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Article

Rangeland Use Rights Privatisation Based on the Tragedy of the Commons: A Case Study from Tibet

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Abstract

Rangeland use rights privatisation based on a tragedy of the commons assumption has been the backbone of state policy on rangeland management and pastoralism in China. Through an empirical case study from Pelgon county, Tibet Autonomous Region in China, this paper provides an empirical analysis of rangeland use rights privatisation. It shows that the tragedy of the commons is not the correct model to apply to Tibetan pastoralism because pasture use in Tibet has never been an open-access institution. Thus, when the tragedy of the commons model is applied as a rationale for rangeland use rights privatisation, the result is not what is intended by the policy, but rather a misfit to features of pastoralism and thus disruption of the essence of pastoralism, i.e. mobility and flexibility. The paper further shows that a hybrid institution combining household rangeland tenure with community-based use with user fees is a restoration of the pastoralist institution. This demonstrates the capacity of pastoralists to create adaptive new institutions congruent with the interdependent and integrated nature of pastoralism consisting of three components: pastoralists, livestock, and rangeland.

Keywords: Rangeland use rights, tragedy of the commons, Tibet, Pelgon county, pastoralism, China

INTRODUCTION

Biologist Garrett Hardin (1968, 1991) asserted that under communal grazing systems each individual herder wants to maximise his or her number of livestock while the costs of rangeland degradation derived from large herds of livestock are shared by the whole community. Consequently individual herders have no incentives to care for rangeland conditions, leading to a tragedy of the commons. Hardin argued that the only way to reverse this tragedy is to privatise commonly managed rangelands. Social scientists refuted Hardin's tragedy of the commons by pointing out that few communally-based resource regimes are open access systems without any regulation and that they are in fact practiced worldwide without resource degradation (Buck 1985; Feeny et al. 1990; McCabe 1990, 2004; Ostrom 1990; Igoe 2003; Cullis and Watson 2005; Richard et al. 2006; Axelrod and Fuerch 2006; Moritz et al. 2013).

For example, by contrasting Hardin's definition of the commons with the traditional legal understanding of the term 'the commons' as applied to medieval England, Buck (1985) points out that the modern-day notion of common as a public right as defined in the tragedy of the commons is significantly different from the concept of the commons existing in the common grazing lands of medieval and post-medieval England. In medieval England the commons was not open to the general public, rather, only to certain individual tenants who used and managed the commons under strict regulations. Thus in fact, the commons was carefully and painstakingly regulated, and those cases in which the commons deteriorated were most often due to lawbreaking, to oppression and exploitation of the poorer land users, and unstinted land rather than to the abuse of a common resource derived from self-interest, as Hardin assumed. She argues that the commons is not and never was free, as Hardin assumed, and that the commons system was

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a successful land-use system, in which land was successfully managed and used by communities.

Similarly, Feeny et al. (1990) show that over the last twenty-two years since Hardin put forward the concept of the tragedy of the commons, various potentially viable resource management alternatives worked well. These alternatives enabled resource users to sustain resource use without degradation, invalidating Hardin's prediction that the commons system will eventually lead to overexploitation and degradation of resources. These include private, state, and communal tenure. Therefore, they suggest that a more comprehensive and complete theory should engage institutional arrangements and cultural factors so that better analysis and prediction can be made.

The two aforementioned critiques are among some insightful critiques of the tragedy of the commons since its emergence. The primary criticism of the tragedy of the commons is its false assumption that communally used rangelands are open access institutions when it is applied to rangeland resource management. Nonetheless in China the tragedy of the commons model is still, implicitly and deeply, embedded in state policy on rangeland management and pastoralism. For example, as recently as 2015 an official report attributed 'overstocking' in Tibetan areas in Sichuan Province to the tragedy of the commons. It first explained what the tragedy of the commons is and then suggested that management should be regulated (Sichuan Daily 2015):

> In 1968 [when he] put forward the tragedy of the commons theory, British scholar Hardin exactly used grazing as an example: Pastoralists graze livestock on common pastures. [They] are well aware that pasture conditions would deteriorate if [they] raise more livestock, still each of them raises more sheep out of self–interest. As a result, pastures would continue to deteriorate to the point no sheep could graze, eventually leaving herders bankrupt.
>
> In 2010 the tragedy of the commons [problem] is particularly serious for the grassland of Sichuan with an average overstocking rate of 45.8%. The solution is to regulate management.

This paper provides a critique of the privatisation of China's rangeland use rights based on a tragedy of the commons assumption through a case study from Pelgon county, Tibet Autonomous Region (TAR) and shows why and how the policy turns out to be infeasible.

Rangeland Use Rights Privatisation

Since all land in China including rangeland belongs to the state (or collectives in a few cases), privatisation in the Chinese context only refers to use rights privatisation. Rangeland use rights privatisation, also known literally as the Rangeland Household Responsibility System (RHRS), has been initiated to prevent rangeland degradation and avoid a tragedy of the commons scenario (Yan et al. 2005; Richard et al. 2006; Cirenyangzong 2006). The Household Responsibility System has been an important national policy in China since 1981, in which the use rights of means of production are contracted out to producers, who then are held responsible for the profits and losses of the production, to reverse the low productivity derived from "eating out of one big pot," the egalitarian distribution system of the commune era (Naughton 2007). As the primary means of production is farmland in the agricultural area and livestock in the pastoral area, both farmland use rights and livestock were allocated evenly among households according to the number of people in the early 1980s. The reform has turned out to be very successful.

However, another primary means of production in the pastoral area, the communally used rangeland, remained a concern to policymakers. For them, the privatisation of livestock (the livestock Household Responsibility System) only solved the problem of pastoralists "eating out of the big pot of livestock," but not the problem of livestock "eating out of the big pot of rangeland." They viewed the former problem as an economic one, i.e. economic efficiency, and the latter one as an environmental one, i.e. rangeland degradation caused by overgrazing. For example, a 1983 official article stated (Aoteng 1983:18):

> In recent years, the livestock Household Responsibility System has been implemented in pastoral Inner Mongolia, which has greatly stimulated pastoralists' incentive to raise livestock. However, the phenomenon of "eating out of one big pot" in rangeland management, utilisation, and construction has not changed to date. Thus, in order to graze their livestock well, pastoralists overgraze, leading to further desertification and degradation of rangeland, and bringing the development of animal husbandry to face a potential crisis.

Thus, in order to protect rangeland from being overgrazed and encourage pastoralists to improve it, its use rights were contracted out to individual households starting in the early 1980s in some places such as Inner Mongolia (Li and Zhang 2009). This echoes Hardin's tragedy of the commons.

In the TAR, officials merely repeat stated rationales articulated by national policymakers. The TAR started a pilot implementation of rangeland use rights privatisation in some counties since the mid 1990s in order to "change the traditional concept of 'rangeland without ownership, grazing without boundaries, utilisation [of rangeland] without fees and damage [to rangeland] without accountability,' and to promote pastoralists' recognition of rangeland [as capital]" (TARG 2009:222).[1] Thus, as it was in the early 1980s in some other places such as Inner Mongolia, the rationale for launching the policy is to prevent a tragedy of the commons scenario, as policy makers assume that the communal grazing system is equivalent to open access and that pastoralists under the system do not perceive the grazing land as being their own, thus they have no interest in taking care of the grazing land. In officials' words, "Pastoralists only take but do not give, only use the rangeland, but do not construct it. They

keep the rights [to use the rangeland] for themselves while leaving the responsibility [of protecting and improving the rangeland] to the state" (PCPG 2007). Therefore, the purpose of rangeland use rights privatisation is "to gradually change the exploitative nature of the [traditional] production system and to unify pastoralists' responsibility, rights and benefits, which stimulates pastoralists' enthusiasm for protecting and constructing rangeland" (DAAH date unknown).

METHODOLOGY

Analytical Framework: The Concept of Institutional Fit in the Study of Social-Ecological Systems

The concept of institutional fit in the study of Social-Ecological Systems (SESs) (Folke et al. 2007; Ostrom 2007, 2009; Ostrom and Cox 2010) suggests that institutions should match or fit the defining features of the problems they are designed to solve (Young 2002, 2008; Folke et al. 2007). In this sense the long-term sustainability of SESs depends on institutions fitting the attributes of the resource system, resource units, and resource users (Ostrom 2007). If institutions are not congruent with local biophysical conditions, the result would be an undesirable outcome (Ostrom 2007; Cox 2012), and long-term sustainability may not be achieved (Ostrom 2007; Folke et al. 2007).

Employing this concept of institutional fit in the context of pastoralism, this paper emphasises the importance of institutions governing rangeland resources fitting features of pastoralism. In rangeland resource management, the resource system, resource units, and resource users are rangeland, livestock, and pastoralists respectively. Dyson-Hudson and Dyson-Hudson (1980) define pastoralism as an adaptation by people whose subsistence is predominantly dependent on livestock and who employ mobility as a production strategy. Following this definition of pastoralism, this paper conceptualises pastoralism by emphasising the interdependent and integrated nature of pastoralism consisting of three components: pastoralists, livestock, and rangeland, and the essence of pastoralism: mobility and flexibility. It argues that these features of pastoralism are often ignored in state interventions into and policymakers' conceptualisation of pastoralism.

In this conceptualisation of pastoralism, my critique of rangeland use rights privatisation based on the tragedy of the commons focusses on its misfit to features of pastoralism. Specifically, I demonstrate that rangeland use rights privatisation blindly following a tragedy of the commons assumption that rangeland use is an open-access institution and ignoring pastoralist institutional mechanisms of rangeland management overlooks the interdependent and integrated nature of pastoralism consisting of three components: pastoralists, livestock, and rangeland. As a result, it disrupts the essence of pastoralism, i.e. mobility and flexibility and turns out to be infeasible.

Study Area and Methods

Located in the south central part of Nagchu Prefecture in the central north TAR and in the heart of the Tibetan Plateau, Pelgon county is a pure pastoral area with a total rangeland area of 24, 676 km^2 (out of a total land area of 28, 977 km^2) (NPSB 2011) and a total livestock population of 1.03 million as agriculture is precluded by its physical environment (PCSB 2010). Geographically, Pelgon county is part of the Changtang, a region of high altitude steppes with sparse vegetation and giant lakes in northwestern Tibet.

The physical environment of Pelgon is characterised by high altitude and a semi-arid climate with low temperatures and a short growing season between May and September. At an average elevation of 4700 m Pelgon county has a mean annual temperature of −0.8°C and receives mean annual precipitation of 321mm, over 80 per cent of which falls during the growing season (Liu et al. 2003). The mean annual evaporation of 2002mm far exceeds the mean annual precipitation; hence Pelgon has a semi-arid climate with sparse vegetation (NPMO 2008). The rainy season between May and September starts later and ends earlier, and precipitation decreases while evaporation increases from the southeast to the northwest (NPMO 2008; Liu et al. 2003). Vegetation communities largely correspond to precipitation. Dominant rangeland types are alpine steppe and desert steppe. Livestock species correspond to rangeland types. Dominant species are sheep (62%) and goats (22%) as meadows are needed for the survival of yaks (15%) (PCSB 2010). In recent years, there is an increasing tendency for pastoralists in eastern and central Nagchu to raise fewer sheep and goats because raising sheep and goats is more labor intensive (for example, herders need to follow sheep all day long). In the study area, however, sheep and goats are still the dominant species given the ecological conditions. Livestock in the study area are owned by individual households and overwhelmingly depend on natural forage as artificial fodder is virtually unavailable.

Tibetans make up more than 99% of the total population of the county (38,186), of whom 91% are pastoralists who herd sheep, goats, yaks, and horses over Pelgon's vast and sparsely inhabited area (NPSB 2011). Pastoralists in Pelgon overwhelmingly rely on pastoralism for their livelihood with little off-range income. According to government statistics pastoralists' average annual per capita net income in 2010 was 3632 yuan (Xie 2012), which was 84% of the prefectural average (NPSB 2011), 88 % of the regional average (RBS 2011) and 61% of the national average (NBS 2011).

Prior to 1959, like their counterparts in the rest of the Nagchu region, pastoralists in the study area bartered their butter, wool, salt, and livestock with farmers from southern and eastern Tibet for barley, wheat, peas, radish, tea, and rice from the Himalayan countries, through caravan trade (Yeh et al. 2014). But today pastoralists purchase grain and other goods mostly in markets.

In a typical pastoral household in the study area, gender division of labor is clear cut. Women are mainly responsible for domestic and childcare chores, milking and processing

milk, collecting dung fuel and water while men perform tasks other than milking that are associated with livestock, such as herding, slaughtering, wool shearing, cashmere combing, and trading and work outside the household. Some work can be shared by women and men depending on labor availability and gender balance in a household. These tasks typically include collecting water and herding. Some work can only be conducted either by women or men, i.e. milking by women and slaughtering by men. Tibetan pastoralists view gender division of labor as complementary rather than exploitive (Goldstein and Beall1990; Yundannima 2012).

This paper draws on research conducted in two research villages in Pelgon over the period of 15 months from July 2009 through October 2010. The two villages in Mentang Township were selected for their differences in herd composition, rangeland types, market access and frequency of seasonal movement (Figure 1, Table 1).

My field research consisted of two parts: an ethnographic study, household interviews and focus group discussions in the villages; and interviews with government officials and reading of government documents including work reports and census data. Through participant observation in everyday life, production practices, and public activities such as meetings and festivals in the villages, I was able to understand the way in which pastoralists come to identify with, reject, negotiate with, or modify state policy. To complement ethnographic data, I conducted in-depth, semi-structured interviews with 30 households, 15 interviews in each of the two villages. I selected these households for a range of herd sizes (small, medium and large), perceived rangeland qualities, and degree of transhumance. In addition, I conducted a focus group discussion with four elders in each village on rangeland use history from 1940 to present. I also conducted in-depth, semi-structured interviews with 22 government officials at all levels of government, from township government up to the central government. The interviews were oriented towards the government's rationales for privatising rangeland use rights, pastoralists' responses to it, its implementation, and results.

Figure 1
Study area: Pelgon county, Nagchu prefecture, Tibet

ARGUMENT

Rangeland Use History and Transhumance in the Study Area: Not An Open-Access Institution

Prior to the Chinese reform in 1959, across the Nagchu region, the rangeland was used communally at the tribal level while herding and migration were usually based on the individual family level.[2] The two research villages were part of Sepa Tribe of Tuva Four Tribes,which were administered by Tashi Lhunpo Monastery in Shigatse.[3] Cross-tribe grazing and camping were not the norm. In fact, it appeared that families in one tribe did not need to go to graze in other tribes' grazing land as there were not as many families as today in a given place, thus there was "no shortage of forage" as the elders put it. For example, according to the elders there were fewer than 20 families in Research Village 1 prior to 1959, compared to 84 households today.[4] The elders recalled:

> As we had large grazing land but not many families, we did not need to migrate much. We would basically stay in

Table 1
Research villages

		Village 1	Village 2
Administrative organisation	County	Pelgon	Pelgon
	Township	Mentang	Mentang
	No. of natural villages	4	4
	No. of households	84	103
	Population	463	452
Herd composition	No. of yaks	527 (2%)	2175 (10%)
	No. of sheep	11,316 (56%)	14,974 (66%)
	No. of goats	8495 (42%)	5385 (24%)
Rangeland types	Alpine marsh meadow (%)	0	10
	Alpine meadow (%)	0	20
	Sandy pastures (%)	100	70
Estimated rangeland area		720 km^2	480 km^2
Market access (km)	Distance to township headquarter	80-100	40-50
	Distance to county town	120-140	80-90
	Distance to prefectural headquarter	340-360	300-310

> the same pasture area in the north for most of the time as we would never run out of forage. We would move to the south in the summer and stay from the 5th to the 8th month partly in order to avoid robbers from the east as they often came to attack us in the north. Within the northern pasture area, migration varied from family to family, primarily depending on pack yak (or sheep) availability.

Rangeland access and the traditional production system underwent little change across the prefecture in the early years after the 1959 reform. A new five-level Chinese administrative structure (region, prefecture, county, district, and township) started to replace the old Tibetan administrative structure in the second half of 1959 in Nagchu Prefecture. In the study area they were established in 1961. A township was composed of several Zuk (zu in Chinese). Sepa Tribe became a township under Tuva District and each of the two research villages became a Zuk under Sepa Township. Meanwhile, the government started initiating ways to improve production, such as encouraging pastoralists to use the same pasture area for the same season and build livestock pens, etc. Thus, in some places transhumance was regulated at that time. Temperature and access to water are two primary factors that pastoralists consider when they decide seasonal pasture areas. A pastoralist explained:

> We use the flat grassland as our fall pasture area because it is warm and not windy in fall. When winter comes, we move to stay in the mountains as it is less cold and windy there. In spring, we stay where we have better access to water. If we stay in the winter pasture area in summer, it would be too warm for the livestock.

Nevertheless, these efforts did not aim to bring about a dramatic change in the traditional production system, which in fact was guaranteed to be maintained by a policy known as the 30-point policy issued in 1961 (TWC 1961). This policy stated that the individual family ownership of livestock should be stabilised; pastoralists should be permitted to continue hiring others as herders and servants, renting out livestock, and engaging in trade, borrowing and lending activities. The rangeland was used communally at the township level and the basic unit of production, including migration, remained at the household level across the prefecture. This means that in the case of a tribe becoming a township, the administrative boundaries remained the same as in the case of Sepa Tribe to which the two research villages belonged.

Rangeland access continued to remain the same in most places when the People's Commune was established in the first half of the 1970s in the prefecture. Typically a former township became a people's commune but its rangeland and households were maintained unchanged. A three-level administrative hierarchy was present in the commune system. A commune consisted of several production brigades (ru khag in Tibetan) and a brigade was composed of several production teams. The Zuk during the previous period became a brigade. The rangeland was used communally at the commune level while livestock was owned and managed at the brigade level. Day-to-day production activities (such as herding and migration) were arranged at the production team level by brigade leaders.

After the commune was abolished in the early 1980s, rangeland has been communally used at the administrative village level. Starting from 1981, the implementation of the Household Responsibility System restored the private ownership of livestock and the primacy of the individual household as the basic unit of production and consumption in Nagchu (Yundannima 2012). Shortly afterwards, in late 1983, the Chinese government started disbanding communes and establishing townships, a process which was finished in the TAR by 1985 (CPCCC and SC 1983; Hao 2008: 69).In many cases the old township was restored with the same rangeland and households. Brigades became administrative villages under townships. In many cases, the rangeland was used communally at the township level. But in the study area, the rangeland use has been based on the administrative village since the commune system was abolished. Therefore, the access to pastures has shrunk as during the period of the commune the rangeland use was based on the commune level, which became a township after the commune was abolished. However, this appears not to be a concern for the pastoralists given that they have vast tracts of rangeland and that it is neither desirable (enough land) not feasible (too far to go) for them to move beyond their own administrative village.

In short, like the rest of the prefecture, rangeland access in the study area did not go through profound changes over four historical periods from before 1959 through the early 2000s:

1. Prior to the Chinese reform in 1959
2. After the 1959 reform to the establishment of the People's Commune
3. During the People's Commune
4. The reform and post-reform eras — the early 1980s to the late 1990s and early 2000s.

Rangeland was used communally more or less as it had been until the privatisation of rangeland use rights starting from the late 1990s and early 2000s (Table 2).

Having reviewed changes in rangeland access over time, I will now discuss transhumance, which is an important feature of rangeland use in pastoralism. Here transhumance refers to the seasonal migration of people with their livestock from their home bases, where their houses are located. Pastoralists in Nagchu did not build houses until the commune was abolished, i.e. in the early and mid 1980s. Prior to this, pastoralists generally lived exclusively in tents. During the commune period, only the production brigade had a public store room and a meeting room. Prior to 1959, except for beggars every family across the region had at least one tent (made of yak hair, also of wool in western Nagchu) to live in. Even some beggars had small tents that they could carry on their backs. Ideally, a family needed two tents, one as a home base and the other for migration as the whole family and livestock were not necessarily able to move together at the same time (very often old people and small children had to be left behind), which

Table 2
Rangeland use history 1940-present

Period	Rangeland access
Prior to the 1959 reform (1940-1960)	-each of the two research villages as a part of Sepa Tribe -rangeland shared within the tribe
After the 1959 reform and prior to People's Commune (1961-1974)	-each of the two research villages as a Zuk under Sepa Township -no change in rangeland access (as the tribe converted into a township and rangeland shared within the township)
During the Common era (1975-1984)	-each of the two research villages as a production brigade merged into commune -rangeland shared within the commune
Reform and post-reform eras (1985-2003)	-each of the two research villages as an administrative village under Mentang Township -rangeland access shrank (as rangeland shared merely within the administrative village)
Post-reform era (2004-present)	2004-08 -individual rangeland use (rangeland access based on the household level) implemented under the Household Responsibility System in Research Village 1 -No change in rangeland access (communal rangeland use at the administrative village level) in Research Village 2
	2008-present -communal rangeland use at the administrative village restored in Research Village 1 -No change in rangeland access (communal rangeland use at the administrative village level) in Research Village 2

was especially true in emergencies such as snowstorms. In the study area, most households built houses by the late 2000s.

In the two research villages, unified seasonal migration--in which all the households move together to seasonal pastures--has been sustained since the 1959 reform and ensures equal access to seasonal pastures among the households. As discussed earlier, since the 1959 reform the government has gradually regulated seasonal migration by encouraging pastoralists to move to the same place in the same season. This practice has continued ever since, especially in Research Village 2 where the village leadership, which is needed for the practice to be implemented (Wade 1994; Baland and Platteau 2000), has appeared to be stronger.[5] Prior to this, pastoralists did not have to migrate much given much lower ratio of population to land at the time. They would stay for three months in their southern pasture area partially to avoid robbers. They would stay for the rest of the year in their northern pasture area, where migration depended on forage availability and pack yak (or sheep) availability, which varied from household to household as discussed earlier. Today, under the unified migration policy, families need to move to seasonal pastures on the same day or at least around a certain date decided by the village leadership to make sure families have equal access to the pastures. All the people and livestock move to the seasonal pastures. Only the poorest families with few livestock are allowed to remain at their home bases most of the time. For example, in Research Village 1, the poorest three families stay at their home bases year-round, compared to three seasonal pastures for the rest of the households as shown in Table 3.

In the case of Research Village 2, only one poor family is allowed to remain at their home base for three seasons, i.e., the family uses two different seasonal pastures, compared to three different seasonal pastures (here the home-base pasture area is used for both winter and summer) as shown in Table 4. Even so, they have to move their livestock to other places no later than the 15th day of the 4th month (usually mid May) when vegetation starts greening up to ensure their livestock are not grazing the newly grown vegetation before other families. These poor families are excused from moving with other families because they do not have transportation means (pack yaks, or trucks) or camping facilities that make migration possible, or they lack adequate labor power; furthermore, they have few livestock.

In sum, a review of rangeland use history from 1940 to the early 2000s and the present practice of transhumance shows that rangeland use in the study area has never been an open-access institution. Pastoralists use the rangeland within certain boundaries and practice transhumance with strict rules.

Consequences of Rangeland Use Rights Privatisation: Restriction of Livestock Grazing, Mobility and Migration

In the study area, the policy of rangeland use rights privatisation was put in place in 2004. Each household was allocated two parcels of grazing land that were based 60% on the number of people and 40% on the number of livestock at that time and received a rangeland use rights certificate that states it has exclusive use rights to its grazing land for 50 years. County officials offered four options for using the grazing land (individually by each household, collectively by groups of households, collectively by the natural village or collectively by the administrative village) after the privatisation of its use rights, though they preferred pastoralists to opt for the first option, which they encouraged the pastoralists to choose by promising more development projects as a reward. They suggested that if the rangeland is used collectively, and if in a given year a household uses more grazing land than its allocated amount, it needs to pay a user fee to those that do not use up their amount. The user fee is set at 0.03 yuan per sheep equivalent unit per day.[6] Research Village 1 chose the first option, i.e. to use the grazing land individually by each household while Research Village 2 opted for the last option, i.e. to continue sharing the rangeland within the administrative village.

However, rangeland use on a household basis resulted in poorer livestock conditions and loss of many more livestock

Table 3
Seasonal pastures in Research Village 1

Season	Spring-Summer	Fall	Winter
Timing	Late 12th month-late 7th month	Late 7th month-the beginning of 10th month	The beginning of 10th month-late 12th month
Distance from home bases (km)	0	40	8
Usual duration	7 months	2.5 months	2.5 months

Table 4
Seasonal pastures in Research Village 2

Season	Summer	Fall	Winter	Spring
Timing	Mid 5th month-mid 7th month	Mid 7th month-early 10th month	Early 10th month-late 12th month/early 1st month	Late 12th month/early 1st month -mid 5th month
Distance from home bases (km)	0	20	0	30
Usual duration	2 months	2.5 months	3 months	4.5 months

due to restricted grazing areas and reduced migration. For example, my host family had 309 sheep, 100 goats, 4 yaks and 4 horses at the beginning of the new practice in 2004, but by the end of 2009, they ended up having just 176 sheep, 85 goats, 1 yak and 6 horses. The policy failed completely. In the end, four years later, the pastoralists had to request the government to restore the collective use of rangeland at the administrative village level. The head of my host family, Puntar, recalled what had happened:

> At that time, the livestock had to graze in a small area, following the same grazing orbit every day. As a result, the vegetation was gone more quickly as more vegetation was blown away by wind after more trampling, resulting in inadequate forage. Plus, we could not move to the winter pasture as it did not belong to us. We had to stay at our home base for three seasons [winter, spring, and summer] and we had only two seasonal pastures as each household was allocated two plots of grazing land. The livestock were getting weaker and weaker and there was little fat on meat. For example, average sheep only weighed as little as 8.5 kg. Today they weigh about 19 kg. We lost many livestock. If the private land use had never been adopted, our number of livestock might have reached over 700 from over 400 at the beginning of the private land use. But we have ended up having fewer than 300 now.

Table 5 shows livestock numbers from census data by the end of 2003 and 2008, i.e. before and after the household-based rangeland use period respectively for the two villages (PCSB 2009). As shown in the table, between 2003 and 2008, the number of both yaks (-20%) and sheep (-4%) decreased in Research Village 1 whereas in Research Village 2 the number of sheep (1%) slightly increased while the decrease rate of yaks (-3%) was not as high as that of Research Village 1.[7] Thus, livestock census data and the pastoralists' accounts of having lost many more livestock during the household-based rangeland use period are consistent with each other. Given there was nothing else abnormal going on during that period, the pastoralists' attribution of it to the household-based rangeland use appears to be reliable. In fact, it is sensible to understand that without experiencing difficulties during the household-based rangeland use period, the pastoralists would not have appealed to the government to restore the collective use of rangeland at the administrative village. This shows that livestock in western Nagchu where there is vast rangeland but rangeland quality is poor need particularly to move around to graze over large areas, but household-based rangeland use restricts livestock mobility and makes livestock grazing difficult, thus reducing productivity (Scoones 1995; Niamir-Fuller 1999; McCabe 2004; Fernandez-Gimenez 2006; Kerven et al. 2008). Therefore, the policy turns out to be infeasible.

Table 5
Livestock numbers before and after the household-based rangeland use period

Livestock		Village 1	Village 2
Yak	2003	728	2113
	2008	519	2044
	Change (%)	-20	-3
Sheep	2003	12350	14355
	2008	11802	14546
	Change (%)	-4	1
Goat	2003	5250	5425
	2008	8806	5498
	Change (%)	68	1
Horse	2003	199	354
	2008	144	231
	Change (%)	-28	-35

Restoration of the Pastoralist Institution: Household Rangeland Tenure with Community-Based Use with User Fees

In contrast, a hybrid policy combining household rangeland tenure with community-based use with user fees (Richard et al. 2006) has been very successful as pastoralists have accepted it as the best option under the enforced rangeland use rights privatisation policy. Pastoralists have willingly accepted the

user fee policy since rangeland use right privatisation in 2004 in Research Village 2 and since the restoration of collective use in 2008 in Research Village 1. Those households that have to pay a user fee do not complain about the policy. Instead, they think it is a rational policy. Asked his opinions on the policy, a pastoralist in Research Village 2 whose family is among those with the most livestock and hence, usually has to pay a user fee every year responded:

> How much grazing land a household has been given was based 60% on the number of people and 40% on the number of livestock. So, poor families with more people but few livestock have their share of grazing land and receive a user fee from rich families. In my case, I always have to pay [a user fee] ranging from 400 yuan to 3300 yuan a year depending on the number of livestock and grass availability, which in turn depends on weather. But I am not unhappy with this policy. On the contrary, I think it is a good policy primarily for two reasons. First, it helps poor families earn some money from their land while the user fee would not leave rich families worse off. Second, it persuades us to control livestock numbers because we have to think of affording to pay the user fee.

Thus, pastoralists view this policy as a pro-poor and fair policy. Accordingly, they are willing to pay a user fee for extra grazing land they need, which also reflects a role that principles of reciprocity in Tibetan pastoral societies play in self-organisation (Baland and Platteau 2000; Ostrom 2005).

However, the underlying reason for their willingness to pay for grazing land, which they used free of charge for generations, is that it is the best option from pastoralists' perspective under the mandatory privatisation initiative because it is a guarantee of mobility and flexibility, which are crucial to livestock grazing in areas with patchy rangeland resources (Behnke and Scoones 1993; Niamir-Fuller et al. 1999; Humphrey and Sheath 1999; McCabe, 2004; Fernandez-Gimenez, 2006; Kerven et al. 2008). The case of Research Village 1 has proven this. Given their harsh experiences during the household-based rangeland use period, households with more livestock in Research Village 1 are more satisfied with collective use of rangeland even though they may have to pay more for the grazing land. A pastoralist whose family has relatively fewer people but more livestock explained why she is happy with collective use of rangeland albeit it costs her more financially:

> As we had fewer people when the land was divided, we ended up receiving two small parcels of pastures–only two seasonal pastures [fall/winter, spring/ summer]. The livestock could not move around to graze as they did before. As a result, they became very weak and few lambs survived. So we had to rent land from others, but there was not much to rent as some other families were trying to rent land from others as well. We were only able to rent pastures worth 1500 yuan a year. After we had the public land [collective use] again in 2008, we paid [a user fee of] 3090 yuan that year and 2122 yuan last year [2009]. Though we now have to pay more, we are better off today because the actual loss was greater during the private land use period as many livestock died due to inadequate grass resulting from restricted mobility.

This indicates that community-based use is a more efficient use of patchy rangeland resources (Bauer 2004: 53). Moritz et al. (2010) reported a similar case of how grazing pressure is affected by a change in the grazing behaviour of animals in Cameron. This policy has turned out to be a compromise between, and a hybrid of the RHRS and the traditional livestock grazing system. Under this system, pastoralists are able to continue using rangeland collectively within the administrative village while households with more livestock pay a user fee to those with fewer. Thus, livestock grazing, mobility and migration are guaranteed.

CONCLUSION

This case study of rangeland use rights privatisation based on a tragedy of the commons assumption from Tibet shows when an institution for managing natural resources established by the state is not congruent with local conditions, it inevitably turns out to be infeasible (Janssen 2002; Norberg et al. 2008). The failure of the rangeland use rights privatisation in this case is due to a false assumption upon which the institution is based and a failure to recognise local resource institutions (Berkes and Folke 1998; NRC 2001; Mwangi 2007).When such an institution is imposed, it results in an undesirable outcome as a consequence of institutional misfit in the sense that the institution does not fit the defining features of the problems it is designed to solve. Specifically, this is a case in which policymakers only consider a single institutional variable (rangeland use rights) while neglecting related and interdependent resources (rangeland and livestock) and the institutions that influence human interactions with those resources (the interdependent and integrated nature of pastoralism consisting of three components: pastoralists, livestock, and rangeland). Consequently a set of maladapted institutions make a failure of such an institution inevitable with an undesirable result (disruption of the essence of pastoralism: mobility and flexibility) (Cole et al. 2014).

Under such a circumstance, this case study shows the capacity of local resource users to create adaptive new institutions congruent with local conditions while at the same time make a governance regime more adaptive through their knowledge and experience, if they are left to make changes to the institution imposed by the state (Armitage et al. 2007). One such example is the successful hybrid institution combining household rangeland tenure with community-based use with user fees. In this case study, out of the ten subsystem variables that Ostrom (2009) identified and summarised based on research from around the world that are most conducive to resource users' self-organisation in Social-Ecological Systems in the commons literature, all but one (resource unit mobility) are present. They are moderate resource territorial

size, relative scarcity of resource, predictability of resource dynamics, relative small number of resource users, leadership, norms of reciprocity, local knowledge of the SES, importance of resource to users, autonomy at the collective-choice level.

This demonstrates conversely that an alteration in existing institutional arrangements (the pastoralist institution in the case study) instead of imposing new institutions by the state may achieve policy goals (Cole et al. 2014). This is also a case supporting Ostrom's critique of the Leviathan solution (regulation of the commons by the state) in the commons literature (1990) that local resource users have the ability to manage the commons without the necessity for state regulation. Therefore, a take-home message for policymakers from this empirical case is to be aware of the wide diversity of local resource institutions in long-surviving resource systems and recognise the self-organising capacity of local resource users to prevent the panacea problem or one-size-fits-all institutional prescriptions (Ostrom 2007, 2009; Ostrom and Cox 2010).

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NOTES

1. In Nagchu Prefecture the implementation of the RHRS started in 1999.
2. As this part is primarily based on the living memory of pastoralists, the start year was 1940 when most of the elders were old enough to remember.
3. Tashi Lhunpo Monastery is the residence of successive Panchen Lamas in Shigatse, the second-largest city in the TAR in southwestern Tibet. The Panchen Lama is the second highest ranking lama after the Dalai Lama in the Gelugpa sect of Tibetan Buddhism. The residence of Panchen Lamas ruled part of Western Tibet prior to 1959 (see Goldstein and Beall 1990).
4. The number of households prior to 1959 in Tuva Four Tribes was over 320 (QASS 1991). By the end of 2009, there were 1013 families in Mentang Township (MTG 2010), which was Tuva Four Tribes prior to 1959.
5. As discussed later in the case of Research Village 1, this practice was interrupted during the four-year household-based rangeland use as many households ended up having different seasonal pastures after the rangeland was allocated to individual households.
6. Sheep equivalent unit (SEU) is calculated as follows: 1 sheep = 1 SEU; 1 yak = 5 SEU; 1 goat = 0.8 SEU; 1 horse = 6 SEU.
7. Notice that the increase in goat numbers in Research Village 1 does not represent a natural growth. In 2006 the county government launched a goat development programme in the village in which fifty target households needed to raise up 95 female goats and five rams, and build a goat shelter and a pen funded by the government.

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