years old (regardless of sex).

Herding Group 5 is of similar composition: consisting of a natal household and the household of one son who currently has no children. **Herding Group 4** consists of a single woman and her children, together with one married daughter and husband. They have been married for three years and have no children (Fig. 2). These three groups consist of newly established households and their respective households of origin and are thus closely related.

Herding Group 2 do not fit into this pattern. Herding Group 2 consists of two households having an uncle/nephew relationship. For them, no such father-son/daughter herding group constellation is

available: the uncle’s father is too old to help with the herding, and nephew’s father is already in such a constellation with his newlywed son (Fig. 2). However, each household in Herding Group 2 have relatively few animals, and according to the Aru nomads, one herd of around 200 animals are more straightforward to herd than two herds of 100 animals. Also, individually, each household has two-four persons available for herding, making it preferable to herd together than alone. For the same reason, there is no father-son/daughter herding group constellation available for **Herding Group 3** (Fig. 2). Therefore, this herding group usually herd their animals alone, although sometimes other households give a helping hand.

According to one herder they share herding responsibilities because:

“We are very poor and have a few animals. A herd of few animals is much more difficult to look after than a herd of good size. Also, some tents have many old and young people and have, therefore many difficulties in their daily herding. Therefore, we help each other with looking after the animals.”

In effect, small groups of animals tend to break up, making them easy prey for predators or animals merely getting lost. By pooling several smaller herds from different households, herders can thus regain control when herding. However, seasonal variations also influence the need for labour cooperation. The demand for labour is at its highest during late spring and summer when they have to milk their animals, shear wool while at the same time, the lamb and kids need careful watching. The Aru nomads thus join in herding responsibilities during summertime,

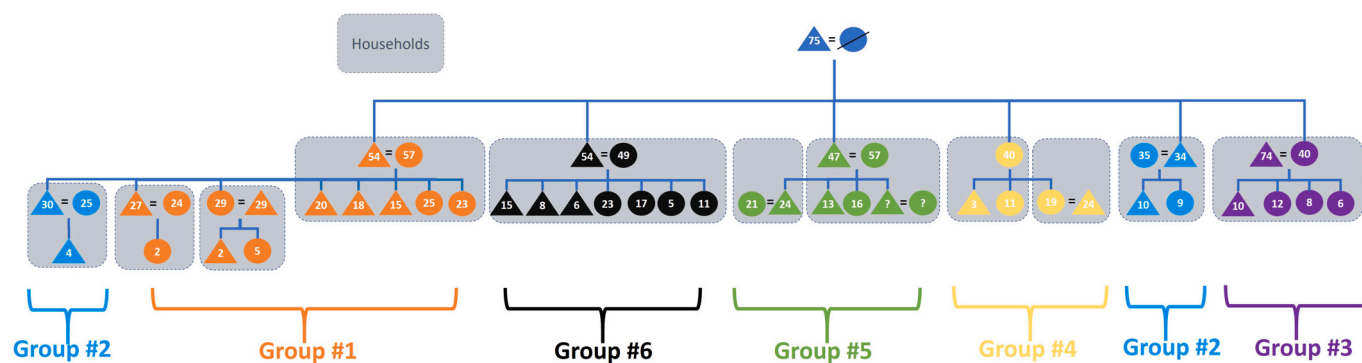


Fig. 2. Showing an overview of people, households, herding groups and known genealogical relationships for Kontrok *tso chung* during September/October 2000.

while in wintertime animals are herded by individual households.

The formation of herding groups is therefore related to 1) the general availability of labour, 2) seasonal need for labour and 3) the number of animals. Also, sharing herding responsibilities between households fulfils a need for economic diversification by providing households means and time to do other labour required activities. For example, four households from Gertse *xian* formed two herding groups who shared herding responsibilities because then they could simultaneously erect an animal corral on the other side of Aru lake.

Labour shortages can have serious consequences: for example, several nomads from Gertse enquired about the whereabouts of their yaks, since:

“We do not have enough people to herd our yaks. Therefore, we do not know exactly where they are anymore. Sometimes when we find them, they have almost become wild, since they often live with the wild yaks in the mountains.”

Labour shortages are not a problem limited to yaks, almost all nomads from Rutok *xian* who returned to the Aru Basin in 1991 had horses. Today there are no horses left since they were left to graze alone and thus became easy prey for wolves.

The Aru nomads also consider the effect of having too many animals grazing together. Too many animals are especially problematic during the summer months when the animals store up fat reserves. If too many animals graze together, the amount of grass available to each animal decreases, which again can harm the animals' chance of survival during winter. **Herding Group 6** illustrates this: this household never herded its animals with other households, and rarely camped close to other tents. By being quite large—consisting of two adults and seven kids of whom only two were young—and having seven persons available for herding it does not need help in the daily herding activities (Fig. 2). Furthermore, it makes sense for them to herd their animals alone since any additional animals can have a negative effect on their animals' access to grass and decrease their chances of survival during winter.

Optimally, the Aru nomads want to split their herds according to the animals' needs. Nevertheless, they rarely do this because it requires a large amount of labour. Only one group of nomads did this: Herding Group 1 separated their herd according to lactating females and adult males, and thereby herded two separate herds. However, as they said:

“This is only a rough separation since there are lactating females and males in both herds, but since we herd two small herds instead of one big herd, it gives the females better and more grass than if they all were herded together.”

The nomads keep young animals separated from their mothers when they are old enough to live off grass alone to prevent from drinking mother's milk. Goldstein and Beal (1990) describe a similar pattern for the Phala nomads who split herds to take advantage of the grassland and to accommodate the specific needs of the different species, e.g. yaks are

usually herded higher up in the mountains than sheep and goats during winter.

4. Discussion

The nomads in the Aru Basin work together in so-called *herding groups*. Usually, a herding group consists of 2–3 households that share the responsibility for the daily herding. The formation of herding groups both makes the daily herding easier and is labour saving for individual households. A herding group is, therefore, a unit sharing responsibilities for the daily herding of its members' animals, and it can consist of animals from one or several households. They are *relatively small* and *flexible*: they change in size and composition throughout the season.

4.1. Comparative aspects of herding groups

4.1.1. The *ru skor* on the eastern parts of the Qinghai-Tibetan Plateau

On the eastern parts of the QTP, named groups known as *tsho bas*⁵ organised the Tibetan pastoral populations. For example, in Serthar county northern Sichuan province, China (Fig. 1), the *tsho bas* resembled a tribe; organised—according to Levine (1999)—around a lineage of a founding clan⁶ and controlled land. Individual *tsho ba*'s varied in size and each had rights to varying sizes of land, which members used at different seasons. In the past, Serthar was organised as a confederacy of 48 separate *tsho bas* (Levine, 1995) under the leadership of hereditary chiefs. Tribal leaders determined the timing of seasonal movements and herding destinations, as well as assigning the rotation of *tsho ba* members to keep guard over the pasture and fight for its defence. They also negotiated the amount to be paid in compensation when someone was killed (Levine, 1995:69).

Yeh (2003) argues that for Amdo—one of three traditional Tibetan regions and parts of present-day Sichuan, Qinghai, and Gansu provinces—not all *tsho bas* existed as part of larger confederacies. Many were independent for periods of time. Large *tsho bas* split into smaller ones, small encampments grew into large *tsho bas*, and migrants fleeing from one *tsho ba* joined others (Yeh, 2003). Rangelands were common

⁵ Also pronounced as *tshowa*, *tsho wa* (Levine, 1995), *tsowa* (Yeh, 2003) or *shokwa* (see Pirie, 2005). Ekvall (1968:28–9) differentiates between the *TSH o Ba* (group ones) or *SHag Pa* (wing ones) which he argues is amorphous to lineage grouping that is related to a common ancestor which provides the group with a name.

⁶ But see Pirie (2005:99) who argue that lineages are overstated in importance and “... a distinction must be drawn between a lineage ideology that legitimates the authority of ruling families, as in Golok, and an ideology that purports to integrate the members of a group [...], which is not found in Amdo”. Consequently, Pirie (2005) prefer the term *dewa* [*sde ba*] which is the more general term meaning ‘group’ or ‘section’. The term *tshowa* carry more of a sense of lineage or clan and is more common in Golok, where an ideology of descent characterizes the former ruling families (Pirie, 2005).

property where the *tsho ba* leaders assigned grazing areas to encampments within a larger tribal territory; either seasonally or in one-time allocations. In general, summer and fall pastures were more frequently adjusted than winter and spring pastures. Moreover, *tsho ba* leaders had the right to confiscate pasture from herders who had lost all their livestock, or who had no descendants (Yeh, 2003). Yeh (2003) argues that there were well-developed senses of territorial rights embedded in *tsho ba* membership, and a *tsho ba* was linked to distinct geographical territories.

Significantly, they were subdivided into ‘encampments’ or *ru skors*,⁷ referring to people who lived alongside one another. Ekvall (1968) translates the term as ‘tent-circle’, meaning that Tibetan pastoralists traditionally lived in tents and camped circularly. According to Levine (1995:70), the *ru skor* varied in size, ranging in size between five and ten households (see also, Yeh, 2003). Ekvall (1968:28) describes it as varying between a small circle of five to six tents to a circle of as many as eighty. It would change as a result of topography, i.e. larger groups on a plain or in broad valleys and breaking up into individual tent sites in rough country. Each encampment had rights to a set of seasonal grazing areas within the broader ‘tribal’ pasture. The boundaries between grazing areas were marked by natural features of the landscape, like ridges and watercourses (Levine, 1995). While the rights of the *tsho bas* were fixed—unless other tribes took them by force—the rights of the *ru skor* were more fluid:

“The camping sites and grazing grounds of the various encampments could be changed from one section of tribal territory to another, reportedly at the discretion of group leaders and in response to the encampment’s needs or the state of their relations with their leaders” (Levine, 1995:70).

4.1.2. Composition of herding groups

As in the Aru Basin, members of a *ru skor* consisted of close relatives, e.g. parents and their married children (Levine, Unpublished result:2). A similar pattern has been found in Turkmenistan and adjoining parts of Iran and Afghanistan where the Yomut *camp* falls in the range of 2–10 households, with 4 or 5 being most common. Pertinently, the core of the camp consists of a cluster of households related in the male line: often a father and his independent sons or a group of independent brothers whose father is deceased (Irons, 1972). Similarly, among the Somali, the nomadic hamlets—called *reer*—is the basic unit of movement as well as a social group and is formed around a nucleus of close male relatives, often brothers, or an extended family (Lewis, 1999).

Nevertheless, while kinship seems to be vital, it is not a prerequisite. Pirie (2005:87) argues that in the *ru skor*, kin relations are regarded “[...] as an inevitable product of family division rather than as a qualification for membership of the group”.

Among Mongolian herders, the *khot ail*—consisting of 2–8 families—cements cooperation between several households (Potkanski, 1993:132). Mearns (1996) argues that the *khot ail* comprises a group of households who are often but not necessarily consanguineal or affinal relatives. Cooper (1993) distinguishes between three types of *khot ails*: (1) those comprised of close kin; (2) those comprised of a central core group of closely related households but with additional unrelated or temporary members; and (3) those made up of loosely related or unrelated households with no dominant family group. Similarly, while Mearns (1996:313–14) found that in 18 of 30 *khot ails* kinship was crucial, in twelve it was not. Moreover, around 50% of the relationships—in *khot ails*, where kin relations were important—consisted of affinals.

Among the Brahui (Baluchistan), the *khalk* (camp) is primarily based

⁷ Spelling varies, Levine (1995:69) uses *Ru Rogs* or *Ru 'Khor*, Levine (Unpublished result:2) *ru skor*, *ru sKor* (Ekvall, 1968) while Pirie (2005:89) use *repor*.

around kinship. Nevertheless, camp formation is mainly voluntarily, contractual and dynamic (Swidler, 1972). Similarly, among the Basseri (Iran) households usually unite in small cooperative herding units—consisting of 2–5 tents—where kin relations are irrelevant. While married sons initially tend to stay in their father’s herding unit, these bonds are broken at any time and relationship between members is contractual and characterised by equality (Barth, 1961). Furthermore, while the Yomut *camp* consists of a father and his independent sons, the core group often join with non-kin (Irons, 1972). With respect to the formation of the *kraal* camps among the Maasai in Kenya, some households may be related but the Maasai hold that a camp should not consist exclusively, or even predominantly, of members of one clan or smaller descent group (Helland, 1977).

In Norway, the pastoral *siida* comprises 2–6 families herding their animals together in a single herd (Næss, 2019). A notable feature is the prevalence of siblinghood, which—according to Paine (2009:5)—is not only biological but also “[...] a social construction of a sense of mutual identity independent of genealogy”.

In sum, comparative evidence indicates that herding groups are relatively small and flexible: they change in size and composition throughout the season, and members are relatively free to change group affiliation. While close kinship characterizes the relationship between core members, kinship is subordinate to the more general requirement of mutual help when herding (Khazanov, 1994).

4.1.3. Why cooperate?

While cooperation has many advantages, the Aru nomads stress labour as the most important reason for forming herding groups. In general, Bonte and Galaty (1991:7) argue that “[...] labor represents the major constraining factor in virtually all systems of pastoral production”. It is almost impossible for individual households to maintain production without cooperative labour investment and mutual help from other households (Khazanov, 1994). An essential aspect of pastoral cooperation is herd management: different categories of livestock have different grazing needs and capacity for mobility. In the Aru Basin, young animals often have difficulties in following the adult herd and are at a very young age kept near the tents, and often also within the tents. If brought out to graze too early, lamb and kids can easily be lost. If the herders do not keep a watchful eye, he/she can quickly lose a lamb or kid who has settled down to sleep. Also, lactating animals need good quality forage, and pregnant, lactating, and young animals need more forage than dry females and adult males. Thus, the best possible management of livestock requires that the herd separates according to species and age and into dry and milk herds. Labour availability also impacts successful economic diversification: by cooperating, an individual household can free up members to pursue other activities like wage labour, agriculture, and hunting.

A similar pattern has been described for the Mongolian *khot ail*: Its primary function is to capture economies of scale (Cooper, 1993; Mearns, 1996). For example, one household herding one species for the entire *khot ail* reduces the overall labour input required by individual members. In other cases, herding is done rotationally. Thus other members are free to pursue alternative activities such as felt and hay-making, vaccinating livestock, transporting milk for processing, moving, collecting wood, cutting hair and wool and preparing and mending winter shelters (Cooper, 1993; Mearns, 1996). Additionally, cooperative labour investment serves as a critical risk-minimizing strategy: during periods of heavy snow a large amount of labour is necessary for bringing animals back to camp shelters quickly and for providing watch to keep animals safe. The *khot ail* also provides a critical social safety net for penurious households, e.g. through loaning and exchanging of food and livestock (Cooper, 1993). Among the Yomut, cooperation is also extensive between members of the same camp. Apart from herding animals together, members often share labour, beasts of burden and tools, and they also provide economic assistance in times of need (Irons, 1972).

Cooperation is thus essential to avoid labour shortages for individual households. Næss (2012) found that by cooperating herders reap benefits concerning economies of scale, i.e. reducing within-household costs of labour investment through cooperation (Næss, 2012). Empirically, cooperative labour investment has a positive effect on production—measured as herd size—in Saami reindeer husbandry (Næss et al., 2010).

4.1.4. The importance of flexibility

Historically, most lands in central Tibet was, in principle, owned by the central government in Lhasa, which distributed the land among the aristocratic families, great incarnate lamas, and monasteries for their upkeep and support. The nomads were tied to the land in the manner that their religious lord gave them rights to grazing areas. The right was hereditary, i.e. the nomads passed the right on to their children just as they got the right from their fathers (Goldstein and Beall, 1990). Before 1959, the Aru Basin was, for example, under the jurisdiction of the Sera monastery in Lhasa. Pastures were re-allocated at 3-year intervals based on individual households' herd size (some areas organised pasture reallocation on a community level, household basis as well as on a lineage basis, see Goldstein, 1992). Households got additional pastures when herds increased, and pastures were taken away from those whose herds had decreased (Næss, 2013).

In contrast, Yeh (2003) argues that rangelands in the eastern parts (e.g. Amdo) were historically common property where the *tsho ba* leaders assigned grazing grounds to *ru skors* within the larger tribal territory, either seasonally or in one-time allocations. Summer and fall pastures were more frequently adjusted than winter and spring pastures. Moreover, *tsho ba* leaders had the right to confiscate pasture from herders who had lost all their livestock, or who had no descendants (Yeh, 2003).

Nevertheless, groups or individuals had some form of user rights to designated tracts of land (albeit informal, Næss, 2017). Furthermore, while the *ru skor* could not establish its rights to grazing privileges without the consent of the tribe, it could always secede and go somewhere else (Yeh, 2003). Moreover, it was flexible: (1) it could change in size over a year and (2) it would fission if it grew too large or when it lost grazing lands to other groups (Levine, Unpublished result). Among the Brahui, Swidler (1972) observed a similar pattern: the formation of the *khalk* relates to the struggle of creating herds of optimal size relative to grazing efficiency. Shifting camp membership serves to join households to create a herd which come as close to 500 as possible. When approaching this number, the camp will no longer accept additional members; and when numbers are substantially higher households will splinter off and form a new *khalk* (Swidler (1972)).

The composition of the Somali *reer* or nomadic hamlet is also flexible: a man may stay with his brother on one occasion and with another at a different time. Moreover, while several individuals might decide to move together at one time, at another, they might decide to separate and move with others (Lewis, 1999). Among the Maasai, differences in opinions over herd management often cause families to break away and join other *kraal* camps. While some camps maintain a core set of members over several years, most camps change composition frequently (Helland, 1977). The Saami *siidas* are also flexible; they are smallest during spring calving and largest during summer (Paine, 2009). Camps among the Yomut fluctuates in composition: at each migration, a camp can divide or merge with another camp group (Irons, 1972:92). Membership in the Mongolian *khot ail* can change both annually (Potkanski, 1993) and seasonally: often being biggest during summer (Mearns, 1996).

Flexibility is vital because mobility—mainly the movement of people—is a crucial prerequisite for cooperation. The ability to move away allows co-operators to assort positively as well as limit co-operators' exposure to defectors. Evidence suggests that merely providing the option to move allows cooperation to persist for a long time (Efferson et al., 2016). In effect, the ability to change group membership might have been a vital mechanism sustaining cooperation within herding groups.

In effect, it is the fluidity and flexibility that makes herding units important. Pastoralism is thus practised in a web of potential cooperative relationships; relationships that can be actualized and discontinued depending on social context and environment. Cooperative networks thus contract or extend depending on the circumstance.

4.2. The changing nature of cooperative herding on the Qinghai–Tibetan Plateau

4.2.1. Rangeland privatisation and its impact on cooperation

The ability to flexible change groups has changed on the QTP. From the 1950s to the 1980s, Chinese agricultural production was mainly managed collectively in communes which were responsible for administering agricultural production, including livestock and pastures (Taylor, 2006; Yan et al., 2005). By the end of the 1970s (early 1980s in most pastoral areas), the commune system came to an end, being replaced by the Household Responsibility System that re-established the household as the basic unit of production (cf. Næss, 2013).

On the eastern parts, the government created new administrative units, *xiangs*, out of the old communes that, according to Pirie (2005), were mapped onto the territories of the *tsho bas*. As for the *ru skor*, Pirie (2005:87) writes that one *tsho ba* now consists of around 40 *ru skor* where members are often related because brothers who establish new tents tend to stay in the same group. Each *ru skor* also has an elected leader (*gowa*) who has the task of coordinating with local authorities as well as sorting out problems within the group. They also deal with leaders of other *ru skors* in the event of disputes and attend the councils of leaders from all the *ru skors* in the tribe (Pirie, 2005:89). In contrast, Levine (Unpublished result) argues that the traditional idea of the *ru skor* has nearly vanished:

“When asked about it, even middle-aged people look perplexed, although a fuller description elicits some recognition. The closest parallels in Golog today can be found in concepts such as *nye skor*, “friends and neighbors,” *ru khag*, referring to the old production brigade of the collective period, and *khyim khag* or *sbra khag*, (pronounced wa khag), meaning house or tent section. In Serthar, people still speak of *cun chhung* and *cun shog*, and also use the term *ru shog* to refer to households that live in close proximity and jointly pasture their animals on the same sectors of grassland” (Levine, Unpublished result:3, emphasis in original).

Levine (Unpublished result) attributes this to (1) herders' increasingly valuing autonomy; (2) ongoing privatisation and division of pasturelands; and (3) that the *ru skor* has always been a flexible and superficial institution (e.g. Ekvall, 1968:28 argues that in many areas it did not exist because each tent camped by itself).

Following the 1985 Grassland Law, rangelands on the QTP became increasingly privatised (Cao et al., 2018; Næss, 2013). Since the dissolution of the commune system, Chinese policies have emphasised that individual household tenure is a necessary condition for sustainable rangeland management (Banks, 2001). By the end of 2003, Yan et al. (2005:32) estimate that 70% of China's available rangeland was leased through long-term contracts, with 68% contracted to individual households and the rest to groups of households or villages.

In general, rangeland division and the imposition of physical barriers like fences have resulted in both physical and social fragmentation as well as eroded traditional social institutions emphasising mutual aid (Cao et al., 2013a). A herder in Machu County (Gansu Province, Fig. 1) said, for example, that “[t]he border, particularly where fences are set up, not only cuts off interactions among livestock, but also interactions between people are cut off” (Cao et al., 2011:224). Privatisation has also decreased security. In areas where individual households manage rangelands and where markets are easily accessible, livestock theft and robbery have increased (Yan et al., 2005). While collaboration provided adequate security, when households live far apart, they must always

guard their herds. Furthermore, workload, especially for women and children, has increased (Yan et al., 2005). In short, both increasing levels of conflicts and decreasing security has resulted in increased labour demands compared to before rangeland privatisation (Yan et al., 2005).

The privatisation process and its effect in the Aru Basin and surrounding areas are less studied. In the TAR the process started in 1994. However, the government and local informants have reported that it was not until 2002 that the land management laws were implemented and then with a provision permitting grasslands to be distributed not just at the household level, but also at village levels (Bauer, 2005). In contrast, Yangzong (2006:6) argues that the process of dividing grassland among households initially started in 2001 in TAR and that 89.2% of the available rangeland has been allocated to individual households, covering 64.85% of pastoral households.

For one township encompassing the Aru Basin, grassland allocation to individual households started in June 2005. In this area, individual households got long-term leasing contracts (50 years) on rangelands; with allocations based on human and livestock population for 2004. The area allocated is kept constant even in the face of population increase or decline (both livestock and human). New households establish themselves within already allocated pastures (i.e. by sub-dividing one of the parents' pasture). Each household received a grassland contract certificate, and only 5–10% of the total grassland was kept as commons for use during a crisis (cf. references in Næss, 2013:128–9). Moreover, late in 2006, fences were being erected as a result of renegotiations of Rutok vs Gertsé County grazing rights and boundaries as well as fencing of boundaries (cf. Næss, 2013:128).

Comparative evidence indicates that privatisation may break up already existing group organisation and prevent “[...] effective cooperation in herd and rangeland management within and among pastoral communities” (Yamaguchi, 2011:141–2). While privatisation has resulted in increasing levels of conflicts and created a potential for new disputes (Cao et al., 2013b; Pirie, 2005; Yeh, 2003), it has also changed the nature of conflicts. Previously conflicts occurred primarily between groups—e.g. in the reindeer husbandry conflicts arose over encroachment onto a rival *siida*'s pasture, theft of reindeer, and destruction of fences, (Paine, 1970). Now conflicts also occur between individual (former) group members (Yeh, 2003) and also between family members (usually brothers) and neighbouring households (Taylor, 2006). In short, formerly cooperative relationships may have been transformed into competitive relationships (Li and Huntsinger, 2011).

4.2.2. From herding groups to multi-household management

Privatisation is, however, differently implemented on the QTP: In Machu County, two grassland management patterns exist. Multi-household management where two or more households jointly manage the grassland without a clear delineation between individual household pastures and single-household management where individual households separately manage the grassland and with fences between individual pastures (Cao et al., 2011). Cao et al. (2011) found that multi-households were more mobile compared to single-households and that the single-household patterns were more likely to cause rangeland degradation. Over time Cao et al. (2013b) found that while there was no significant difference in 2009, in 2011, multi-household grasslands had significantly higher biomass, vegetation cover and species richness than single-household grasslands. Multi-household grassland management also has significant social benefits (Cao et al., 2013a). Herders prefer multi-household management because they can help each other when they have difficulties, livestock can graze larger areas, and people can access grassland resources more fairly (Cao et al., 2011). The multi-household grassland management system helps maintain good relationships among neighbours by requiring fewer fences.

Furthermore, during disasters, some households may lose all their livestock, and in the multi-household grassland management system, herders who have lost their livestock often get help from others (Cao et al., 2011). Corroborating these findings is a review of 12 papers

focusing on differences and similarities in individual private property (same as single-household management) and jointly managed private property (same as multi-household management) on the QTP. Cao et al. (2018) found that grasslands under the first system were more degraded according to soil and vegetation measurements. Degradation was mainly caused by limiting livestock mobility through fencing. Furthermore, in the individual property context, property lines between individual households disrupts social networks and consequently limits the sharing of labour, food and pasture (Cao et al., 2018). Specifically, the jointly managed private property system scored better on socioeconomic variables like income, cost, equality, livestock mortality, monitoring, mutual aid, social relations and cultural heritage (Cao et al., 2018).

4.3. Limitations

The herding group in the Aru Basin consists of 2–3 households that share the responsibility for the daily herding. While similar estimates exist for the *ru skor*, Ekvall (1968:28) describes it as varying between a small circle of five to six tents to a circle of as many as eighty. In effect, it appears to have the potential of being more extensive than what has been described for the herding group in the Aru Basin. Furthermore, Yeh (2003) argues that in Amdo, the encampments (i.e. *ru skors*) typically consisted of patrilineally-related households that constituted the basic pastoral economic unit. Following this, the *ru skor* and the herding group in the Aru Basin are somewhat different. The herding group is not a fundamental economic unit; instead, households are. It is the household and not the herding group that has decision rights over the use of production from herds. The herding group—as I have described it here—is in contrast a cooperative constellation based on convenience.

Concerning size, it thus seems to be that it is the *ru skor* and the *tso chung* that are the equivalent units rather than the *ru skor* and the herding group. In effect, while I have described the herding group in terms of daily herding requirements, there is limited information available concerning the *ru skor*. Ekvall (1968) describes it in terms of residential pattern and security, and not with reference to actual labour cooperation. Complicating the matter further is the fact that the word *tso chung* means ‘small *tsho ba*’,⁸ i.e. a small tribe. Levels of organisation and size of groups thus seem to vary, something that needs to be researched further.

However, the size of cooperative groups might be connected to differences in herd composition on the western and eastern parts of the QTP. Compared to the Aru nomads, herders in the east keep predominantly yaks. Significantly, herding yaks might entail different labour and herding requirements and thus, different cooperative patterns. Comparing the Rwala camel herders with Somali herders, who also herd sheep and goats, Rubel (1969) argues that a shift in herd composition generates a series of shifts in the other variables of herd management. Rubel (1969) argues that adding sheep and goats to a predominantly camel based herding systems results in a dual camp system. This because sheep and goats have different ecological requirements from those of camels. They need watering much more often, which, in turn, necessitates a different pattern of nomadic exploitation. Hence, adjustments in herd management must necessarily take place when sheep and goats in significant numbers are introduced into a pastoral economy based solely upon camel breeding (Rubel, 1969:269–70). In short, among the Rwala, the agnatic core forms the basis for the camp; while among the Somali, we see a dual camp system with *camel camps* of closely related agnatic males and nomadic *hamlets* with up to thirty-two per cent non-agnatic kin (Rubel, 1969:271).

While the literature on herding groups agree that they are flexible and change composition according to season and other factors, little longitudinal evidence exists concerning how herding partnerships change over time. This study is no exception; the herding groups

⁸ I thank one anonymous reviewer for pointing out this fact.

documented in the Aru Basin represent a snapshot in time and thus does not adequately document changes in composition and the reasons why. Recent evidence from the Saami reindeer husbandry questions, for example, the assumption of *siida* flexibility. Thomas et al. (2015) found that only one of 30 herders had changed summer *siida* within the past 15 years. Thus, while the *siida* has been described as fluid with frequent change in partnership, recent evidence indicates that it is relatively stable. Consequently, to come to grips with cooperation and herding, we need longitudinal data that encompass both its history and current position.

5. Concluding remarks

By joining other households in herding activities, nomadic pastoralists attain commensurability between herd and personnel without increasing the numbers of consumers. Since members without herding responsibilities can pursue other necessary activities, it also positively influences the possibility for economic diversification. The formation of herding groups also reduces risk: herding groups increases control and make livestock less susceptible to predation. Furthermore, by carefully considering the need of their animals, the nomads can split their herds and provide more forage for each animal, which again increases individual animals' chances of survival during a harsh winter. While herding groups probably change during time, the underlying rationale—meaning labour cooperation and increased herd control—remains the same. The current global trend of rangeland privatisation has the potential of breaking social connectivity by dismantling the traditional cooperative networks necessary for successful pastoralism. For the *khot ail*, Bazargür et al. (1993:2) argue that Mongolian herders have used cooperative labour arrangements to solve problems concerning the rational use of natural resources and to counter the adverse effects of environmental hazards for a millennium. At a minimum, privatisation initiatives should thus consider the beneficial aspect of jointly managed private property to preserve the critical collaborative nature of nomadic pastoralism. As Khazanov (1994) has noted, privatisation turns *pasture* into *land*, a process that represents a threat to collective existence.

CRedit authorship contribution statement

Marius Warg Næss: Conceptualization, Formal analysis, Writing - review & editing, conceptualised, collected and analysed the data, drafted and revised the article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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