

FROM “RETIRE LIVESTOCK, RESTORE RANGELAND”
TO THE COMPENSATION FOR ECOLOGICAL SERVICES:
STATE INTERVENTIONS INTO RANGELAND ECOSYSTEMS AND PASTORALISM IN
TIBET

by

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From “Retire Livestock, Restore Rangeland” to the Compensation for Ecological Services: State Interventions into Rangeland Ecosystems and Pastoralism in Tibet

Thesis directed by Associate Professor Emily T. Yeh

This dissertation investigates China’s *tuimu huancao* and destocking policy under a Compensation for Ecosystem Services program as a case study of how “received wisdom” environmental degradation narratives are used to justify state interventions into the livelihoods of minority pastoralists. *Tuimu huancao* calls for grazing bans and restrictions by fencing for the purpose of restoring purportedly degraded rangeland and protecting rangeland. The destocking policy is intended to adjust herd size to carrying capacity through a reward mechanism for the purpose of protecting rangeland.

It examines the scientific and theoretical foundations of these two policies and the way in which they are understood, received, negotiated, and contested in multiple ways through a case study from Nagchu Prefecture, Tibet. The framework for analyzing these two programs as state interventions draws from and contributes to political ecology. Field research of an ethnographic study used a mix of methods that included detailed household surveys, in-depth, semi-structured interviews, oral histories, focus groups, transect walks, participatory mapping and participant observation.

This dissertation argues that *tuimu huancao* and the destocking policy ultimately have the effect more of intensifying existing policy directions that transform traditional pastoralism than of mitigating rangeland degradation, restoration and protection. Hence, narratives of rangeland degradation underpinning *tuimu huancao* and the destocking policy serve to justify state interventions that aim to achieve this goal of transforming traditional pastoralism. Furthermore,

broadly defined political and economic forces maintain the persistence of “received wisdom” on pastoralism and prevent alternative perspectives to existing policy directions from emerging. This dissertation also argues that Tibetan pastoralism can be well adapted to state interventions based on a middle way approach that accommodates both development and the livestock components of pastoralism. Nonetheless, the dissertation demonstrates that the formation of such a policy will not be easy because it will be a political process and can be jeopardized by officials’ vested political and economic interests.

DEDICATION

This research is dedicated to the pastoralists of Nagchu, Tibet. As their saying goes, “Pastoralists depend on livestock and livestock on rangeland (*mgo nag brten sa spu nag, spu nag brten sa spang spu*).” With the sophisticated wisdom and practical experience of their ancestors, which demonstrate and confirm with a very simple clarity the interdependent and integrated nature of pastoralism consisting of these three components of pastoralists, livestock, and rangeland, they are the real experts who know how to make a living from livestock and rangeland. Thus, they deserve to be heard.

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I understand that after all, information provided in this dissertation will need updating with time passing by. But I have found that the essence of what I have learned from this PhD program is to think critically, creatively and independently, which will never be outdated and can be passed on to others. Therefore, I am very thankful to all the professors who have taught me this essence of learning.

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Introduction

The state [rgyal khab] forced us to fence off alpine meadows [spang] and sandy pastures even though doing so is useless for us. We fenced off and seeded this sandy land three years ago, but the condition remains the same. As you see, nothing has grown, which is not surprising at all because it has been like this with sparse vegetation since my childhood. Also, unlike grass in alpine marsh meadows [na], grass in alpine meadows will either be blown away by wind or covered by snow in winter even if reserved by fencing in summer. The only benefit from this program is compensation and free fencing. I guess the state just has no idea how pastoralism works. Otherwise how come it puts forward policies neither beneficial to us nor to it? This time, if we have to reduce livestock numbers as the state wants us to, then our life would become very difficult...

--a pastoralist in Nagchu, the Tibet Autonomous Region, 2010

This is part of my conversation with a middle-aged pastoralist in central Nagchu, the Tibet Autonomous Region (TAR) in September 2010 when he showed me one of the fenced sandy pastures in his village. He was talking about two recent rangeland protection programs initiated by the Chinese Government in China's pastoral areas, namely *tuimu huancao* and "rangeland ecological protection subsidy and reward mechanism," which I refer to as a Compensation for Ecosystem Services (CES) program. The former calls for grazing bans and restrictions by fencing for the purpose of restoring purportedly degraded rangeland and protecting rangeland. The core of the latter is to adjust herd size to carrying capacity through a reward mechanism for the purpose of protecting rangeland, forcing many pastoralists to reduce herd size.

This dissertation investigates the rationales for formulation of *tuimu huancao* and the destocking policy under the CES program, the politics of their implementation, their reception and their results through a case study from Nagchu Prefecture, TAR. It examines the scientific and theoretical foundations of these two policies and the way in which they are understood, received, negotiated, and contested in multiple ways. The following paragraphs introduce these two programs and the research questions that the dissertation aims to address.

Tuimu huancao

The Chinese government launched *tuimu huancao*, translated as “retire livestock, restore pastures” (Yeh, 2005) in 2003 in its pastoral areas in order to reverse and restore rangeland degradation, as it is widely believed that 90% of China’s rangeland has been degraded to various degrees, as I will discuss in Chapter 3.¹ The Ministry of Agriculture defines *tuimu huancao* as a basic rangeland construction project that aims to restore vegetation, improve rangeland ecology, enhance rangeland productivity, and promote coordinated development between rangeland ecology and pastoralism through fencing, seeding of grass (*bubo*), grazing bans (*jinmu*), grazing restrictions (*xiumu*) and rotational grazing (*lunmu*).² *Tuimu huancao* is one of the nine programs designed to achieve China’s goals of sustainable use of rangeland resources, improvement of rangeland ecological environment and sustainable socioeconomic development in the National Comprehensive Plan for Rangeland Protection, Construction and Utilization (*quanguo cao yuan baohu jianshe liyong zongti guihua*), which was most recently updated in April 2007 by the Ministry of Agriculture and describes specific targets for China’s four different rangeland regions by 2010 and 2020 respectively. For example, the targets set for total *jinmu* areas and

¹ Tibetan: `brog skyur rtswa gso.

² Rangeland construction (*caochang jianshe*) refers to rangeland improvement through man-made measures such as irrigation, seeding, fencing, etc. It is a concept that can be traced back to the early years of the PRC (Hong, 2006) and the underlying principle is that rangeland should be managed like farmland.

‘Suggestions Regarding Another Step toward Strengthening the Implementation and Management of the *tuimu huancao* Program’ (*guanyu jinyibu jiaqiang tuimu huancao gongcheng shishi guanli de yijian*). Ministry of Agriculture, 11 April 2005. In August, 2011, the *tuimu huancao* policy was slightly adjusted. Under the new policy, **in** principle, no new zones of *jinmu* (grazing bans) will be established. It appears that this is partially because under the Compensation for Ecosystems Services Program, grazing will still be banned in places characterized by what the government considers harsh natural conditions, or severely degraded rangeland or land that is unsuitable for grazing, and in source regions of major rivers. ‘Suggestions regarding Perfecting the *tuimu huancao* Policy’ (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

xiumu areas on the Tibetan Plateau are 12 million hectares and 25 million hectares respectively by 2010, and 13 million hectares and 42 million hectares respectively by 2020. Accordingly, *tuimu huancao* will be implemented in all of China's pastoral counties by 2020.³

On the ground the program works through the establishment of fenced zones in which grazing is to be closed for several months annually (for *xiumu* and *lunmu*) or for several years (for *jinmu*). A *xiumu* zone should be established for slightly degraded rangeland while a *jinmu* zone for severely degraded rangeland where vegetation has decreased due to overgrazing.⁴ According to the head of Rangeland Office of Department of Animal Husbandry under the Ministry of Agriculture, in order to accelerate the restoration of vegetation, seeding of grass in *jinmu* zones has been added as a component of the program since 2005. The area to be seeded is set at 30% of the total area to be fenced (including both the area of *jinmu* and *xiumu* zones) at the county level. Therefore, *tuimu huancao* is based upon three questionable assumptions: that there is pervasive rangeland degradation across the country, that this degradation results from pastoralists' overgrazing and irrational management practices, and that degraded rangeland can therefore be restored through a grazing ban and seeding of grass. The last two assumptions are, in turn, based on an understanding of China's rangeland as being equilibrial ecosystems, those in which biotic interactions maintain homeostasis and that are characterized by a successional

³ According to the head of Grassland Office of Department of Animal Husbandry under the Ministry of Agriculture (*nongyebu xumuyesi caoyuanchu*) (interview in January, 2009), by the end of 2009, *tuimu huancao* had been implemented in 179 counties of the 279 counties, which are now administered as 266 counties (Liu, 2010). According to the new *tuimu huancao* policy adjusted in August 2011, 106.7 million ha out of 1.584 billion ha of degraded rangeland need to be restored and improved. The target during the 12th Five-Year Plan is to fence off 33 million ha of it and seed 10 million ha of it. 'Suggestions regarding Perfecting the *tuimu huancao* Policy' (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

⁴ 'Technical codes of grazing bans' (*jinmu he xiumu jishu guicheng*). Ministry of Agriculture. no date.

continuum model in which a Clementsian climax community exists and concepts of a single carrying capacity apply (Sayre, 2008).

The central government funding covered 70% of the cost of fencing (including fencing material, transportation costs of fencing, and fencing installation), and the cost of seeding (including seeds, transportation costs of seeds and seeding), and compensation of pastoralists for pastures fenced off.⁵ In addition, it supported a project operating fee of 1% of the total project funding from the central government.⁶

In the TAR, the program was launched in 2004 in two counties in Nagchu Prefecture and one county in Ngari. With time passing by, the project is being implemented in almost all the pastoral counties in the region. There is not a uniform policy on length of these grazing bans across the country. In the TAR, in most cases, a *jinmu* zone needs closing off for ten years and a *xiumu* during the growing season, and there is not the *lunmu* component of the program. By the

⁵ In the Tibetan Plateau region, which includes the TAR, Qinghai Province and parts of Gansu, Sichuan and Yunnan Provinces, the central government funding for fencing was 17.5 *yuan* per *mu* and for seeding 10 *yuan* per *mu*. The compensation for the *jinmu* zone each year was 2.75 kg of grain per *mu* and *xiumu* zone each year 0.69 kg of grain per *mu*, and that the compensation should be paid for ten consecutive years both for the *jinmu* and *xiumu* zones and the price of grain should be 0.9 *yuan*/kg. The same policy is supposed to be applied across the region. The policy says from 2004 the compensation should be paid in cash, but if it has to be paid in grain the provincial government should cover the transportation costs. ‘Notice on Several Opinions Regarding Another Step toward Perfecting Several Policy Measures on *tuimu huancao*’ (*guanyu jinyibu wanshan tuimu huancao zhengce cuoshi ruogan yijian de tongzhi*). Office for the State Council Leading Group for Western China Development, National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, April 20, 2005. The village committee is responsible for transporting the material from the township headquarter to the fencing sites and covering the transportation costs (from the village public funds). In several cases the fencing and seed suppliers transport the fencing and seed to the fencing sites. Under the new *tuimu huancao* policy adjusted in August 2011, the central government funding for fencing has been increased to 20 *yuan* per *mu* for the Tibetan Plateau region, and to 16 *yuan* per *mu* from 14 *yuan* per *mu* for the rest of the pastoral area. The central government funding for seeding has been increased from 10 *yuan* per *mu* to 20 *yuan* per *mu* across the country. ‘Suggestions regarding Perfecting the *tuimu huancao* Policy’ (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

⁶ Under the new *tuimu huancao* policy adjusted in August 2011, the central government funding will cover 80% of the cost of fencing and the project operating fee has been increased to 2% of the total project funding from the central government. ‘Suggestions regarding Perfecting the *tuimu huancao* Policy’ (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

end of 2010, the total central government investment in the program in the TAR was 1.929 billion *yuan* and the area of fenced zones was 4.56 million ha.⁷

The Destocking policy under the Compensation for Ecosystem Services (CES) program

On August 22, 2009, the TAR Government officially launched another major rangeland protection program, a pilot implementation of a Compensation for Ecosystem Services (CES) program in five pastoral counties in the region with funding from the central government.⁸ The backbone of the program is compensation to pastoralists in exchange for not exceeding their livestock quotas based on carrying capacities of their rangeland. This is literally called “rewards for livestock numbers determined by forage availability.”⁹ One year later, the program was included in the national CES program announced to be implemented in eight pastoral regions

⁷ ‘Implementation of the *tuimu huancao* Project has gone smoothly’ (*xizang tuimu huancao gongcheng shishi shunlu*) TAR Government, 18 August 2011. <http://www.xizang.gov.cn/getCommonContent.do?contentId=382413>

⁸ The program is literally called “Rangeland Ecological Protection Reward Mechanism” (*caoyuan shengtai baohu jiangli jizhi*). According to the head of at the Grassland Office of Department of Agriculture under Ministry of Agriculture, the total budget from the central government was more than 200 million *yuan* (interview in January, 2009).

⁹ *yicao dingxu jiangli* in Chinese. The program also included three other components, fuel subsidies to pastoralists (*xinchai tidai butie*), livestock ear tagging (*shengxu dianzi erbiao zhidu*) and the establishment of a rangeland ecological monitoring system (*caoyuan shengtai jiance zhidu*). The rangeland condition of the target counties since implementation of the program would be compared to that of two selected counties through the rangeland ecological monitoring system that would employ such technologies as remote sensing systems, GIS and GPS. ‘Primary Components of a Pilot Implementation of Rangeland Ecological Protection Reward Mechanism’ (*jianli caoyuan shengtai baohu jiangli jizhi shidian de zhuyao neirong*). Department of Agriculture and Animal Husbandry of the TAR, 2009

(Inner Mongolia, Xinjiang, the TAR, Qinghai, Sichuan, Gansu, Ningxia and Yunnan) since 2011 with an annual budget of 13.4 billion *yuan* from the central government.¹⁰

Under the national CES program, pastoralists will be compensated (six *yuan* per *mu* annually nationwide) for grazing bans in places with what the government considers harsh natural conditions, or severely degraded rangeland or land that is unsuitable for grazing, and in source regions of major rivers. They are to be paid 1.5 *yuan* per *mu* annually nationwide for not exceeding their livestock quotas based on carrying capacities of their rangeland where they continue grazing their livestock.¹¹ National policy advisors and policymakers believe that the

¹⁰ The national CES program is literally called rangeland ecological protection subsidy and reward mechanism (*caoyuan shengtai baohu jiangli buzhu jizhi*).

¹¹ Literally grazing ban subsidies (*jinnmu buzhu*) and rewards for maintenance of forage and livestock balance (*caoxu pingheng jiangli*). The compensation rate applies to *tuimu huancao*'s grazing bans (*jinnmu*). Under *tuimu huancao*, the annual compensation rate was 2.5 *yuan* per *mu* in the Tibetan Plateau region for ten years and five *yuan* in the rest of the country's pastoral region for five years. 'Notice on Several Opinions Regarding Another Step toward Perfecting Several Policy Measures on *tuimu huancao*' (*guanyu jinyibu wanshan tuimu huancao zhengce cuoshi ruogan yijian de tongzhi*). Office for the State Council Leading Group for Western China Development, National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, April 20, 2005.

'Responsible Personnel from Ministry of Finance, the Office of the CPC (Communist Party of China) Central Leading Working Group on Rural Affairs, Ministry of Agriculture Answer journalists' Questions about Establishment of Rangeland Ecological Protection Subsidy and Reward Mechanism' (*caizhengbu he zhangyang nongban nongye bu fuzeren jiu jianli caoyuan shengtai baohu buzhu jiangli jizhi da jizhe wen*). Xinhua News Agency, 15 October 2010.

http://www.gov.cn/jrzq/2010-10/15/content_1723773.htm;

'Notice regarding Doing A Job in Preliminary Work on Establishing on Rangeland Ecological Protection Subsidy and Reward Mechanism' (*guanyu zuohao jianli caoyuan shengtai baohu buzhu jiangli jizhi qianqi gongzuo de tongzhi*). Ministry of Finance and Ministry of Agriculture, 31 December 2010.

http://nys.mof.gov.cn/zhengfuxinxi/czpjZhengCeFaBu_2_2/201101/t20110111_409674.html

In the TAR, except those in the core area of the Changtang Nature Reserve and in uninhabited areas (14 million ha or 20% of the total useable rangeland), usable rangeland with less than 40% vegetation cover (8.6 million ha or 12% of the total useable rangeland) is the target for grazing bans for five years. 28% (2.4 million ha) of it has already been in place (presumably under *tuimu huancao*), thus the rest (6.2 million ha or 72%) of it needs targeting under the CES program. The vegetation cover is based on remote sensing data during the peak growing season in 2009 and 2010. Grazing ban zones will be established at the administrative village level. New carrying capacities will be determined for the rest of the usable rangeland (60 million ha or 87% of the total usable rangeland), which means a total reduction of 24 % of the region's livestock (over 11 million SEUs) in Sheep Equivalent Unit (SEU). SEU is calculated as follows: 1 sheep = 1 SEU; 1 yak = 5 SEU; 1 goat = 0.8 SEU; 1 horse = 6 SEU. Pastoralists will have to meet the target of livestock reduction within three years (presumably by 2014), with the first and third year by 30% and the second year by 40% (for example, if a pastoralist has 100 sheep but his new quota is 90 sheep, he will have to get rid of three sheep in the first and third year and four sheep in the second year). 'The TAR's implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011' (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011 niandu shishi fang'an*). TAR Government, July 29, 2011.

move from *tuimu huancao* to the CES program represents significant progress in protecting rangelands in that the former aims to restore and protect rangeland after degradation whereas the latter targets grassland condition both before and after degradation. However, the basic assumption behind the CES program is identical to the second assumption of *tuimu huancao*.

This dissertation investigates China's *tuimu huancao* and the destocking policy under the CES program as a case study of how "received wisdom" environmental degradation narratives are used to justify state interventions into the livelihoods of minority pastoralists, a pattern experienced by pastoral peoples the world over. Tracing *tuimu huancao* and the CES program from their architects in Beijing to their implementation in the TAR, this dissertation investigates the following research questions:

1. Why do the environmental narratives underpinning *tuimu huancao* and the destocking policy under the CES program persist?
2. What is the process through which these programs have been translated from central government project formulation to local implementation?
3. To what extent do traditional forms of rangeland management system and pastoralists' local knowledge conform to or contradict the programs' assumptions, and how does this affect pastoralists' response?
4. How are pastoralists accepting, rejecting, modifying or adapting to the policies?

This dissertation points out that *tuimu huancao* and the destocking policy under the CES program have more to do with intensification of existing policy directions ultimately intended to transform traditional pastoralism than with rangeland degradation, restoration and protection. Hence, narratives of rangeland degradation underpinning *tuimu huancao* and the destocking policy under the CES program serve to justify state interventions that aim to achieve this goal of

transforming traditional pastoralism. Furthermore, broadly defined political and economic forces maintain the persistence of “received wisdom” on pastoralism and prevent alternative perspectives to existing policy directions. This dissertation also points out that Tibetan pastoralism can be well adapted to state interventions based on a middle way approach that accommodates both development and the livestock component of pastoralism.

This dissertation contributes to political ecology through a multi-scalar analysis of how state interventions into pastoralism are formulated, translated into implementation, and contested and how “received wisdom” environmental degradation narratives function and why they persist. By investigating the on-the-ground implementation of these two programs and the ways in which pastoralists come to identify with or reject them, the dissertation contributes to more nuanced understandings of state interventions and environmental projects, including their socioeconomic and environmental consequences as well as the ways in which they may produce new desires. By examining the production and persistence of environmental degradation narratives through an analysis that incorporates both political economy and the power of discourse, it presents empirical evidence that elaborates how “received wisdom” environmental degradation narratives work and why they are persistent. Furthermore, this dissertation also contributes to range ecology through an analysis of Tibetan pastoralists’ observations and knowledge of rangeland and livestock interactions that point out the complexity of range ecosystem dynamics and the importance of livestock trampling in rangeland degradation. Moreover, the dissertation also makes a very substantial contribution to studies of pastoralism by emphasizing the integrated nature of pastoralism consisting of three components and the vital role of livestock in pastoralism both in terms of pastoralists’ source of livelihood and rangeland health. Lastly, given the immediate policy relevance of its findings, the dissertation will potentially provide policy

recommendations to the Chinese Government for future government interventions in pastoral Tibet from the standpoint of Tibetan pastoralists.

This dissertation consists of six substantive chapters in addition to this introduction and the conclusion: a literature review (Chapter 1), China's pastoral policies underlying *tuimu huancao* and the CES program (Chapter 2), degradation discourses underpinning *tuimu huancao* and the CES program (Chapter 3), the central government's rationales for launching *tuimu huancao*, local officials' incentives to implement *tuimu huancao*, and pastoralists' responses to *tuimu huancao* (Chapter 4), the implementation of *tuimu huancao* and its results in Nagchu (Chapter 5) and rationales for, implementation and possible results of the CES program (Chapter 6). The following paragraphs introduce the study area and discuss research methods and field experiences.

Study Area: Nagchu Prefecture, the Tibet Autonomous Region

This dissertation research was conducted in three research sites in three different counties from the west to the east in Nagchu Prefecture, TAR. Located in northern TAR and in the heart of the Tibetan Plateau as seen in Map 1 below, Nagchu Prefecture (E 83°55'-95°05'; N 29°55'-36'30") is the largest pastoral prefecture on the Tibetan Plateau with a total rangeland area of 340,000 square kilometers (out of over 400, 000 square kilometers of land) and approximately 15 million SEUs since 1980.¹² The physical environment of Nagchu is characterized by high altitude and semi-arid climate with low temperatures and a short growing season. With the exception of its southeastern margins, Nagchu Prefecture is a treeless and cold landscape with an average elevation of over 4500 meters (14,764 ft) and a mean annual temperature ranging from -2.9°C to 3.4 °C (26.8°F -38.1°F) across the prefecture. Annual precipitation ranges from over

¹² Nagchu Prefecture Census Data (2008), Nagchu Prefecture Census Bureau, 2009.

700 mm to less than 300 mm while evaporation increases from 1500 mm up to 2300 mm from the southeast to the northwest (Liu, et al., 2002). The growing season in Nagchu is between May and September, starting later and ending earlier from the southeast to the northwest, and over 80 percent of the annual precipitation falls during the growing season. The vegetation communities largely correspond to precipitation. Rangeland types in Nagchu change gradually from alpine shrubland to alpine meadow to alpine steppe to desert steppe from the southeast to the northwest. Topography changes considerably from narrow valleys to large flat plains crisscrossed by mountain ridges from the southeast to northwest. Geographically, western and northern Nagchu is part of the Changtang, the name for a region of high altitude plains with sparse vegetation and giant lakes in northwestern Tibet. Snowstorms are the primary natural hazard that threatens pastoral production on the Tibetan Plateau. Nagchu Prefecture is among the areas on the plateau that are most vulnerable to snowstorms (LingzhiDuojie, 2000; Yang and Zheng, 2004, p.40; Miller, 2000). Pastoralists in central and eastern Nagchu are much more vulnerable to snowstorms than their counterparts in western Nagchu as they have much more snowfall.

Map 1: Prefectures on the Tibetan Plateau¹³



¹³ Source: TibetInfonet.net. http://www.tibetinfonet.net/static/map_of_tibet

Nagchu Prefecture is a pure pastoral area given agriculture is precluded by its physical environment, with the exception of some agro-pastoral activities in the far southeast and far southwest. Tibetans account for over 98 percent of the total population of the prefecture (425,532), of which 89 percent are pastoralists who herd yaks, sheep, goats and horses over Nagchu's vast and demographically sparse area.¹⁴ Livestock species correspond to rangeland types. Dominant species of livestock change from being yaks to goats from the east to the west as the dominant vegetative communities change from being meadow to desert steppe because meadows are crucial to the survival of yaks. In addition, 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 western Nagchu, sheep and goats are still the dominant species given the ecological conditions. While pastoralists in western and central Nagchu are overwhelmingly dependent on pastoralism for their livelihood with little off-range income, their counterparts in eastern Nagchu generate considerable income from harvesting and selling caterpillar fungus, which has become their most

¹⁴ Nagchu Prefecture Census Data (2008), Nagchu Prefecture Census Bureau, 2009; In fact, the value of horses has been significantly reduced since the early 2000s with them getting replaced by motorcycles as the most common means of transportation in the pastoral communities. Today, horses are left grazing on range forage almost like wildlife. On only a few occasions (for example, during the annual horse race fair), pastoralists will look after the horses for a few days. The government also encourages pastoralists to control the number of horses. It should be noted that Tibetan pastoralists do not milk mares, nor eat horse flesh, nor herd on horseback.

important source of cash income, over the past decade.¹⁵ The prefecture government reported that the average annual rural per capita net income in 2010 was a little over 4000 *yuan*, which was virtually the same as the regional average and 69 percent of the national average.¹⁶

Culturally and linguistically, pastoralists in eastern and central Nagchu (particularly those in the east) and in western Nagchu are closer to their counterparts in the upper part of the Kham Region (*kham stod*) to the east and in the Tod (*stod*) Region to the west, respectively.

Correspondently, pastoralists in the east are renowned for being aggressive whereas those in the west for being submissive.¹⁷ Religiously, while the majority of pastoralists in Nagchu are Buddhists, many in the northeast are followers of the Bon tradition. Therefore, Nagchu

¹⁵ Caterpillar fungus or *Ophiocordyceps sinensis* (*dbyar rtswa dgun 'bu* in Tibtan), also known as a medicinal mushroom in the West, grows in the eastern and central Tibetan Plateau (see Winkler, 2005, 2008). Pastoralists in Nagchu started harvesting caterpillar fungus since the beginning of the Chinese rule in 1960. Since the early 1990s the price of caterpillar fungus in Nagchu has been rising up when it reached 2000 *yuan* per kg. Around 2003, it reached a new high, moving above 20,000 *yuan* per kg for the first time. In 2010, the price of average caterpillar fungus was around 80,000 *yuan* per kg in Nagchu. Caterpillar fungus from eastern Nagchu is believed to be the best quality one on the Tibetan Plateau by buyers (Chinese and the Hui), followed by the one in Yulshul (Nagchu's neighboring prefecture to the northeast), Qinghai Province. Eastern Nagchu is also the largest producer of caterpillar fungus in the TAR with an annual average production of 17 tons (nearly 40 percent of the regional total) between 1999 and 2009 (Winkler, 2009). The prefecture government reported that the total caterpillar fungus production in Nagchu in 2010 was 21.5 tons. In recent years an increasing number of pastoral families from core caterpillar fungus production areas in eastern Nagchu have left pastoralism and just live on caterpillar fungus by having relatives take care of their few yaks, and moved to live in town, looking after their school children or doing small business or just hanging around. Each year during the caterpillar fungus harvest season they go back to the village to harvest it.

¹⁶ 'A Strong Momentum of Economic and Social Development in Nagchu Prefecture' (*naqu diqu jingji shehui fazhan shitou qiangjing*). Xiong Yuhua, 26 June 2011.

http://www.chinatibetnews.com/caijing/2011-06/26/content_729087.htm; 'Statistical Communiqué of the TAR on the 2010 National Economic and Social Development' (*2010 nian xizang zizhi guomin jingji he shehui fazhan tongji gongbao*). Regional Bureau of Statistics of the TAR, 12 March 2011; 'Statistical Communiqué of the People's Republic of China on the 2010 National Economic and Social Development' (*zhonghua renmin gongheguo 2010 nian guomin jingji he shehui fazhan tongji gongbao*), National Bureau of Statistics of China, 28 February 2011.

¹⁷ As a local person from Nagchu, I am not unfamiliar to the aggressive personality of pastoralists in the east. But this time I was still struck by it, particularly in the context of a comparison of pastoralists in the west. For example, I witnessed a fight between the village head of Research Village 1 and the township head, which reflects this particular culture. The village head thought that his village had been discriminated over some government policies. So he was ready to fight with the township head by saying, "as people usually say, 'not being afraid of official, but of his power. So today, you give up your position of township head, and I will give up my position of village head. Then let's go out to see who is the real man..." Later the township head told me in private that working as an official is more challenging in eastern Nagchu than in other places and that without official power, it is really difficult to deal with the local people there.

Prefecture is distinct from the west to the east in terms of physical environment, livestock structure, culture and economy.

The three research sites with two administrative villages in western and eastern Nagchu and one administrative village in central Nagchu are typical of western, eastern and central Nagchu respectively. The two research villages (hereafter Research Village 1 and Research Village 2) in the west and in the east are in Medang Township, Bengun County and in Kangche Township, Drachen County respectively. The research village in central Nagchu is in Zaren Township, Amdo County. Basic information on the five research villages is summarized in Table 1.

Table 1 Basic information on the five research villages¹⁸

		West-1	West-2	Central	East-1	East-2
Administrative organization	No. of natural villages ¹⁹	4	4	30	3	4
	No. of households	83	103	383	33	45
	Population	463	452	1446	182	209
Livestock	No. of yaks	527 (2%)	2175 (10%)	8669 (36%)	1245 (55%)	1124 (52%)
	No. of sheep	11,316 (56%)	14,974 (66%)	13674 (56%)	800 (36%)	947 (44%)
	No. of goats	8495 (42%)	5385 (24%)	1885 (8%)	200 (9%)	85 (4%)
Off-range income and market access	Access to caterpillar fungus	No.	No.	No	Yes	other villages ⁷
	Distance to Township (km)	80-100	40-50	0-20	25-30	5-10
	Distance to County (km)	120-140	80-90	40-60	170-175	160-165
	Distance to Prefecture (km)	340-360	300-310	100-120	260-265	270-275
Physical environment	Alpine marsh meadow (<i>na</i>) (%)	0	10	45	20	40
	Alpine meadow (<i>spang</i>) (%)	0	20	50	50	20
	Sandy pastures (<i>sana or bye sa</i>) (%)	100 (alpine steppe and	70 (alpine steppe and	5	30	40

¹⁸ Data on “Administrative organization” and “Livestock” are from village records (2009). Percentage of rangeland types are based on household surveys. Road distances and elevations are from GPS coordinates. Meteorological data are based on those of the nearest county meteorological stations to the three research sites respectively. The western site is about 88 km northwest of Bengun; the central site is about 36 km southeast of Amdo; the eastern site is about 68 km northwest of Sogzong (Nagchu Prefectural Meteorological Station, TAR, 2012).

¹⁹ A natural village, or hamlet, is a natural settlement of pastoralists. The smallest natural village can just consist of one household. Administrative villages consist of one or more natural villages, and are administrative units.

	desert steppe)	desert steppe)			
Elevation (ft)	14,928~ 15,371	14,902~ 16,063	15,171~ 16,076	14,575~ 15,748	15,295~ 15,748
Precipitation		<317	447		<587
Mean annual temperature (°C)		< 0	-1.2~-2.8	<0 (south), <-2 (north)	

Lying in the Changtang, the western site is much drier and correspondently dominated by alpine steppe and desert steppe though meadows are present in Research village 2, which is located to the southeast of Research Village 1. Sheep and goats, consequently, predominate in the two research villages in the west. By comparison, the central and eastern sites alternate with valleys and plains separated by twisting mountain ranges and ridges, and are dominated by alpine meadows and alpine marsh meadows though there is a significant amount of sandy pasture in the eastern site. There is a southern and northern pasture area division in the east. The south is a narrow valley of lower altitude with both meadows and sandy pastures whereas the north area approximately 80 kilometers to the north, consists of flat plains at higher altitude, dominated by alpine marsh meadows. The home base is in the south. Consequently, both yaks and sheep predominate in the central and eastern sites. Caterpillar fungus grows in the south in Research Village 1 while it does not in Research Village 2, which lies to the northeast of the former and has access to the former's caterpillar fungus after paying a nominal fee.²⁰ Pastoralists' home bases and seasonal camps are much more scattered over the vast steppes in the western site than those in the central and eastern sites, where they are relatively concentrated, because livestock need particularly to move around to graze over the vast but poor quality rangeland with sparse

²⁰ The 16 families surveyed in Research Village 1 in the east where there is caterpillar fungus received an average income of 24,866 yuan, ranging from 12,000 yuan to 54,000 yuan per family from harvesting and selling it in 2009, contributing on average 60% of household income. The 16 families surveyed in Research Village 2 in the east that has access to the former village's caterpillar fungus for 100 yuan per capita earned an average income of 15,250 yuan, ranging from 5000 yuan to 28,500 yuan a family, providing on average nearly 40% of household income. This research township in the east is an average to low production area by local standards in eastern Nagchu.

vegetation. For example, in Research Village 1, distances between households are at least one kilometer.

The central village has relatively easy access to transportation and market as it is located along a main paved road between the prefectural town and the county town linking the TAR with Qinghai Province (hence to China proper).²¹ There has been regular mini-bus and van services between the two towns over the past several years. In contrast, the four research villages in the west and east are relatively remote ones linked merely by village tracks or feeder roads branching off from main dirt automobile roads. Under normal weather conditions, all the home bases and seasonal camps in the three sites are basically accessible by vehicles though very difficult in some cases. Within the pastoral communities, motorcycles are the most common means of daily transportation and have become an inevitable aspect pastoralists' life. Virtually all households in the three sites have at least one motorcycle. Moreover, pastoralists use motorcycles much more frequently than horses in the past because they are so handy.²²

Being closer to major towns and roads, pastoralists in the central site have better access to social services such as health care and education. For example, quite a number of children in the central research village are in college whereas few in the western and eastern sites are even in middle school. They are also more market driven. For example, some households sell livestock to the Hui, a Muslim ethnic group (see Gladney, 1991), which is considered as a demerit by locals.²³ They have also better access to off-range employment such as short-term work at

²¹ The distance to the road from a settlement ranges from less than 50 meters to 25 kilometers.

²² There is gas for sale in stores at the township headquarters and in the villages where it is sold by some pastoralists.

²³ For example, pastoralists Research Village 1 in the west made a village rule in 2009 that not only should pastoralists not sell livestock to the Hui, but they should also refrain from giving live animals to Tibetan farmers (*gtsang pa*) who come to work (building houses, tanning sheep skins, etc) as wages because they find that the farmers tend to sell the livestock to the Hui on their way home. If a household needs to give livestock to farmers, it needs to have the farmers slaughter the livestock in the village before they leave.

construction sites or full-time work for the railway station.²⁴ Lastly, pastoralists in the three research sites are followers of two different sects of Tibetan Buddhism (Kagyü in the west and Gelug in the central site) and the Bon tradition (in the east).

Research Methods and Field Experiences

My research in the field consisted of three components: an ethnographic study including focus groups and oral histories in three natural villages; in-depth household interviews in the five administrative villages in Table 1 above (120 households); and in-depth interviews with 25 government officials, including three policy advisors from academic institutions in Beijing, at all levels of government, from the central government down to the township, and collection of government documents including work reports and census data. All formal interviews and most conversations were recorded with a voice recorder. It took me fifteen months to complete the fieldwork, from July 2009 through October 2010.

In the context of Nagchu Prefecture as the study area, I decided to conduct the research in three geographical locations from the western to the eastern part of the prefecture because I hypothesized that the differences from the west to the east regarding physical environment (climate, topography, and rangeland types), livestock structure, culture and economy may affect the implementation of *tuimu huancao*. However, my study in the three locations with these different characteristics was not designed as a strictly comparative study in which I would test the effects of these differences as independent variables. Rather, it is an ethnographic study in which I sought to examine the way in which particular socio-economic, cultural and

²⁴ Since the operation of the railway service to the TAR, local young men have been recruited by the government as railway guards. Their work is to patrol the railway lines. Their monthly salary is 1900 to 2000 yuan, depending on the locations of their camps (distance from the major town, altitude, etc).

environmental characteristics may play a role in the way in which pastoralists come to identify with, reject, negotiate with, or modify state policy.²⁵

My first step was to select one administrative village as a primary research village in each of the three sites. I used three primary criteria to select the three administrative villages: (1) the villages should be typical of its respective geographical location of Nagchu and represent its key characteristics. (2) They have implemented or have ongoing *tuimu huancao* projects, ideally with all three components so that the way in which they have been implemented and their effects could be studied. (3) The central village should be one closer to major towns and roads as the western and eastern villages would be remote ones because I hypothesized, as it turned out correctly, that being close to major towns and roads would have a bearing on how officials implement state policy and how pastoralists receive and negotiate it.²⁶ The village selection involved four steps. I first approached the prefectural Bureau Agriculture and Animal Husbandry (BAAH) about suggesting three research counties. Next, I requested each county BAAH to

²⁵ It has turned out that among these factors, precipitation, rangeland types, the presence of caterpillar fungus play a significant role in the way in which pastoralists respond to *tuimu huancao* while livestock structure and cultural difference make little difference. As discussed in chapter 5, pastoralist in the east welcomed *tuimu huancao* because of seeding of grass worked there apparently thanks to higher precipitation. By contrast, due to a drier climate, seeding of grass failed both in the western and central sites. Consequently, pastoralists there are less enthusiastic about *tuimu huancao* though pastoralists in the west still hoped they could yield more forage through the seeding component given it has not long since seeding of grass there. Enclosure of alpine meadows as *xiumu* zones encountered the most resistance from pastoralists in the central site. While pastoralists in the western and central sites accepted *tuimu huancao* primarily for compensation their counterparts in the east did not care much about compensation partially because they generate considerable cash income from harvesting and selling caterpillar fungus in recent years. Overall, among the pastoralists in the three sites, those in the east reacted to *tuimu huancao* more positively, followed by those in the west, while their counterparts in the central site rejected *tuimu huancao* considerably.

²⁶ As discussed in Chapter 5, *tuimu huancao* was implemented more strictly in the central site. For example, enclosure of alpine marsh meadows was not allowed there while it was not an issue in the remote eastern site. Furthermore, grazing bans near the major road in the central site was more closely monitored by passing officials.

suggest a research township. I then approached each township government about suggesting a research administrative village. Finally, I requested the administrative village heads to suggest a typical and ordinary family with which I would live to conduct intense ethnographic investigation in its natural village.

I did three rounds of fieldwork in each of the three sites. In the first round, I aimed to learn about and be familiar with the site -- the area and people, and their production practices and way of life -- through a deep understanding of the case of my host families. Like a member of the family, I completely lived with the host family according to their daily schedule, eating whatever they ate and sleeping in the same room or tent. I also herded livestock with one member of each host family. Through participant observation in everyday life, production practices, and public activities in the village such as meetings and festivals, I was able to become familiar with the way of life and production practice of the community. Through formal and informal semi-structured and unstructured interviews with members of my host family and neighboring families, and with village heads, I was able to obtain basic information about the village, such as administrative division, number of households, people and livestock, and production practice, and on the implementation of *tuimu huancao*, specifically when, where, what components, how, pastoralists' attitudes towards and experiences with *tuimu huancao*, whether *tuimu huancao* worked as intended by the government, i.e., whether and how grazing was banned, whether seeding of grass worked, etc. I also asked questions about the destocking policy under the CES program, specifically pastoralists' opinions on it and the way it was implemented. Through participatory mapping by village heads and members of my host family and transect walks, I was able to learn about the geography of the area and its rangeland, and the implementation of *tuimu huancao* on the spot: where and how the fencing was installed, whether and how grazing was

banned effectively, whether and how the fenced zones were seeded, whether seeding of grass worked, etc.

After the first round of fieldwork in each site, I designed a detailed household survey to be conducted through in-depth semi-structured interviews based on the information obtained from the first round of fieldwork. I added a new administrative village (Research Village 2) in the western and eastern sites in the survey. In the western site, the criterion was rangeland quality with Research Village 2 having a significant amount of meadows (30%). In the eastern site, the criterion was access to caterpillar fungus with Research Village 2 having only access to the production sites of Research Village 1. I approached the township government in each site about suggesting the new village. I conducted 30 individual household interviews in the western and eastern sites and 60 in the central site given the number of households in each site. In each administrative village in the western and eastern sites, I selected the individual households to be interviewed according to herd size (small, medium or large), i.e., three categories with five households in each category. In the central village, I designed the survey according to herd size (small, medium, or large), transhumance (yes or no) and rangeland quality (poor or good). Hence, there were a total of twelve categories with five households in each category (See Table 2-4).

Table 2 Household survey criteria in the western site

Rangeland quality	Herd size	Number of households
Poor (Research Village 1)	Low	5
	Medium	5
	High	5
Good (Research Village 2)	Low	5
	Medium	5
	High	5
Total number of households		30

Table 3 Household survey in the eastern site

Access to caterpillar fungus within the village	Herd size	Number of households
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Yes (Research Village 1)	Low	5
	Medium	5
	High	5
No (Research Village 2)	Low	5
	Medium	5
	High	5
Total number of households		30

Table 4 Household survey criteria in the central site

Herd size	Mobility	Rangeland quality	Number of households
Low	Yes	good	5
		Poor	5
	No	good	5
		poor	5
Medium	Yes	good	5
		Poor	5
	No	good	5
		poor	5
High	Yes	good	5
		Poor	5
	No	good	5
		poor	5
Total number of households			60

I did not consider gender balance when I designed the survey because I have found that what is important is to interview whoever is the household head, who often is the husband and father. Traditionally, in a typical pastoral household in Nagchu, 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. Today, men's work also includes fencing installation and maintenance. 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 Beall, 1990) as my hostess in the eastern site put it:

I think as long as there is a good balance of men and women in a family, it can be a potentially good family in terms of labor. I am happy to do all of the housework, including getting up very early in the morning these days to milk the yaks, which is a hard task for women physically. But men also have their own tough tasks, especially mentally. For example, if there is a grassland dispute, it is Jekzi [her husband] who will have to deal with it. Men also have to slaughter livestock, which is really a huge mental burden. This is so, because, as you know, it will affect your next life. So I really do not think we can say who gains by doing less or who loses by doing more by differentiating men and women. Men and women are just dependent on each other by doing different tasks for the sake of the family...

This shows that Tibetan pastoralists refer to both physical and mental burdens in terms of labor.

Typically men, i.e. the husband and father, are the household head in charge of the overall well-being of the household, including production management and decision-making. They are also responsible for external affairs and relations, such as participation in public activities in the community. Some households are female-headed typically run by widows, divorcees or women without a husband.²⁷ Therefore, for the purpose of gathering informative data, it is essential to engage with the household head regardless of gender.

I requested village heads in each site to determine typical households meeting these criteria for the survey. The mean age of interviewed household heads was 47 with 24 being the youngest and 84 the oldest. Females accounted for ten percent of those whom I interviewed. During my survey in each site, I was based in my host family and went by motorcycle to interview two households a day. I often encouraged other family members, including the wife and adult children, to join the conversation. I had a total of thirty such family interviews. In some cases, my male interviewees encouraged me to do so by saying, “You had better ask the women about the milking question because they are the ones who milk the livestock.” From the data analysis, I have found no trend in answers specific to gender or to a certain age.

²⁷ It is not uncommon in pastoral Nagchu that women give birth to children before marriage. A few of these women may only live with her children.

Questions in the survey were aimed at answering Research Question 3 and 4 through the following themes as shown in Table 5.

Table 5 Themes asked in household interviews

Research Question 3	Research Question 4
livestock conditions	fencing installation
herd size and species	seeding
rangeland conditions	rangeland use and conditions before and after <i>tuimu hunacao</i>
rangeland tenure	implementation costs
transhumance	compensation for fenced zones
production activities	results of <i>tuimu huancao</i>
pastoral facilities (fencing, livestock pens and shelters)	Opinions on <i>tuimu huncao</i> and the destocking policy under the CES program.
pen-raising	
climate change	

During my third round of fieldwork in the three primary research villages, I conducted focus groups and oral histories with fifteen elder pastoralists (mean age 71) to address most of the above themes for Research Question 3 from a historical perspective. I also used this last round of fieldwork to clarify information gathered during the previous two rounds. As Tibetan pastoral production is a seasonal one, through three rounds of fieldwork in each site, I was able to observe the status of *tuimu huancao* (grazing bans, seeding of grass and vegetation conditions), rangeland conditions, vegetation events, pastoralists' life and their production activities in different seasons, from summer 2009 through the end of fall 2010.

After the first round of fieldwork in the three villages, I began my work with the top three levels of government, starting with the prefecture. As I will discuss in Chapter 4, five government institutions (the National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, the Office for Western China Development, and the State Grain Administration) were involved in coordinating and implementing *tuimu huancao*. I approached the first three institutions at the prefectural level and the first four at the regional

level for information on their roles in coordinating and implementing *tuimu huancao*, and interviewed officials at all these institutions. But except for the prefectural Bureau and regional Department of Agriculture and Animal Husbandry (DAAH), the other institutions did not have much input into the research, saying that it was the prefectural BAAH and the regional DAAH that were involved in *tuimu huancao* most as they were the ones that implemented *tuimu huancao* on the ground. The Office for the Western China Development turns out to be a division under the Development and Reform Commission. After the second round of fieldwork in the villages, I formally interviewed officials at the county BAAH and the township government in each of the three counties and townships, although I closely engaged with them during the fieldwork in the villages. My rationale for working with officials after my first and second rounds of fieldwork in the villages starting from the medium level (prefectural) was to incorporate information from pastoralists and different levels of government among each other.

In Beijing, knowing from my work with the prefectural and regional levels of institutions supposed to be involved in *tuimu huancao* that the latter three institutions did not have much to contribute, I only approached the Ministry of Agriculture and the National Development and Reform Commission. I was able to conduct a very informative interview with the head of the Grassland Office of the Department of Animal Husbandry under the Ministry of Agriculture, but officials at the National Development and Reform Commission only received a brief interview over the phone.²⁸ I also conducted interviews with three professors in Beijing (China Agriculture

²⁸ After the interview, I requested a copy of a document she mentioned during the interview (the National Comprehensive Plan for Grassland Protection, Construction and Utilization). The official said she could not because it was an internal document. Instead, she offered a copy of a collection of colored pictures with descriptions on improvement in vegetation conditions in *tuimu huancao* areas in different provinces. In the end, I just happened to find a copy online.

University, Beijing Forestry University, and Chinese Academy of Agricultural Sciences) who gave advice on the formulation of *tuimu huancao*.

My questions for officials at the regional down to township levels were oriented towards answering Research Question 2 while those for central government officials towards answering Research Question 1. The former focused on the translation of *tuimu huancao* and the destocking policy under the CES program as they moved down the administrative hierarchy, their implementation and results, while the latter on rationales for designing *tuimu huancao* and the destocking policy under the CES program. In addition, I asked all officials regardless of levels about their views about pastoralism, their explanations of ecological conditions in pastoral areas, background on deliberations within the respective institutions on the policy, and the ways in which they explained *tuimu huancao* with respect to other previous policies governing rangeland management and pastoralism.

With a letter for my fieldwork from the Nagchu Prefectural Meteorological Observatory (NPMO), TAR, where I worked before I started my PhD program, I did not experience any problems of not having access to field sites or government institutions. But officials, particularly at prefectural, regional and central governments, whom I wanted to talk to were often unavailable, which made me have to wait for them and get behind schedule. Most officials, particularly those at prefectural level and above tended to talk about issues according to government lines and avoid mentioning negative aspects.

Given the great political sensitivity in Tibet in recent years, to pastoralists and to the three lower levels of government from prefectural down to township, I presented myself as a researcher from the local meteorological observatory rather than a US-based PhD student. To the central and regional levels, I presented myself both as a government researcher from the local

meteorological observatory and a PhD student based in the US partially because my colleagues at the NPMO who issued the fieldwork letter thought they had to tell the higher levels about my multiple affiliations. It was also partly my own decision because I thought knowing I am a PhD student from the US, they would receive me more seriously. This strategy was based on my past experience dealing with various levels of government: Though it depends on individuals, in general, officials at the two highest levels, particularly those at the central government level, are under less political pressure emanating from attempting to avoid political mistakes possibly derived from responding to questions from a researcher affiliated with a foreign organization. By contrast, lower-level officials are more cautious about responding to questions from researchers affiliated with a foreign organization. My strategy has turned out to be right as I was well received by all officials I approached but one at the prefectural level because of his awareness of me studying in the States. This official, who knew I was conducting this research for my PhD program in the States before this time, told me he could not receive an interview without me obtaining a letter from the local foreign affairs bureau first. He treated me like a foreigner!

Pastoralists in the three research sites warmly received me primarily for three overlapping reasons. First, my identity as a government researcher made pastoralists feel they were obligated to receive me warmly as the state controls all resources in Tibet. If I presented myself as an independent researcher not affiliated with the government, I would not have been as warmly received initially as I was as a government researcher because they would feel that they were under no obligation to work with me. Second, as a local Tibetan from within the prefecture, pastoralists were happy to have me because they saw we share the same language and culture specific to pastoral Tibet. Third, with time passing by, pastoralists were happy to see that I was

different from government officials whom they engaged with before, willing to listen to their opinions, concerns and perspectives, rather than telling and giving them orders.

Nonetheless, they definitely viewed me as an outsider from their perspective of them being pastoralists and me being an urban resident. In the beginning of my research, many pastoralists and township officials told me it would be extremely hard for me to live with a pastoralist's family given the harsh living conditions. Later, they were impressed that I, as a person from the town, survived their hard living conditions. My hostess Dronlha in the western site would often tell other pastoralists who came to her place, "Gen [I was addressed as a teacher out of respect], is unlike a city person, but is like us Changtang *'brog pa* [a pastoralist from the Changtang]. He eats whatever we eat and drink whatever we drink. Otherwise how could a city person survive this hard living in the Changtang...He even worked as an *rdzi bo* [herder]." Thus pastoralists saw the primary difference between me and them as being that they are pastoralists and I am an urban resident, though we are all Tibetans. Furthermore, they understand pastoralism as hard work and hard living that urban Tibetans would find unpleasant. This experience has helped me conceptualize the different connotations of "a herder" and "a pastoralist": During my fieldwork I was a herder because I herded livestock, but not a pastoralist because I did not live on pastoralism.

The biggest challenge in terms of work was access to electricity in the villages. Families in the villages only had family-based solar electricity, which was not able to power my laptop. I purchased a solar power system, but it did not work well when I was in the field. The power just lasted less than half an hour when my laptop was plugged in. As a result, I was not able to write up thick, ethnographic description and notes. As an alternative strategy, I have recorded all

formal interviews and conversations. Later, I bought a portable generator, which worked very well but the cost of gasoline was quite high.

Another problem was dogs. In the villages (especially in the western site), there were many cases in which outsiders were attacked by dogs and got severely injured. During the survey in each village I had to approach different families each day, so I had to very carefully watch out for dogs. Fortunately and thankfully with the help of pastoralists there I was spared the dog problem in the villages.

Drinking water was the biggest challenge in terms of living in the villages. I got a kidney stone and had to get treatment in the regional capital Lhasa as nothing could be done in the prefecture town. As it was my first time that I had ever got this problem, my doctors believed that the formation of the kidney stone could have been directly related to the water that I drank for the several months in the villages, especially the muddy and dirt water in the western site, where the drinking water (shared with livestock) is from ditches (no streams nearby) and there are worms in the water. Some pastoralists in the west said they were sorry to hear their drinking water might have made me sick because I was not adapted to it, which further convinced them to believe pastoralism is hard work and hard living for urban Tibetans. Others said they might have also got sick from the water, at some point, but just did not have resources to get treatment in a timely manner before stones pass out on their own.

Chapter 1

The Political Ecology of Pastoralism in Tibet: A Theoretical Overview

My framework for analyzing *tuimu huancao* and the destocking policy under the CES program as a state intervention draws from and contributes to political ecology, an approach that analyzes the ways in which environmental problems and their proposed solutions are always shaped by political-economic, social, and cultural factors, at multiple scales, rather than being problems that can be understood and resolved through technical analyses and solutions alone (Robbins, 2004; Neumann, 2005). Furthermore, as many political ecological studies have shown, politics play an important role in constructing environmental knowledge, and environmental narratives are always laden with power and never innocent of politics. This means that supposedly neutral explanations of ecological reality should be critically analyzed (Jarosz, 1996; Leach and Mearns, 1996; Fairhead and Leach, 1996; Zimmerer, 1996; Forsyth, 2003; Davis, 2007). I also build upon scholarship in geography and anthropology on pastoralism, and critical development studies, particularly work on the relationship between development projects and state power (Ferguson, 1990; Scott, 1998; Li, 2007). Specifically, this project engages with the following themes: pastoralism; range ecology theory and implications; the persistence and effects of degradation discourses; and complicating state interventions.

1. *“Received Wisdom” on Pastoralism*

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 dissertation conceptualizes pastoralism by emphasizing the integrated nature of pastoralism consisting of the three components of pastoralists, livestock and rangeland. In particular, I emphasize the critical role

that livestock play in pastoralism both in terms of pastoralists' source of livelihood and rangeland health, and argue that this component is often ignored in state interventions and outsiders' conceptualization of pastoralism. In this conceptualization of pastoralism, this dissertation examines state interventions into Tibetan pastoralism by engaging with three prominent themes in the literature on pastoralism, namely, the Tragedy of the Commons, the Cattle Complex theory and the future of pastoralism. The first two have been major themes in pastoral research for a long time and there are a reasonable number of critiques of them. But this dissertation attempts to provide new critiques in the context of contemporary Tibetan pastoralism partially because they still underlie China' policies on range management and pastoralism as the dissertation will show in Chapter 2. Furthermore, the bulk of research to date on these questions has been conducted in Africa. This dissertation seeks to fill gaps in the literature on Tibetan pastoralism by drawing on empirical observations from Africa.

Ecologist Garrett Hardin (1968, 1991) asserted that under communal grazing systems each individual herder wants to maximize 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. Hardin argued that the only way to reverse this phenomenon was to privatize commonly managed rangelands. Social scientists refuted the tragedy of the commons model 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 (Igoe, 2003; Cullis and Watson, 2005; Buck, 1985; Feeny et al., 1998; Richard et al, 2006; McCabe, 2004).

For example, by contrasting Hardin's definition with the traditional legal understanding of the term the commons as it applied to medieval England, Buck (1985) points out that the

modern-day notion of common as a public right in “tragedy of the commons” is significantly different from the concept of the commons existing in the common grazing lands of medieval and post-medieval English. In medieval English the commons was not open to the general public, rather, only to certain individual tenants who used and managed the commons under strict regulations. So 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 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 a successful land-use system, in which land was successfully managed and used by communities.

Similarly, Feeny et al (1998) 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, in which resources users have been able 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 a more comprehensive and complete theory should engage institutional arrangements and cultural factors so that better analysis and prediction can be made.

While this dissertation also shows that the communal grazing system in Nagchu is not an open access system, the focus of its critique of the Tragedy of the Commons is its irrelevance to pastoralism rather than on land tenure. Through the case of China’s rangeland use rights privatization based on the tragedy of the commons, this dissertation demonstrates that as an economic approach and solution to ecological concerns, when it is adopted in pastoralism, the

tragedy of the commons model inevitably neglects the livestock component of pastoralism, encompassing livestock grazing, mobility, and flexibility. Thus, the tragedy of the commons model is inappropriate to range management and pastoralism. As the dissertation will show in Chapter 2, all the negative socioeconomic and ecological consequences derived from rangeland use right privatization is ultimately associated with livestock grazing. This is a result of the model being unable to accommodate livestock, which is an inseparable part of pastoralism. Thus, I expand the critique of the Tragedy of the Commons beyond rangeland use and tenure to include livestock management.

Using the term Cattle Complex, American anthropologist Herskovits (1926) believed East African pastoralists raised cattle more for social and cultural purposes than for subsistence. In his words, “In east Africa ... cattle constitute an almost exclusive hall-mark of wealth... They are merely possessed and esteemed for the prestige their possession brings” (p. 265). Nonetheless, anthropological research over the past three decades in Africa has rebutted this long-held notion of large herds being a symbol of wealth, status and prestige based on irrational cultural norms. Instead, these researchers have shown that pastoralists’ decisions about herd size are rational in particular cultural, social and economic contexts in which pastoralists live. Examining the reluctance among the South East African pastoralists to sell their cattle in the capitalist market, Mtetwa (1978) argued that it was capitalist exploitation rather than pastoralists’ “irrational” attitudes held towards cattle that made pastoralists unwilling to sell cattle. He found that pastoralists raised cattle essentially as an economic asset and because of their economic value. Hence, pastoralists were willing to sell their cattle if they were to obtain favorable prices. Similarly, McPeak (2005) found among pastoralists in northern Kenya that household income was positively correlated with herd sizes, reflecting a rationale for a larger herd size. McCabe’s

study of Turkana pastoralists shows that a large herd size is a means rather than an end. For Turkana pastoralists the rationale for raising a large herd of livestock is to store wealth, guarantee sources of food and income, and marry more wives and have more children (McCabe, 2004, p. 241). Therefore, McCabe suggests that pastoralists' own goals and strategies must be understood in cultural context.

Drawing on these critiques of the Cattle Complex theory, this dissertation deconstructs the theory in the context of Tibetan pastoralism. Specifically, it demonstrates that it is desirable for Tibetan pastoralists to have a larger herd size for three overlapping reasons that do not follow the logic of the Cattle Complex theory. First, owing to biological, cultural and economic factors, herd sizes are not equivalent to actual livestock available for production. Second, pastoralists desire a larger herd size as a long-term strategy for livelihood security and flexibility. Third, pastoralists desire a larger herd size as a means to improve their standard of living.

Finally, the future of pastoralism in the face of a changing world is an important theme often discussed in the literature on pastoralism. Ongoing changes, such as climate change, population growth, and changes in policies are often unfavorable to pastoralism. Among them, modernization, privatization and intensification, which have been the focus of pastoral development efforts in many pastoral areas throughout the world, including China, have particularly threatened traditional pastoralism because they have threatened the essence of pastoralism (mobility, flexibility, reciprocity and diversity) that has contributed to its sustainability. Nonetheless, most researchers hold an optimistic view on the future of pastoralism. They argue that pastoralism is far from in decline thanks to its deeply embedded adaptive capacities, as the above definition of pastoralism suggests, even though it has undergone profound change. Specifically, they believe a middle-way approach to pastoralism that combines

traditional forms of pastoralism with development interventions is both desirable and feasible. (Humphrey and Sneath, 1999; Fratkin and Mearns, 2003; Bauer, 2008). For example, using a microeconomic model of labor efficiency within pastoral economies, Humphrey and Sneath (1999) compare two scenarios of mechanization and industrial forms of labor organization in pastoral economies. In the first scenario pastoralists harvest hay mechanically and transport to the enclosures where livestock are kept. In the second scenario pastoralists migrate across the landscape to where there are hay and other forage available. They argue that the second scenario is not only equally workable but more importantly may be more ecologically sustainable in the long run.

In the conceptualization of pastoralism with livestock playing a critical role in it, this dissertation finds that Tibetan pastoralism can be well adapted to state interventions through a middle-way approach that accommodates the livestock component of pastoralism. For example, as the dissertation will show in Chapter 2, a hybrid policy combining household rangeland tenure with community-based use with user fees has turned out to be successful in the context of rangeland use rights privatization. It is feasible because it is a compromise between the government's rangeland use rights privatization and pastoralists' traditional livestock grazing practice. Therefore, it works towards the government goals of commodification of rangeland use rights and control over stocking rate while at the same time it guarantees livestock grazing, mobility and flexibility. Another example is the policy of "sedentarized pastoralists with mobile livestock" that was adopted in pastoral areas in China before the 1980s. Pastoralists today still welcome such a policy in the form of construction of houses at the home base or seasonal camps but reject concentrated settlement because the former is a compromise between the wellbeing of people and livestock while the latter totally ignores the livestock component of pastoralism.

Nonetheless, this dissertation also demonstrates that the formation of a middle-way approach to pastoralism will not be easy because of the persistence of the top-down approach to policymaking and policy implementation. It ultimately depends on pastoralists' meaningful participation and input in policymaking. In doing so, officials need to look at pastoralism from the standpoint of pastoralists as a significant body of research in human geography and anthropology suggests the importance of doing. Nevertheless, this is easier said than done because the process of doing so will be political and may be jeopardized by officials' vested political and economic interests as the dissertation will discuss in section 3 and 4.

2. Range Ecology Theory and Implications

In equilibrial ecosystems, external conditions outside a certain ecosystem are stable, which allows the internal conditions and processes of the ecosystem to equilibrate and regulate system structure and dynamics (Ellis et al, 1993, p. 31). Biotic interactions maintain homeostasis, the property of a living organism that regulates its internal environment in order to maintain a stable, constant condition. The notion of equilibrium is closely associated with the concept of plant succession. The theory of plant succession (Cowles, 1899; Clements, 1916), the processes of vegetation change over time, states that one community of plant species will replace another in an orderly and directional process until a climax community, which usually demonstrates a good deal of species diversity and is a relatively stable system, has been formed. Disturbances return the system back to previous successional stages. For example, in African rangelands, overgrazing by domestic livestock is believed to be the primary disturbance that drives a climax community to an earlier successional stage (Lamprey, 1983).

Both the concept of plant succession and the paradigm of vegetation-herbivore dynamics (Caughley, 1979) suggest that vegetation-herbivore interactions are tightly coupled. In range

ecology, the carrying capacity of rangeland is defined as the maximal number of herbivores that the vegetation can support for a year without degradation.²⁹ In equilibrium rangeland ecosystems, the notion of ecological carrying capacity is that in natural conditions the availability of forage controls the number of grazing herbivores, which leads to a stable state of the ecosystem (Behnke and Scoones 1993). Hence, herbivore population growth rate is negatively correlated with population size (Vetter 2005). The carrying capacity of rangelands can be exceeded through the effect of anthropogenic activities by overexploiting vegetation, which will lead the vegetative community to an earlier successional stage with less palatable forage (Lamprey, 1983). If this effect keeps going for a certain period of time, it will impact soil composition and lead to the exposure of bare soil to erosion, which will result in rangeland degradation and rangeland desertification. The publication of Garrett Hardin's *Tragedy of the Commons* in 1968 further supported the concepts of equilibrium and the carrying capacity in rangeland ecology (McCabe 2004).

The concepts of complexity were first applied to ecological systems in the early 1970s (Holling 1973). Holling (p. 2) found that "An equilibrium centered view is essentially static and provides little insight into the transient behavior of systems that are not near the equilibrium." Noy-Mier argued that it might be climate rather than biotic interactions that plays a crucial role in controlling dry ecosystems (Noy-Mier 1973). In 1977, research by Join Wiens found that the paradigm of an equilibrium-based, self-regulating ecosystem does not work in arid and semiarid environments (Wiens, 1977). Wiens interpreted the avian community structure and competition as evidence of the existence of non-equilibrium grassland ecosystems. He proposed that

²⁹ According to Sayre (2008), the concept of carrying capacity in rangeland management appeared in the late 19th century. For example, *Science* (1889, p. 458) discussed carrying capacity as the number of livestock that rangeland in a certain climate could carry (Sayre, 2008, p. 124).

equilibrium communities exist in areas with low to moderate environmental variation while non-equilibrium communities exist in areas with harsh and unpredictable climate events. Later, he further argued that in arid environments biotic interactions among species are dissociated and that in fact individual species respond to environment changes independently on a large scale (Wiens, 1983). He also argued that in arid environments it is abiotic factors rather than species density or availabilities of resources that greatly influence population dynamics.

Later, research on arid rangelands of Australia showed that livestock populations will remain relatively stable and that homeostatic balance between the herbivore populations and vegetation will maintain in ecosystems where the precipitation coefficient of variation (CV) is less than twenty percent (Caughley, 1987). In addition, the research finds that rainfall variations rather than mean rainfall have more significance in differentiating equilibrial ecosystems from non-equilibrial ecosystems and that non-equilibrium ecosystems exist in arid areas with annual precipitation coefficient of variation (CV) that nears or exceeds thirty percent. In general, the coefficient of variation of rainfall is negatively correlated with annual rainfall (Conrad 1941). At 30 degrees latitude, CVs of thirty three per cent or greater likely exist in areas where annual rainfall is 350 mm or below without ENSO effects while with ENSO effects, CVs of thirty three per cent may occur up to 600 mm annual rainfall (Nicholls and Wong 1990). Researchers found that these ideas were appropriate to the ecological conditions of arid savannas and applied these approaches to the dynamic ecosystems of southern Africa (Walker *et al*, 1981, Walker and Noy-Meir 1982).

In 1988, Ellis and Swift reported that in the South Turkana, vegetation is strongly influenced by climate and that linkage between the herbivore population and the plant community and condition is weak. The major disturbance is drought rather than overgrazing.

They noted that during the previous fifty years as of 1988, the region had experienced thirteen annual precipitation drops of over thirty-three percent and that livestock condition and production were closely associated with seasonal vegetation production influenced by climate, for example, livestock losses of over fifty percent were common during droughts. They concluded from their research that the structure and dynamics of the South Turkana ecosystem, which has little evidence of degradation despite the dynamic nature of it, fit the model of non-equilibrium systems proposed by Wiens and that the ecosystem and pastoralists living in it are in a relatively stable condition albeit with severe external stresses. They called this type of ecosystem a non-equilibrium but persistent ecosystem (p. 453).

Some ecologists suggest that in fact there exists a gradation between these two strikingly different types of ecosystems (Ellis and Swift 1988, p. 453, Scoones 1995). In other words, ecosystems change gradually from equilibrium conditions where biotic interactions and internal factors determine system structure to non-equilibrium conditions where abiotic controls or external factors determine system structure and dynamics (Wiens 1984, DeAngelis and Waterhouse 1987). Scoones (1995) points out that in reality the distinction between equilibrium ecosystems and non-equilibrium ecosystems is blurred. In addition, within the same area, ecosystem dynamics may vary in different years. Equilibrium may occur in a series of wetter years while non-equilibrium dynamics may emerge in a run of drier periods. At the same time, micro equilibrium may exist. For example, within a non-equilibrium ecosystem relatively wetter parts of the ecosystem may show a more equilibrium pattern, where vegetation does not vary much between years.

In 1989, Westoby et al. put forward the state and transition model based on non-equilibrium ecology to explain vegetation dynamics in a non-linear framework in semi-arid and

arid rangeland ecosystems as an alternative to the linear continuum process and a single climax community suggested by the theory of plant succession. The vegetation types in this model are referred to as “states” that are not simply reversible in the linear successional framework, and the processes that cause states to change from one to another are referred as “transitions.” Multiple disturbances including natural events (such as fire, flood, etc) and management activities (such as grazing, farming, burning, etc) often trigger transitions between states. Transitions may occur quickly (for example in the case of fire or flood) or slowly (for example, in the case of climate change), and may be either short-lived or persistent. Before the transition is complete the system is unstable.

Before the emergence of the non-equilibrium ecosystem paradigm, the concept of equilibrium was adopted in rangeland management and pastoral development planning throughout the semiarid and arid pastoral regions of the world (McCabe 2004). For example, adjusting the number of grazing animals to the carrying capacity became both the means and the goal of rangeland management in these pastoral regions and removing pastoralists from their rangelands or reducing the number of their livestock became a rangeland resource management strategy in practice during the colonial period in Africa (Lamprey, 1983).

By contrast, the paradigm of disequilibrium suggests that maintaining mobility and flexibility should be a top priority in rangeland management (Behnke and Scoones; 1993; Fernandez-Gimenez, 2006; McCabe, 2004; Niamir-Fuller *et al.*, 1999; Kerven *et al.*, 2008; Humphrey and Sneath, 1999) and that opportunistic strategies and flexible movement are environmentally benign strategies (Scoones 1995, Sandford 1983, Ellis and Swift 1988). Two basic characteristics of pastoralism in non-equilibrium ecosystems are high mobility and opportunistic movement strategies. Pastoralists have developed livestock mobility as their

strategy for utilizing various pastures for optimal periods and avoiding vegetation scarce periods in such a way that livestock move from place to place in which each pasture reaches peak carrying capacity in a different time (Benhke and Scoones 1993).

This dissertation explores China's policies on range management and pastoralism, and pastoralists' observations and knowledge of rangeland and livestock interactions in the context of these ecological theories and their implications. This dissertation points out, as it will show in Chapter 3, that equilibrium assumptions and the concept of carrying capacity are deeply embedded in contemporary Chinese policy. Overstocking and overgrazing are believed to be a direct and principal driver of ecosystem degradation. Following this logic of equilibrium dynamics, Chinese policy is oriented towards adjusting herd size to carrying capacity.

While ecological studies need to be conducted with variables carefully being controlled and tested to determine the extent to which equilibrium vs. non-equilibrium dynamics predominate in Nagchu, an exploration of the issue through Tibetan pastoralists' observations and knowledge adds to previous work on the complexity (temporal variability and spatial heterogeneity) of range ecosystem dynamics. Specifically, this dissertation offers three observations that suggest range ecosystems in Nagchu as a whole can be characterized as a mix of equilibrium and non-equilibrium dynamics. First, a greater variation in precipitation in the early part of the growing season from the southeast to the northwest makes forage quantity subject to seasonal variability and spatial heterogeneity. Second, higher livestock productivity in the past from a historical perspective may reflect density-dependent interactions between forage and livestock. Third, however, forage limitation and density-independent mortality under unfavorable weather conditions such as snowstorms result in some degree of non-equilibrium dynamics.

Therefore, this dissertation illustrates that the concept of carrying capacity may be of very limited relevance to range ecosystems in Nagchu because of these features of the ecosystem dynamics. Furthermore, this dissertation will show that Tibetan pastoralists conceptualize carrying capacity in terms of livestock productivity rather than as measures of rangeland condition, reflecting the fact that grazing to date has not caused any degradation. Moreover, this dissertation will describe why reduction of livestock mobility leads to rangeland degradation-it is because of constant trampling, a topic relatively under-addressed in range ecology literature.

While discussions on equilibrium or non-equilibrium dynamics are an important debate in range science, literature on range ecology also suggests the importance of viewing the impact of grazing on rangeland from an evolutionary perspective. Milchunas et al (1988) raised the question of why some plant communities are very sensitive to grazing by herbivores while others are not. They suggested that the evolutionary history of grazing should be considered as an important factor contributing to the wide range of responses by plant communities to grazing by herbivores. Cingolani et al (2005) further explored this question in the context of the state and transition model (Westoby et al, 1989) and pointed out two different effects of grazing on vegetation from the perspective of the evolutionary history. First, rangelands with a long evolutionary history of grazing have developed resilience mechanisms contributing to reversible changes in floristic composition in the course of changes in grazing intensities because any species or community not resilient would have disappeared and catastrophic erosion that could occur would have already occurred in the evolutionary process. In such systems, given that the density of herbivores has fluctuated over time and space owing to factors such as diseases, natural hazards, migrations, etc, different pools of species adapted to low and high grazing intensities have evolved.

Second, however, for rangelands with a short evolutionary history of grazing, such changes may be irreversible because resilience mechanisms to grazing have not fully evolved. At the same time, they acknowledged cases of irreversible changes in species compositions in response to grazing intensity in semiarid rangelands with a very long evolutionary history of livestock grazing. But they emphasized that such changes can only occur under new types of disturbance not experienced by the system that breaks the limits of resilience of the system, such as changes in management regimes, for example, the change from mobile to sedentary grazing, or in particular contexts, for example, near water points.

Through an ecological approach Miede et al (2009) suggested that the making of a pastoral environment on the Tibetan Plateau started approximately 8800 years ago. They pointed out that the present plant species and plant functional types are a result of the selective foraging of livestock in a free range grazing system because vegetation cover disappears if livestock grazing is removed, indicating that the rangeland is well adapted to grazing. Therefore, rangelands on the Tibetan Plateau have experienced a long history of grazing. This dissertation also suggests that China's policies on range management, particularly grazing bans, may be inappropriate from the perspective of the evolutionary history of grazing. Another example is household-based rangeland use under the policy of rangeland use rights privatization, which increases the chance and frequency of prolonged and constant trampling, which in turn can be considered as a new type of disturbance that challenges the stability and the resilience of the system.

3. The Persistence and Effects of Degradation Discourses

The literature on “received wisdom” environmental narratives has suggested three prominent points. First, narratives of environmental degradation that blame local or indigenous

peoples for environmental degradation are frequently used to justify certain interventions (Davis, 2007; Fairhead and Leach, 1995; Leach and Mearns, 1996). Second, local knowledge and narratives about environmental change often represent a much more accurate reflection of landscape history and ecosystem dynamics than do these supposedly “scientific” degradation discourses (Leach and Mearns, 1996; Fairhead and Leach, 1995, 1996; Forsyth, 1996, 2003; Davis, 2007; Jarosz, 1996). For example, Diana Davis (2007) points out that French colonists used environmental narratives that large and lush forests existed in ancient Maghreb and during the Roman Empire, which made Maghreb the granary of Rome. The narrative that Arab nomadic pastoralists’ land usage through the post Roman Empire era led to the degradation and desertification of the once-fertile land justified the expropriation of Maghreb’s natural resources and colonial development initiatives. Davis argues that in fact climate change (from a relatively humid climate to a relatively arid) has played a key role in shaping what Maghreb was during the past three millennia and what it is today.

Third, “received wisdom” environmental narratives of degradation are very persistent despite a lack of scientific evidence. In addition to serving political functions for states and capitalist interests, such narratives may also persist because of the political economy of incentives within funding institutions (Bassett and Zueli, 2003; Blaikie and Muldavin, 2004; Fairhead and Leach, 1995; Leach and Mearns, 1996). For exemplifying, examining how environmental problems are defined in the northern savanna region in the World Bank’s National Environmental Action Plans (NEAPs), Bassett and Zueli (2003) argue that scientific “truth” of desertification is legitimized by a network of power within which desertification narratives circulate. They point out the governments of developing countries must demonstrate to the donor agencies that they are willing to deal with these environmental issues even if these environmental

problems sound imaginary to them. Farmers' and pastoralists' interpretations of environment change are not taken seriously when they do not conform to the frameworks and narratives of donor agencies. Given this situation alternative environmental knowledge and narratives are not paid enough attention or taken seriously because the national governments do not have required institutional authority and the capacity to raise funds that will empower government ministries. They conclude that in the case of Ivorian savanna the global and mainstream narrative of desertification dominates the explanation of environmental change because it empowers some people and institutions that have a stake in it if it becomes everyone's business. Thus, narratives of environmental degradation are often useful for raising funds from donor agencies and securing future potential contracts in unequal power networks.

Furthermore, the ways in which epistemic communities of scientists are organized may also contribute the persistence of such narratives (Williams, 2000; Forsyth, 2003). Williams (2000) argues that discourses of rangeland degradation in Inner Mongolia of China have existed for a long time. One of the reasons for this is that natural science and social science are separated and interdisciplinary research combining natural sciences and social sciences is very rare. In China, research on rangeland and the environment is overwhelmingly conducted through natural science disciplines.³⁰ As a consequence, possible political and socioeconomic factors are overlooked and the "received wisdom" on rangeland degradation is not contested. Lastly,

³⁰ This was clearly shown in the implementation of *tuimu huancao*. The Western Development Division of the National Development and Reform Commission hosted an advisory meeting on the *tuimu huancao* policy in 2009. The fields of all individuals invited to the meeting were natural science. 'Western Development Division of the National Development and Reform Commission hosted an advisory meeting on the *tuimu huancao* policy' (*guojia fagaiwei xibu kaifasi zhaokai tuimu huancao zhengce zhuanjia zixunhui*). Western Development Division of the National Development and Reform Commission, 13 May 2009. http://xbkfs.ndrc.gov.cn/gzdt/t20090514_278739.htm

citatoriality itself also plays a role, where an idea is recounted so frequently that it simply becomes accepted as fact (Davis, 2007; Leach and Mearns, 1996).

This dissertation seeks to enrich this prominent theme in political ecology by describing how these function in contemporary China and in the Tibetan context. First, I argue that in China narratives of rangeland degradation are an important part of state interventions into pastoralism that aims to transform traditional pastoralism. As the dissertation will show in Chapter 2, transformation of traditional pastoralism into a modern intensive production system is both the means and the ultimate goal of China's pastoral development. Rangeland use rights privatization is a basis for and an important step towards transformation of traditional pastoralism. The dissertation will demonstrate in Chapter 4 and 5 that given the most important precondition for the implementation of *tuimu huancao* is rangeland use rights privatization, *tuimu huancao* has more to do with transformation of traditional pastoralism than it does with rangeland degradation, restoration and protection. The implementation of China's latest policy on pastoralism, the Compensation for Ecosystem Services, which is a hybrid of rangeland protection and pastoral development, further demonstrates the narratives of rangeland degradation as part of state interventions into pastoral livelihoods (see Chapter 6).

Second, I argue that local pastoralists' observations and knowledge of range ecosystems may more accurately reflect the actual rangeland conditions in Nagchu. As the dissertation will show in Chapter 3, a narrative of extremely pervasive rangeland degradation primarily due to overgrazing widely circulates in scientific reports, policy statements and news reports in China and in the TAR. China's range management policies, including *tuimu huancao* and the CES program, are based upon such a narrative. However, a critical analysis of official reports of rangeland degradation reveals contradictory, problematic and inconsistent figures and statements.

This challenges the credibility of these reports in terms of the magnitude and extent of rangeland degradation in China and in the TAR. At the same time, pastoralists' memories and observations of rangeland conditions in Nagchu contradict such a rangeland degradation discourse in terms of both magnitude and causes (Goldstein et al., 1990; Miller, 2000; Williams 2002; Ho, 2000; Holzner and Kreichbaum 2001, Yeh, 2005; Harris, 2009). Contrary to the official narrative of widespread rangeland degradation and overgrazing, pastoralists have observed only localized rangeland damage evidently caused by off-road vehicles and livestock trampling, and possibly expanded by the burrowing of voles depending on rangeland types and topography. More importantly, pastoralists do not observe that grazing up until now has led to any observable changes in rangeland conditions. Moreover, as the dissertation will show in Chapter 5, the conditions of what officials labels degraded rangeland are original and persistent in pastoralists' living memory.

Nonetheless, narratives of rangeland degradation persist in China in the TAR, which is the third point that this dissertation seeks to contribute to the literature on "received wisdom" environmental narratives. Broadly, the durability of degradation narratives is maintained by political and economic forces. First of all, reports of pervasive rangeland degradation are constructed out of economic and political motivations. As the dissertation will show in Chapters 3 and 4, narratives of pervasive rangeland degradation are helpful for capturing state funding for each level of government, including the functional ministry. Specifically, for the Ministry of Agriculture as the policy implementer at the central government level, such narratives are useful for promoting sectoral interests both politically and economically. Among the four levels of local government (regional, prefectural, county and township), the regional government desires to receive state funding most and the three lower levels need to act towards this goal accordingly.

For example, the county BAAH made false reports of improvement in vegetation conditions after the implementation of *tuimu huancao* in order to demonstrate its “achievements” and claim more state funding as discussed in Chapter 5. Thus, reports of degradation and “improvement” achieved through national policies by local governments further support and strengthen broader national narratives of degradation and policies designed to address degradation (Fairhead, and Leach 1995).

Second, alternative input about the actual state of rangeland in Tibet is prevented by the following six overlapping factors as discussed throughout the dissertation. First, in China’s hierarchical fiscal and political system and undemocratic top-down policymaking each level of government and lower-level officials are held more accountable to the high-level government and officials than to the public and to the state (*rgyal khab*). Hence there is little chance of expressing alternative knowledge and viewpoints by lower-level officials and governments. Second, the notions of expressing consensus and remaining consistent with the Party line in politics discourage officials and pastoralists to think critically and challenge “received wisdom”, particularly those labeled science. Third, as Williams (2000) argues, the Chinese government usually emphasizes factors that deflect blame away from it, for example, overgrazing versus reclamation. Fourth, cultural politics leaves little space for sophisticated pastoral knowledge and wisdom to be appreciated and considered in policymaking in the context of Chinese farming culture as the dominant culture and of Chinese political dominance over pastoralists who are ethnic minorities in China. Fifth, “rule of experts” legitimized by the rhetoric of science and belief in science as neutral rather than as a social practice shaped by political forces discourage officials and pastoralists from being skeptical of “received wisdom” and officials from listening to pastoralists’ alternative voices. Lastly, in terms of the role citationality plays in the persistence

of “received wisdom” in China, the problem is not only that an idea has simply become a fact after being frequently cited. It is not uncommon in official writing in China to copy exact texts from previous writing without any references. For example, the regional DAAH copied statements on rangeland degradation in the TAR reported by the national CPPCC in 2003 in its proposals in 2005 and 2009 as discussed in Chapter 3. This practice makes officials used to using and accepting earlier reports uncritically over time.

All these broadly defined political and economic forces contribute to the persistence of “received wisdom” environmental narratives in the TAR. From these this dissertation demonstrates that all factors leading to the persistence of “received wisdom” elsewhere in the world suggested by the literature play roles in the TAR and that politics plays an important role in constructing and maintaining environmental knowledge (Forsyth, 2003). It further demonstrates that narratives of widespread rangeland degradation may be more persistent in China in general and in Tibet in particular given most of these political factors are specific to China in general and to Tibet in particular given the nature of Tibetan politics in China.

4. Complicating State Interventions: Disaggregating the State and Beyond Resistance

A number of geographical and anthropological studies of development have focused on the question of why state projects of improvement fail with great regularity. Scott (1998) suggests that the grand schemes imposed by high modernist states fail because they are implemented through visual techniques and plans that attempt to simplify and render the world legible, writing out complexity, detail, and local, embodied, practical knowledge. While useful, this argument have been critiqued for relying upon an overly simplified notion of a monolithic, reified state, imagined as floating “up there” above and separate from society (Li, 2005). This ignores the fact that the state itself is composed of agents and institutions operating under

multiple pressures and competing for power and resources. This suggests an analysis of bureaucrats as agents acting under particular sets of political and economic pressures, and attention to the political economic pressures that affect the translation of policy from the central government down through the administrative hierarchy to local implementation. For the purpose of analysis, I refer to the four levels of government from the township up to the regional government as “local government.”

In China’s fiscal hierarchy, state funding for each level of government has to come via the level immediately above it. In its political hierarchy lower-level officials are evaluated and promoted by higher-level officials. This hierarchical fiscal and political system makes each level of government and lower-level officials more accountable to the higher-level government and officials than to the public and to the state.³¹ In this political and economic context of accountability, this dissertation demonstrates that the essential political-economic incentives for local governments and officials (regional down to township) to implement policies from the central government are to deal with the political economic pressures from the immediate higher-level, rather than the problems per se to be addressed through the national policies. This disjuncture between local officials’ incentives to implement policies and policy intentions contribute to the failure of state interventions. For example, as the dissertation will show in Chapter 5, the implementation of *tuimu huancao* on the ground in Nagchu is oriented towards achieving a double goal of passing the evaluation of present programs and securing future programs, which are the specific political and economic pressures in the context of the implementation of *tuimu huancao*. Therefore, local officials installed fencing as an end in and of

³¹ Here I refer to “state” in the same sense as found in phrases such as “state interventions”, “state funding”, “state security”, etc.

itself in lieu of a means of restoring and protecting rangeland as designed in *tuimu huancao*. Moreover, they reported *tuimu huancao* as a successful policy to secure future funding. Thus, restoration and protection of rangeland was not a top concern for local officials, compared to the above-mentioned double goal. Similarly, in the implementation of the destocking policy under the CES program as discussed in Chapter 6, a best-case scenario for the three lower-level governments (township, county and prefecture) was to secure funding from the central government without a dramatic reduction in stocking rate. Thus, the problem of “overstocking and overgrazing” to be solved through the destocking policy was not a primary concern for local officials.

This dissertation further demonstrates that the political and economic pressures vary between the two ends of the local government. For the regional government as the highest level of local government, its primary driving force of implementation of central government policies is state funding while the township government as the lowest level of government has to implement policies as intended by the higher levels of local government even though it does not receive implementation funding. Moreover, these pressures run at odds with lower-level officials’ (township and county to a lesser extent) knowledge and experience given their closer ties and engagement with local people. However, they have to compromise. For example, as the dissertation will show in Chapter 5, the western and central county AHB still had to continue to seed in *jinmu* zones even though they were aware that it did not work at all.

In addition to pointing to the need to analytically disaggregate the state, recent work in critical development studies has also shown that responses to state interventions are not limited to resistance, whether outright rebellion and subversion, or forms of everyday resistance such as feigned ignorance, foot-dragging, or indifference (Scott, 1985; Peluso, 1992; Neumann, 1998).

The targets of state intervention do not exist in a space of pure resistance completely removed from power (Mitchell, 1990; Moore, 1998; Li, 2005). Here, I conceptualize state power as the effect of political relationships among bureaucrats, rather than a substance derived from a unitary entity called “the state” (Ferguson, 1990). Throughout the dissertation, I will show the presence of both coercive power and power in the Foucauldian sense, which is not coercion exercised by individuals or groups on other individuals or groups, in the implementation of *tuimu huancao* and the destocking policy under the CES program. For example, as shown in Chapter 4, 5, and 6, under the political and economic pressures from higher levels of government, county and township officials imposed the policies on pastoralists when the latter opposed the policies through the stick component of a carrot and stick approach, i.e. coercive power. At the same time, my analysis draws on Foucault’s (1990[1978]) insight that power is productive, rather than merely repressive. Thus, environmental and development interventions do not only repress; they may also produce new desires (Agrawal, 2005). Targets of intervention may resist the state, or they may instead make further claims on the state for development. Thus, “the effects of planned interventions have to be examined empirically, in the various sites where they unfold” (Li, 2005: 391).

Using this theoretical approach, I argue that Tibetan pastoralists make their lives neither from a space of pure resistance nor pure complicity in the complicated and compromised political conditions in which they find themselves. Instead, they are agents, but at the same time subjects of state power. This dissertation demonstrates that Tibetan pastoralists make efforts to both resist certain aspects of state interventions, and also to desire state interventions and use it as a basis for further claims on the state (Li 2005, 2007). For example, as the dissertation will show in Chapter 4, in the case of *tuimu huancao* in the central research site, while pastoralists

opposed the *xiumu* component of *tuimu huancao*, they took advantage of free fencing and compensation under *tuimu huancao*.

Furthermore, the specific way in which pastoralists desire further intervention is a result of a technology of governmentality. Foucault defined governmentality as the conduct of conduct, meaning a form of activity that aims to shape, direct or influence the conduct of others. What Foucault suggested was certain techniques of power or knowledge that would be used to observe, monitor, and control the behavior of individuals within a range of social and economic institutions (for instance a school). Inspired in various ways by Foucault, Escobar (1992, 1995) and Ferguson (1990) developed a Foucault's understanding of governmentality as an attempt to create governable citizens who fulfill governments' policies through the discourse of improvement. While agreeing that this understanding of governmentality is an accurate guide to development as a project of rule, Tania Li (1999, 2007) argues that the actual accomplishment of rule depends so much on an understanding of the cultural framings embedded in a particular society, the imposition of development schemes and related forms of disciplinary power.

Following Tania Li's approach to governmentality, this dissertation contributes to the literature on governmentality by presenting how governmentality functions in the context of state interventions into Tibetan pastoralism. The dissertation shows that some of state interventions worked as intended by the state and pastoralists wanted the state to provide more of them because they are a way of configuring pastoralists' desires for better livestock care and improved living conditions without affecting livestock. Thus, they are a way in which "government operates by educating desires and configuring habits, aspirations and beliefs" as Tania Li put it (p. 238). These interventions include construction of houses at the home base or seasonal camps, livestock shelters and pens, and reserve pastures by fencing depending on local situations.

Furthermore, they work out in a way that is consistent with the ultimate goal of the state of transforming traditional pastoralism, yet the particular way in which they work towards this goal is unintended. In other words, it is an effect, rather than the immediate purpose of these interventions (Ferguson, 1990).

Structure of Dissertation

Chapter 2 explores China's pastoral policies that form the basis *tuimu huancao* and the destocking policy under the CES program and pastoralists' responses to these policies. Specifically, it discusses China's basic policy on range management, the Rangeland Household Responsibility System (RHRS), pastoral development efforts and official attitudes towards and pastoralists' decisions about herd size. It begins with a historical review of rangeland access from before 1959 until the implementation of the RHRS with the purpose of providing a foundation for later discussion of the effects of the RHRS on rangeland access and use. Next, it discusses rationales for, implementation and consequences of the RHRS, and forms of transhumance still in existence under the current policy regime. Finally, it examines rationales for and effects of pastoral development efforts through the cases of sedentarization of pastoralists and pastoral facilities, and pastoralists' perceptions of the feasibility of pen-raising, followed by a discussion of pastoralists' rationales for herd size. The chapter demonstrates that China's pastoral policies have been aimed at transforming traditional pastoralism into a modern intensive production system. Furthermore, these policies approach pastoralism as a purely technical problem to be solved in a purely technical way following the logic of the Tragedy of the Commons and the Cattle Complex theory, but fail to look at pastoralism from the standpoint of pastoralists. Consequently, they neglect the livestock component, and cultural, social and moral dimensions of pastoralism. On the other hand, the chapter shows that when the livestock

component of pastoralism is accommodated, some of these policies function as a technology of governmentality.

Chapter 3 examines rangeland degradation discourses underpinning *tuimu huancao* and the destocking policy under the CES program, and pastoralists' conceptualization and observations of range ecosystem dynamics. It begins with a discussion of equilibrium assumptions made in China's range management and pastoralists' conceptualization and observations of rangeland and livestock interactions. The rest of the chapter explores the credibility of official reports of rangeland degradation in China and in the TAR, and pastoralists' observations of rangeland degradation. The chapter demonstrates that equilibrium ecosystem paradigm and the concept of carrying capacity underlie China's range management policies, but pastoralists' conceptualization and observations of range ecosystem dynamics contradict the equilibrium assumptions and contest the relevance of the concept of carrying capacity. Instead, range ecosystems in Nagchu can be characterized as a mix of equilibrium and non-equilibrium, reducing the relevance of the concept of carrying capacity. Furthermore, the magnitude and causes of rangeland degradation in China and in the TAR are not only contradicted by pastoralists' observations, which suggest merely localized degradation and the importance of constant trampling rather than grazing in terms of deterioration of rangeland conditions, but also by the governments' own reports. Moreover, the determination of carrying capacity in practice and reports of rangeland degradation in the TAR are shaped by political and economic motivations.

Chapter 4 discusses the central government's rationales for launching *tuimu huancao* and local (regional down to township) officials' incentives to implement *tuimu huancao*, and pastoralists' responses to *tuimu huancao*. It begins with a review of rangeland enclosure in

Nagchu. The chapter demonstrates that *tuimu huancao* has less to do with rangeland degradation, restoration and protection than it does with state interventions that aim to transform traditional pastoralism into a modern intensive production system. Furthermore, local officials' incentives to implement *tuimu huancao* are to deal with political and economic pressures from the higher level government, rather than tackle rangeland degradation as *tuimu huancao* was designed. These political and economic pressures along with other political and economic forces prevent alternative views on *tuimu huancao* from being heard. The chapter also shows that pastoralists are both subjects of state power and creative agents in that officials impose *tuimu huancao* on pastoralists through state power, but at the same time pastoralists act rationally to both resist and take advantage of *tuimu huancao*, depending on local ecological and socioeconomic realities.

Chapter 5 discusses the implementation of *tuimu huancao* on the ground and its results in Nagchu. Specifically, it looks at how decisions about fencing sites and sizes were made, whether grazing was banned effectively as intended in *tuimu huancao*, whether vegetation conditions were improved, whether seeding of grass worked, and how *tuimu huancao* was evaluated. It shows that under the political and economic pressures from the higher level government, local officials aimed to achieve a dual goal of passing the evaluation of present programs and securing future programs. Thus, in practice *tuimu huancao* was implemented as fencing installation as an end in and of itself in that local officials installed fencing as an end rather than a means of restoring and protecting rangeland as designed in *tuimu huancao*. Furthermore, the conditions of what officials labeled degraded rangeland have turned out to be original and persistent in pastoralists' living memory rather than a recent phenomenon caused by overgrazing. Seeding of grass regardless of local conditions resulted in a waste of funding where it does not work while insufficient funding where it works, yielding little overall benefit. Hence *tuimu huancao*

produced little positive effects on rangeland as it was designed. Nonetheless, it was reported and evaluated as a successful policy to secure future funding.

Chapter 6 discusses rationales for, implementation and possible results of the destocking policy under the CES program. It begins by analyzing China's CES program in the context of international practices of Payments for Ecosystem Services (PES). It then examines how the program was implemented in Nagchu by looking at how the regional government imposed the destocking policy under the CES program on pastoralists via lower-level governments and how pastoralists responded to the program. Lastly, it predicts possible results of the program from *tuimu huancao*. The chapter demonstrates that although the destocking policy under the CES is a different policy from *tuimu huancao*, the central government's rationales that underlie it, local officials' incentives to implement it and approaches to implementation resemble those of *tuimu huancao*. This further demonstrates the validity of findings regarding why "received wisdom" underpinning *tuimu huancao* and the destocking policy under the CES program persist.

The dissertation concludes by summarizing how "received wisdoms" on pastoralism underlying and underpinning *tuimu huancao* and the destocking policy under the CES program are contested and contradicted by pastoralists' memories, observations and knowledge, why they are persistent, and under what conditions state interventions into pastoralism may be desirable and feasible. This dissertation points out that *tuimu huancao* and the destocking policy under the CES program have more to do with intensification of existing policy directions ultimately intended to transform traditional pastoralism than with rangeland degradation, restoration and protection. Hence, narratives of rangeland degradation underpinning *tuimu huancao* and the destocking policy under the CES program serve to justify state interventions that aim to achieve this goal of transforming traditional pastoralism. Furthermore, broadly defined political and

economic forces maintain the persistence of “received wisdom” on pastoralism and prevent alternative perspectives to existing policy directions. Lastly, this dissertation points out that state interventions based on a middle way approach that accommodates both development and the livestock component of pastoralism is both desirable and feasible from the standpoint of pastoralists. Nonetheless, this dissertation also shows that the formation of such a middle-way policy will not be easy because it will be a political process that can be blocked by officials’ powerful vested political and economic interests.

Chapter 2

China's Basic Policy on Pastoralism: Transforming Traditional Pastoralism

I understand the state is trying to help pastoralists and I am very grateful to it. But sometimes what it wants us to do does not make sense at all to us. Of course, I understand it because the cadre do not have the know-how to understand why livestock need to graze the way they do even they know how to fly an airplane-I mean without practical knowledge how could they come up with policies that make sense for livestock, which is our source of income, even if they are experts....

This is a quote from a pastoralist in Nagchu talking about how some state policies, which form the basis for *tuimu huancao* and the destocking policy under the CES program are inappropriate to the reality. This chapter explores what these policies are, why they have been formed, and why and to what extent they are inappropriate to range management and pastoralism in Tibet.

1. *Communally Used Rangelands: Rangeland Access Prior to Use Rights Privatization*

Prior to Chinese rule beginning in 1959,³² pastoralists in Nagchu had adequate grazing land for their livestock given de facto access to large areas of grazing land and much fewer households at that time.³³ Research Village 1 in the west was part of Sepa Tribe of Tuva Four

³² In 1951, an agreement was signed between the People's Republic of China and representatives of the Tibetan Government on China's rule over Tibet. Being the document in which Chinese sovereignty over Tibet was affirmed for the first time in history, the agreement included a provision among others that the traditional political system of Tibet should remain unaltered under Chinese rule. Thus, China promised to delay Socialist reforms such as redistribution of land in Tibetan areas (central and western Tibet) under the direct rule of the Tibetan Government. However, it implemented reforms in other Tibetan areas (in Sichuan, Qinghai, Gansu and Yunnan Provinces) outside the administration of the Tibetan Government, leading to armed resistance in these areas in 1956. The rebellion spread to central Tibet and eventually a revolt broke out in Lhasa, the capital of Tibet, in 1959. After cracking down on the revolt immediately, China did not abide by the agreement, which has consequently become invalid. Instead, it abolished the Tibetan Government and began implementation of political and social reforms in central and western Tibet. Therefore, 1959 marked the beginning of Chinese rule (see Tséring Shakya, 2000; Melvyn, 1991, 1999, 2009).

³³ 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 recall. I will discuss rangeland access over time primarily through the cases of Research Village 1 in the west and east and the central research village.

Tribes,³⁴ which were administered by Tashi Lhunpo Monastery in Shigatse.³⁵ The research village in the central site was part of Amdo Mema Tribe of Amdo Eight Tribes,³⁶ which were administered by the Tibetan Government's *byang spyi*³⁷ via Nagchu *rdzong*.³⁸ Research Village 1 in the east was part of Bokshok Tribe of Hor Thirty-Nine Tribes,³⁹ which were administered by the Tibetan Government via its *hor spyi*⁴⁰ from 1916 until 1942 and then via its *byang spyi* through Drachen *rdzong* (Zhawa, 1984).

Across the Nagchu region, although herding and migration was usually based on the individual family level, the rangeland was used communally at the tribal level. This was different from what Goldstein and Beall (1990, p. 69-71) found in Pala, a pastoral community about 200 km south of the western research site. In Pala, according to Goldstein and Beall (p. 69), "There was no 'common' pasture open to all." Moreover, pastures were redistributed every three years among households within the community according to their number of livestock, which was not the case in Nagchu, and the allocated pastures were used exclusively by individual families or small group of families. It appears that the difference between Pala and Nagchu was derived from the different entities that pastoralists in the two places belonged to. According to Goldstein and Beall, pastoralists in Pala were bound to an estate of the Panchen Lama like farmers in agricultural areas. But pastoralists in Nagchu belonged to tribes. Virtually everything was more

³⁴ *dos pa tso gshi* in Tibetan

³⁵ 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 (*dge lugs pa*) sect of Tibetan Buddhism. The residence of Panchen Lamas ruled part of Western Tibet prior to 1959 (see Melvyn and Beall, 1990).

³⁶ a mdo shog bryad in Tibetan; the elders in the focus group believe that people in this tribe (present Amdo County in Nagchu) came from Amdo in eastern Tibet several centuries ago-hence the name of the tribe. Also see *Tibetan Tribes in China*. Tibetology Institute, Qinghai Academy of Social Sciences, p. 515.

³⁷ *byang spyi* was an administrative unit similar to present prefecture; prior to 1959 a three-level administrative structure was practiced in Tibet with *bka 'shag* at the highest level followed by *spyi khyab* and *rdzong*.

³⁸ *rdzong* was an administrative unit similar to the present county

³⁹ *hor tso pa so dgu* in Tibetan

⁴⁰ *hor spyi* was an administrative unit similar to the present prefecture

loosely controlled in tribes than in estates, although in both Pala and Nagchu all rangeland was ultimately owned by the Tibetan Government in Lhasa, which granted some rangeland to aristocratic families and monasteries, and pastoralists in tribes also had to pay heavy taxes either to the Tibetan Government or the residence of the Panchen Lama.

Unlike in the central and eastern sites, in the western site, cross-tribe grazing and camping was 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 in the west and about 155 families in the central village prior to 1959, compared to 83 and 383 families respectively in the two villages today.⁴¹ The elders in the west recalled:

As we had large grazing land but not many families, we did not need to migrate much. We would basically stay in 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.⁴²

In central and eastern Nagchu, there were nominal boundaries between tribes but in practice cross-tribe grazing and camping was not an issue. Across the region a few tribal leaders, or monasteries or powerful families would reserve certain grazing land near where they were settled or camped for their own exclusive use. But these grazing land were not large and were within a daily grazing orbit. Thus, its impact was insignificant.

⁴¹ Focus groups with the elders and village committee records (2010). The number of households prior to 1959 in Tuva Four Tribes was over 320. 'Tibetan Tribes in China' (zhongguo zangzu buluo). Tibetology Institute, Qinghai Academy of Social Sciences, 1991; By the end of 2009, there were 1013 families in Medang Township (Medang Township Government, 2010), which was Tuva Four Tribes prior to 1959.

⁴² This means basically that their summer pasture was in the south, i.e., their southern pasture area while they used the northern pasture area for the rest of the year and there were satellite camps (called *kabrang*) within the northern pasture area.

Rangeland access and the traditional production system underwent little change across the prefecture in the early years of Chinese rule. The first political campaign launched in pastoral Tibet after the Chinese came was what was known as the “three-antis and mutual benefits”⁴³ (anti-rebellion, anti-corvee, anti-slavery, mutually beneficial to pastoralists and livestock owners), which was started in the second half of 1959 in Nagchu Prefecture (Wang and Nima, 1997). The “three-antis” led to the abolishment of the old tax system of Tibet and the loss of privilege (such as exclusive access to grazing land near where they were settled or camped) of tribal leaders and elite families. A new tax system was established, which significantly reduced the tax burden of pastoralists. The “mutual benefits” regulated the employment relationship between rich families and poor pastoralists hired by the former to herd their livestock on a mutual benefit basis so as to better protect the rights of the latter.

At the same time, a new five-level Chinese administrative structure (region, prefecture, county, district and township) started to replace the old Tibetan administrative structure. A township was composed of several Zuk (*zu* in Chinese). In the three research sites they were established in 1961. In the western site, Sepa Tribe became a township under Tuva District and Research Village 1 was a Zuk under Sepa Township. Amdo Mema Tribe in the central site and Boshok Tribe in the eastern site were divided into several townships. The research village in the central site became Naser Township with five Zuk and Research Village 1 in the east was a Zuk under Kangche Township. Within a Zuk, ordinary pastoralists were encouraged to join “mutual assistance groups”, a program introduced by the government to encourage communal production through cooperation among several households.⁴⁴

⁴³ *rgol gsum gnyis phan* in Tibetan

⁴⁴ *rogs res tsug chung* in Tibetan

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 this time. Temperature and access to water are two primary factors that pastoralists considered when they decided seasonal pasture areas. A pastoralist in the west 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, all 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 1961.⁴⁵ This policy stated that the individual family ownership of livestock should be stabilized; 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 the western site) while in the case of a tribe being divided into several townships (as in the case of central and eastern sites) the administrative boundaries have shrunk as prior to 1959 boundaries between tribes were only nominal. Nonetheless, pastoralists' access to pastures was not affected significantly as grazing and camping across townships were permitted on request. In the words of an old pastoralist in the central site, "After the township

⁴⁵ 'Regulations of the Tibet Work Committee regarding Several Specific Policies in the Pastoral Area Today' (*xizang gongzuo weiyuanhui guanyu muqu dangqian ruogan juti zhengce de guiding*). Tibet Work Committee, 4 July 1961.

boundaries were set up in 1962, boundaries were not as strictly controlled as today while not as loosely as in the past.”

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, but many livestock died due to poor care and management after the private ownership of livestock was replaced by the collective ownership of the commune system. Typically a former township became a people’s commune but its rangeland and households were maintained unchanged (for example, in the central site Naser Township became Xiangyang Commune in 1970; in the eastern site Kangche Township became Kangche Commune in 1974). But in a few cases, the administrative boundaries changed when the commune was set up (for example, Research Village 1 in the west was added to a nearby commune rather than remaining in the commune of the original township). A three-level administrative hierarchy was present in the commune system. A commune consisted of several production brigades⁴⁶ (*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. Therefore, the basic unit of production and consumption was the brigade, which distributed food rations and necessities to individual families.⁴⁷

During the commune era, pastoralists lacked any incentive to take care of the livestock as carefully as their own because the overwhelming majority of them experienced the hardest life

⁴⁶ *shengchan dadui* in Chinese

⁴⁷ Each family was permitted to milk several livestock for home consumption (for example, five sheep and goats per family in the first research village in the west and one yak for two people in the central research village).

during this period both materially and spiritually (see Goldstein and Beall, 1990). Spiritually, religion was banned and traditional values and customs were abandoned. Physically, they had endless work to do (such as building stone walls to reserve pastures) and political study sessions to attend, which started since the Cultural Revolution, in addition to pastoral tasks. Materially, after deduction of heavy taxes and mandatory quota sales to the government partly derived from local officials' inflated production reports, and of various production costs, the distributable revenue to individual families was extremely limited (see Draga and Lu, 1998; Goldstein and Beall, 1990). As a result, average families experienced food shortages and “many livestock died due to poor management though ironically a common slogan went, “Livestock need to give birth to babies and pastoralists need to regard the commune as home,” meaning livestock numbers should be promoted, as the elders recalled.⁴⁸ For example, in the case of Research Village 1 in the west, the elders believed they had the least yaks and sheep during the commune era as a consequence of many having died. This shows that for livestock good care and management is equally as important as access to grazing land.

After the commune was abolished in the early 1980s, the old townships were restored and rangeland access was left unchanged in many places. 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 (see more on the Household Responsibility System in the next section). Shortly afterwards, in late 1983, the Chinese Government⁴⁹ started disbanding communes and establishing townships, a

⁴⁸ *phyugs bu phrug skye dgod, hri rang khyim btsi dgod* in Tibetan

⁴⁹ ‘Notice from the CPC Central Committee and the State Council concerning Separating Government from the Commune and Establishing Township Governments’ (*zhonggong zhongyang guowuyuan guanyu shixing zhengshe fenkai jianli xiangzhengfu de tongzhi*), Oct 1983.

process which was finished in the TAR by 1985.⁵⁰ In many cases the old township was restored with the same rangeland and households. For example, in the central site, Xiangyang Commune became Naser Township and in the eastern site Kangche Commune became Kangche Township. Brigades became administrative villages under townships. In many cases, the rangeland was used communally at the township level. For example, in the central site, after the five brigades became five administrative villages, nominal boundaries were made between the villages, but herding and migration beyond an administrative village was not a problem, i.e. the rangeland was shared within the township. In the eastern site, boundaries between administrative villages have never been decided and remain fuzzy to date. Thus in practice, in both of these two sites, pastoralists' access to pastures did not change from the commune era. In the western site, the rangeland use has been based on the administrative village since the commune system. Therefore, for pastoralists in the west their administrative boundaries have 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 them given that they have vast tracts of rangeland and that it was neither desirable (enough land) nor feasible (too far to go) for them to move beyond their own administrative village.⁵¹ In 2002 in the central site, the township became an administrative village and its five administrative villages five Zuk respectively, but its rangeland and households have remained unchanged to date. In sum, rangeland access across the prefecture did not go through profound changes over four historical periods from before 1959 through the early 2000s: 1. prior to Chinese rule in 1959; 2. from 1959 prior to the establishment of the People's Commune; 3. during the People's Commune, 4. and the

⁵⁰ 'Economic Structural Reform in the Agricultural and Pastoral Areas: Review and Prospect' (*nongmuqu jingji tizhi gaige huigu yu zhanwang*) in (1978-2008) the 30th Anniversary of Economic Structural Reform and Opening-Up of Tibet: Review and Prospect (pinyin and publishing house), P. 69. Therefore, the Commune System existed in name until the mid 1980s though the livestock Household System was initiated in 1981.

⁵¹ For example, the first research village in the west has a land of 720 km² (72, 000 ha).

reform and post-reform eras from the early 1980s to the late 1990s and the early 2000s.⁵²

Rangeland was used communally more or less as it had been until the privatization of rangeland use rights starting from the late 1990s and the early 2000s (see Appendix Table 1).

2. *An Economic Approach and Solution: Rangeland Use Rights Privatization*

Rangeland use rights privatization, also known as the Rangeland Household Responsibility System (RHRS) literally, was initiated to prevent rangeland degradation and avoid a “tragedy of the commons” scenario; thus, it is an economic approach and solution to rangeland environmental concerns (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.⁵³ 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 privatization 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.,

⁵² In Nagchu Prefecture, the implementation of the RHRS started in 1999.

⁵³ In the TAR, livestock were allocated to pastoralists free of charge. But In some regions, such as Inner Mongolia the government made pastoralists pay for the livestock several years later. However, it appeared that many pastoralists did not or were not able to pay in the end (see Li and Zhang, 2009, p. 70-71).

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, p. 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, utilization 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).⁵⁴ This echoes Hardin's Tragedy of the Commons as discussed in Chapter 1. As in China, in essence, all land ultimately is owned by the state, policy makers attempt to privatize rangeland use rights without privatizing land ownership to apply an economic approach to rangeland management.

Therefore, rangeland use rights privatization is not merely a replica of farmland use rights privatization (the farmland Household Responsibility System) in the agricultural area because their purposes and theoretical foundations are different. Farmland use rights (and livestock) privatization was to promote economic efficiency based on neoliberal economics (Harvey, 2007) whereas rangeland use rights privatization is to protect rangeland based on the Tragedy of the Commons. As decollectivization of agriculture to promote production was part of the Chinese economic reform launched in the late 1970s and the early 1980s, farmland use rights and livestock were privatized simultaneously nationwide. Therefore, though today officials and many researchers consider rangeland use rights privatization the same as farmland use rights privatization as a basic national policy in pastoral China since the early 1980s (for example, cf.

⁵⁴ It should be noted that during the period of the early 1980s until the mid 1990s, in practice the grazing land was used communally at the natural village level in many cases albeit its use rights were contracted out to individual households (see Li and Zhang, 2009, p. 71; Squires et al, 2009, p. 178; Brown et al, 2008, p. 55)

Ho, 1996⁵⁵), its implementation has been highly dependent on local initiative and varied from region to region as there has not been a uniform national policy issued by the central government to date (Ma, 2011; Liu, 2007; Squires et al, 2009, p. 221; Brown et al, 2008, p. 262).⁵⁶

In addition, laws and policy directions are inconsistent with one another as to the basic unit (households or collectives) of rangeland use rights contracting and, they are ambiguous as to how grazing land should be used (privately or collectively) after the privatization of its use rights. China's first Grassland Law of 1985 (Article 4) stipulated that grazing land may be contracted out to collectives (*ji ti*) or individuals (*ge ren*) for pastoral production. The Land Administration Law of 1986 and 1988 (Article 12) and of 1998 (Article 15) reiterated this statement as do the amended Grassland Law of 2002 (Article 13) and Land Administration Law of 2004 (Article 15).⁵⁷ However, the Rural Land Contract Law of 2002 (Article 15) and Property Law of 2007 (Article 124) state that land (including grazing land) should be contracted out to individual households. Furthermore, "Opinions on Strengthening Rangeland Protection and Construction" issued by the State Council in September 2002, which has been the highest-level document on rangeland environmental issues to date emphasizes that the household must be the basic unit of rangeland contracting. In its one sentence on rangeland use rights privatization toward its end, the Opinion explicitly suggests the allocation of rangeland use rights to individual households:

The rangeland Household Responsibility System should be further implemented according to the principle of long-term allocation (of rangeland use rights) to individual households, holding pastoralists accountable for managing (jingying), protecting (baohu) and

⁵⁵ Ho (1996, p. 8) interprets the RHRS as a replica of the Household Responsibility System in the agricultural area by stating that "Household Contract Responsibility System, initiated in the early 1980s and extended to rangeland areas in 1985 as part of the de-collectivization process."

⁵⁶ It should be noted that the RHRS was initiated by environmental concerns based on the Tragedy of the Commons model when it was launched (first in Inner Mongolia in the early 1980s), but today officials and many researchers believe, like the privatization of farmland and livestock, it is also intended to promote economic efficiency.

⁵⁷ literally "contracted to **units** (*dan wei*) or individuals (*ge ren*)" in Land Administration Law of 1998 and 2004 and "contracted out to households (*jia ting*) or **joint households** (*lian hu*)" in Grassland Law of 2004

constructing (jianshe) rangeland and stimulating their enthusiasm for protecting and constructing rangeland.

Thus, it appears that the latter two laws and the Opinion are inconsistent with the Grassland Law and Land Administration Law as to the basic unit (individual households or collectives) of the allocation of rangeland use rights. Furthermore, “Notice regarding Accelerating Implementation of the rangeland Household Responsibility System” issued by the Ministry of Agriculture in March 2007, which is the first and only national document on rangeland use rights privatization thus far, appears to accept or at least acquiesce in the allocation of rangeland use rights beyond households. This makes sense because the Grassland Law, the law that governs the management of rangeland resources, explicitly endorses the allocation of rangeland use rights to joint households as discussed above. The Notice first points out problems associated with the implementation of the RHRS:

There has been unbalanced implementation of the rangeland Household Responsibility System. It has not been yet implemented in some places and in those places where it has been implemented, the implementation and transfer of rangeland use rights are not standardized and formalized.

To overcome these problems, it suggests:

[We should] continue to adhere to the household-based contracts as primary, properly handle the interests of the state, collectives and pastoralists... Where [the policy] has not been yet implemented or the rangeland use right has been contracted out to groups of households...with respect for the wishes of pastoralists as a prerequisite and the issuance of rangeland use rights certificates as a starting point, [we should] steadily promote the work of the rangeland Household Responsibility System.

The statements “the household-based contracts as primary, properly handle the interests of the state, collectives and pastoralists” and “with respect for the wishes of pastoralists as a prerequisite” suggest that rangeland use rights contracting to units at a scale larger than the household is officially permitted. “Primary” implies that there can be other forms of contracts in addition to household-based contracts. The stated interests of the state are to better manage and

protect the country's rangeland through household-based rangeland management. But if pastoralists wish to have alternative forms of contracts other than household-based contracts, "properly handle the interests of the state, collectives and pastoralists" and "respect for the wishes of pastoralists" suggests officials will have to respect pastoralists' wishes or at least pay attention to them. What is even more ambiguous is that none of these laws and policy directions offers any suggestion as to how grazing land should be used after the privatization of its use rights. In fact, the Notice appears to acquiesce in community-based rangeland management, at least for the time being, as it just suggests "the issuance of rangeland use rights certificates as a starting point" in places where the rangeland use rights have been contracted out to groups of households, rather than adding that the grazing land has to be used privately after the issuance of the certificates. All these have led local officials to legitimately offer options of either household-based or community-based rangeland use after the allocation of use rights to individual households, as has been the case in Nagchu, as discussed below.

Thus, when the government says rangeland has been contracted out, this should be understood to mean that each individual household has been issued a Rangeland Contractual Management Certificate (*caochang chengbao jingyingquan zheng*) by the provincial government that gives details about how much grazing land is allocated to the household, while the rangeland may legitimately be used either collectively or privately. Accordingly, claims about how much rangeland has been contracted out refer to the total rangeland allocated to individual households as shown in the certificates, rather than in actual use. For example, the TAR claims that by the end of 2009 a total of nearly 37 million ha of rangeland (67% of its utilizable rangeland) has been contracted out.⁵⁸ As is shown in the cases in Nagchu discussed later on, allocated rangeland

⁵⁸ Interview with an official at the regional DAAH on December 21, 2009.

is not necessarily used individually by households (see Squires, 2010, p. 279). However, when discussing the RHRS in China, many researchers tend to assume use rights and use in practice need to correspond with each other if the policy is “strictly” implemented (for example, cf. Richard et al, 2006, p: 6⁵⁹). Therefore, it is important to clarify that the issue is not that local officials do not strictly interpret and implement the policy, but inconsistency between and ambiguity in laws and policy directives that legitimate collective use of rangeland after its use rights are privatized.

In addition to rangeland protection and improvement, policy makers regard rangeland use rights privatization as a basis for transformation of the traditional pastoral production system and a catalyst that helps transform traditional pastoralism (Humphrey and Sneath, 1999; Williams, 2002). The aforementioned notice suggests that it is essential to put the range Household Responsibility System in place in order to “promote transformation of pastoral production system,” in addition to “stimulating pastoralists’ enthusiasm for protecting, constructing and rationally utilizing rangeland and effectively reversing the trend of deteriorating rangeland environments.” Then, it details goals of transformation of the traditional pastoral system by suggesting local governments should:

Accelerate transformation of pastoral production system with the implementation of the Rangeland Household Responsibility System to promote pastoral productivity and achieve the goals of rangeland becoming green, pastoralism becoming strong and pastoralists becoming rich; transform the traditional extensive herding system to a scientific feeding system of a combination of pen feeding, partial pen feeding with livestock numbers determined by forage availability, rotational grazing, seasonal grazing restrictions; rationally utilize rangeland resources and reverse overgrazing as promptly as possible.

⁵⁹ They state, “An obvious paradox lies in the fact that a strict interpretation of the law [meaning the Grassland Law], which favors individual usufruct rights and true “individual household responsibility,” simply does not match Tibetan cultural or rangeland characteristics. As it is, the vast majority of areas in western China are still managed by common property regimes, despite government claims of over 90% allocation to the household level (Banks et al 2003, Schwarzwald et al 2004, Sheehy 2001).”

But it does not explicate plainly why rangeland use rights privatization helps promote transformation of pastoral production system. It just states:

As the rangeland Household Responsibility System unifies the primary factors of production [labor, rangeland and livestock] at the household level, it facilitates transformation of the [traditional] pastoral system, promotion of grassland-livestock balance, grazing bans (jinmu) and grazing restrictions (xiumu), utilization of rangeland resources scientifically and rationally, and long-term income stabilization of pastoralists.

From “the rangeland Household Responsibility System unifies the primary factors of production [labor, rangeland and livestock] at the household level,” it is sensible to see that in fact policymakers believe that once the household becomes the basic unit of rangeland management, it will make it possible to achieve these above-mentioned goals. For example, “promotion of grassland-livestock balance,” “livestock numbers determined by forage availability” and “[to] reverse overgrazing” suggest an effort to control livestock numbers. Policymakers believe that rangeland use rights privatization will push pastoralists to control their livestock numbers as they believe individual households will not raise more livestock than their allocated grazing land and their economic status (in the case of renting others’ grazing land) can support. Thus, rangeland use rights privatization is China’s basic policy on rangeland management and pastoralism that intends to protect and improve rangeland and transform traditional pastoralism.

In the TAR, officials primarily merely repeat stated rationales articulated by national policymakers. The TAR started a pilot implementation of rangeland use rights privatization in some counties since the mid 1990s in order to “change the traditional concept of ‘rangeland without ownership, grazing without boundaries, utilization [of rangeland] without fees and damage [to rangeland] without accountability,’ and to promote pastoralists’ recognition of

rangeland [as capital].”⁶⁰ 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 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.”⁶¹ Therefore, rangeland use rights privatization 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.”⁶² At the same time, officials in the TAR also state that rangeland use rights privatization is a basis for modernizing traditional pastoralism.

In addition to rangeland protection and improvement, and transformation of traditional pastoralism as elsewhere, management of rangeland as capital is added as a rationale for rangeland use right privatization in the TAR. This aims to encourage pastoralists to value their grazing land and to introduce commercial pastoralism through the transfer of rangeland use rights.⁶³ However, it was not until the beginning of 2005 that the TAR government began implementing the policy widely across the region so as to receive more *tuimu huancao* programs from the central government as the primary precondition for *tuimu huancao* is rangeland use

⁶⁰ ‘A general overview of the Tibet Autonomous Region’ (xizang zizhiqū gaikuang). P. 222. Minzu Publishing House, 2009.

⁶¹ ‘A report on implementation and improvement of the RHRS in Bengun County’ (bāngē xiān luòshì hé wànshān cāochāng chéngbào jīngyīng zèrènzhi gōngzuò qīngkuāng huìbào cǎiliào). Bengun County Government, July 3, 2007.

⁶² ‘A report on rangeland protection and construction in the TAR’ (xizang cǎoyuán bǎohù jiānshe qīngkuāng). Department of Agriculture and Animal Husbandry of the TAR, no date.

⁶³ This can be understood as an attempt to produce new subjectivities, transforming pastoralists into rational market-oriented actors.

rights privatization (see Chapter 4). At the time, the TAR Party Committee and Government issued its first and only document on rangeland use rights privatization to date.⁶⁴

Having examined national policymakers' and regional officials' rationales for privatizing rangeland use rights, I will now discuss how the policy is being implemented and its consequences in the three research sites. Local officials in the western site provided options of household-based or community-based rangeland use after the privatization of its use rights, though they prefer pastoralists to opt for the former, which they encouraged the pastoralists to choose by promising more development projects as a reward. In the western site, the policy was put in place in 2004. Each household was allocated two parcels of grazing land 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. On the other hand, the county government 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). It suggested that if the rangeland is used collectively and 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.⁶⁵ 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. A township official recalled how the two villages made the different decisions:

⁶⁴ At the beginning of 2005, the CPC Committee and the TAR Government issued 'Opinions on further implementation and improvement the rangeland Household Responsibility' (*zhonggong xizang zizhiqu weiyuanhui xizang zizhiqu renmin zhengfu guanyu jinyibu luoshi wanshan caochang chengbao jingying zerenzhi de yijian*); On January 29, 2005, the CPC Committee and the TAR Government endorsed 'A pilot implementation plan for the RHRS' (*xizang zizhiqu caochang chengbao jingying zerenzhi shidian gongzuo fan'an*).

⁶⁵ The user fee policy is called bogs mar slog sprod in Tibetan by pastoralists. The calculation is conducted according to 0.03 *yuan* per SEU per day and 0.3 *yuan* per *mu*.

Officials from the county government and county BAAH said that division of land among households is a basic national policy that must be done and pastoralists must accept it. They added pastoralists can have these four choices of land use after it is divided. But they strongly suggested that each household should ideally use its own pastures. This would be the most desirable choice while sharing the rangeland within an administrative village would be the least desirable choice from the government's perspective. They explained that if pastoralists use their own pastures, they would take more responsibility for managing, constructing and protecting them. They promised more development projects in the future if the pastoralists decided to pick the first choice. However, the overwhelming majority of administrative villages chose to keep sharing the rangeland within the administrative village since they were worried that the household pastures were too small to herd the livestock on. In the whole county only our administrative Village One and Two decided to go with the first choice for two considerations. First, they thought that as they have relatively large rangeland, grazing the livestock on one's own pastures might work and if so, life would be easier (for example, they would not have to migrate seasonally). Second, they wanted to receive more development projects as the government promised.⁶⁶

Thus, local officials just parroted the tragedy of the commons assumption made by national policymakers and regional officials when they reasoned why household-based rangeland use is highly desirable. They used the carrot part of the carrot and stick approach (see more in Chapter 4) to attempt to persuade pastoralists to accept it by promising more state development aid. Pastoralists made rational decisions based on their resources and perceived benefits.⁶⁷

However, rangeland use on a household basis under the RHRS restricts livestock mobility, leading to insufficient forage-hence weaker livestock and higher livestock mortality rates, i.e. reduced productivity. In fact, in Research Village 1, it failed completely. The majority of households in Research Village 1 reported that the household-based rangeland use resulted in poorer livestock condition and loss of many more livestock due to restricted grazing areas and reduced migration.⁶⁸ In the end the pastoralists had to request the government to restore the

⁶⁶ According to this and another township official, in fact this village did not receive more state projects than other villages.

⁶⁷ The first village's decision also indicates that if not for the sake of livestock, pastoralists do not want to practice transhumance as they see it as a difficult task.

⁶⁸ 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 just had 176 sheep, 85 goats, 1 yak and 6 horses.

collective use of rangeland at the administrative village level four years later. 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 consumed more quickly, 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 the settlement for three seasons (winter, spring and summer).⁶⁹ 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 kilograms. Today they weigh about 19 kilograms. 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 only less than 300 now.

Table 6 Livestock numbers before and after the household-based rangeland use period

Livestock		West-1	West-2
Yak	2003	728	2113
	2008	519	2044
	Change (%)	-20	-3
Sheep	2003	12350	14355
	2008	11802	14546
	Change (%)	-4	1
Goats	2003	5250	5425
	2008	8806	5498
	Change (%)	68 ⁷⁰	1
Horse	2003	199	354
	2008	144	231
	Change (%)	-28 ⁷¹	-35

Table 6 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.⁷² As shown in the table, between 2003 and 2008, the number of both yaks (-20%) and sheep (-4%) decreased in the first village whereas in the second village the number of sheep (1%) slightly increased while the decrease rate of yaks (-3%) was not as high as that of the first village. Thus, livestock census

⁶⁹ As each household was allocated two plots of grazing land, they had only two seasonal pastures.

⁷⁰ The increase in goat numbers does not reflect natural growth. In 2006 in the first village the county government launched a goat development program in which the 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.

⁷¹ It should be noticed that the number of horses decreased greatly in both the villages. This can be an effect of reduced value of horses. Consequently, many horses either have been sold or died.

⁷² Summary of Agriculture and Animal Husbandry Census Data-1999-2008, Bengun County Census Bureau, June 29, 2009

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.⁷³ 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 makes livestock grazing difficult, thus reducing productivity (Scoones 1995; Niamir-Fuller 1999; McCabe 2004; Fernandez-Gimenez 2006; Kerven *et al.* 2008). Therefore, it is infeasible.

In contrast, a hybrid policy combining household rangeland tenure with community-based use with user fees (see Richard *et al.*, 2006) has been very successful as pastoralists have accepted it as the best option under the enforced rangeland use rights privatization policy. Pastoralists have willingly accepted the user fee policy since rangeland use right privatization in 2004 in Research Village 2 and since the restoration of collective use in 2008 in Research Village 1.⁷⁴ 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 the second village whose family is among those with the most livestock and hence, usually has to pay a user fee every year responded:

⁷³ Of the 15 surveyed households, two households (in 2005 and 2007) and five households (in 2008) reported livestock deaths due to snowstorms during the household-based rangeland use period. However, alternatively, it could be possible that already weak livestock became more vulnerable snowstorms due to insufficient forage resulting from the new rangeland use system.

⁷⁴ For example, in 2009 in Research Village 1, 20 households paid a user fee (in cash, livestock or pastoral products) ranging from a monetary value of 65.7 *yuan* to 4682 *yuan*, which was shared by 63 households with the amount ranging from a monetary value of 1.8 *yuan* to 795.7 *yuan*.

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 principles of reciprocity in Tibetan pastoral societies.

However, the underlying reason for their willingness to pay for grazing land, which they used free of charge for generation, is that it is the best option from pastoralists' perspective under the mandatory privatization 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; Fernandez-Gimenez, 2006; McCabe, 2004; Niamir-Fuller *et al.*, 1999; Kerven *et al.*, 2008; Humphrey and Sneath, 1999). 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.⁷⁵ A pastoralist whose family has relatively fewer people

⁷⁵ Four of the poorest households in the survey of fifteen households reported that they earned more income from renting their grazing land during the household-based rangeland use period than today. This appears to be due to two reasons. First, as household-based rangeland use is a less efficient use of rangeland, there was a greater demand for grazing land during that period. Second, given there was a greater demand, these households tended to charge more than the government suggests. Thus, these households preferred the older system simply because they earned more from renting their pastures at the time. These households added that their livestock did not get weaker because their grazing land was more than enough. In fact, one of these households and an average household that has relatively large grazing land reported that their livestock were better off. Interestingly, a fifth poorest household said he preferred collective use of rangeland because he does not have to be worried that his livestock would go to graze in others' land as he did during the household-based use period due to a shortage of labor power (only himself and wife). This indicates that household-based rangeland use consumes more labor (see Yan *et al.*, 2005).

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 account shows that demand exceeded supply of grazing land when the rangeland was used on a household basis for the village as a whole. However, when the rangeland was returned to common use, supply and demand came in balance. This indicates that what determines total “supply” is not just the total area of rangeland, as is assumed in standard accounts of “overgrazing” but also very much on how it is managed. This also indicates that community-based use is a more efficient use of patchy rangeland resources (see Bauer, 2006, p. 53). This policy turns out to be a compromise between and 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 is not affected while the goal of using rangeland as capital has been achieved, i.e. transfer of rangeland use rights with a user fee in this case. At the same time, the hybrid policy makes it possible to control livestock numbers, which is an underlying goal of the RHRS as discussed previously.

However, community-based rangeland use in the absence of a user fee in the context of use rights privatization leads to unfair access to grazing land. In the central research village, the policy was implemented in 2005. As in the western site, each household was allocated grazing

land based 60% on the number of people and 40% on the number of livestock and received the Rangeland Contractual Management Rights Certificate issued by the TAR government that gives details about the grazing land (areas, locations, etc) and states the household has long-term exclusive use rights to its grazing land.⁷⁶ Three parcels of grazing land, rather than two, were allocated to each household, i.e. one parcel for each type of rangeland (alpine marsh meadows, alpine meadows and sandy pastures). Unlike those in the western site, county officials did not initiate a user fee policy, but just let pastoralists use the grazing land as they wished.⁷⁷ The pastoralists have to date continued sharing the rangeland at the Zuk level. In fact grazing cross-Zuk was not a big problem and *de facto* communal rangeland use at the administrative village level was maintained until the implementation of the *tuimu huancao* program (see more in Chapter 4). At the same time, a few wealthy households and a small group of families have started fencing alpine marsh meadows near their houses for the purpose of future use during the calving and lambing periods or under severe weather conditions, leading to a situation in which unfenced pastures are shared by all households while fenced alpine marsh meadows can only be used by those households (cf Williams, 1996, 2002 for a similar situation in Inner Mongolia). Obviously, if a user fee policy were adopted as it has been in the western site, all the grazing land would have to be shared, making it impossible for these households to use the fenced pastures exclusively.

In addition, in the central site another problem resulting from rangeland use rights privatization in terms of rangeland access is that pastoralists are discouraged to attempt to migrate temporarily to other administrative villages, townships or counties when they experience

⁷⁶ This Rangeland Contractual Management Rights Certificate was also issued to households in the western site in 2007, extending the contract term from 50 years stipulated in the rangeland use rights certificates issued by the prefectural government to a “long term.”

⁷⁷ In a few villages, the county officials enforced household-based use as an experiment. It appeared that the experiment was not successful, discouraging the county officials to continue enforcing it in other villages.

severe weather conditions, such as snowstorms. Virtually all the pastoralists perceive that it would be more difficult for them to move their livestock to other places due to the RHRS in the absence of government coordination. As a pastoralist explained:

Because now the rangeland has been allocated to individual families it might be more difficult for us to go to graze in other places. In the past, we just needed to talk to the village head there, who would tell us where we should stay. But now we may need to talk to an individual family if the grazing land is used privately, or get permission from every single family if it is shared among families. So without the government arranging for a place, we are discouraged to take the initiative to migrate to other places.

Thus, the RHRS has made pastoralists become more dependent on the government. Without government coordination, it is more difficult for them to have access to alternative pastures beyond their own control. Therefore, the policy may affect livestock migration and thus vulnerability to livestock loss under severe weather conditions.

In the eastern site, full-scale rangeland use rights privatization has been hampered by the presence of caterpillar fungus because of pastoralists' concern over access to the herb as the herb has been their most important source of cash income and its distribution is not even over the landscape. This has encouraged pastoralists to resist the policy.⁷⁸ At the same time, however, pastoralists requested the government to privatize the use rights of land around settlement houses (home bases) given that elite households unfairly keep control of the land by putting up fences.⁷⁹ Asked why the government wants to privatize rangeland use rights and how the policy has been implemented, a township official from a pastoral family background who shares pastoralists' views on the policy responded:

From the government's perspective, rangeland contracting will primarily bring two positive changes. One benefit is that the gap between rich and poor can be narrowed because

⁷⁸ Access to caterpillar fungus has become an important source of conflicts among pastoralists over the past decades.

⁷⁹ Many officials and researchers refer to land around settlement houses as winter pastures, which creates considerable confusion as the situation varies from place to place as shown in this research. In some cases it is not a winter pasture; in others, it is a pasture for several seasons; in still other cases, winter pastures are located at more than one place (see more in Section 3). Therefore, I just call it land around settlement houses.

families with few livestock can rent their land to those with more, as the land should be allocated based 80% on the number of people and 20% on the number of livestock. Another benefit is that it helps reduce conflict over land and makes it more convenient for pastoralists to protect and use the land because each village and household will have its own land. However, overall, pastoralists in our county regard the rangeland contracting policy as a demon and reject it. First, people do not accept the idea of dividing all the land- they are concerned about livestock grazing and disputes over the land after it is divided. Second, particularly, rich families with many livestock do not like it they are -unwilling to pay for land. In my opinion, it is necessary to divide land around houses because powerful families tend to fence them off and use them privately, leaving poor families having less grazing land available. But it is a very bad idea to divide all the land. This causes disputes over the bu (caterpillar fungus) collection as bu is not distributed evenly over the area. Also, dividing the land makes it very difficult to graze livestock as it will redistrict livestock mobility. It will keep livestock well fed and happy if they can move around to graze. So the government now just suggests giving the land around households to individual families.

Local officials here more explicitly recognize the concept of rangeland as capital introduced by regional officials as a mechanism for decreasing disparity between rich and poor. Accordingly, they attempt to allocate the rangeland with the number of people counting more (80%) than it does in the western and central sites (60%). In addition, they hope to reduce disputes over grazing land by making the rangeland boundaries less fuzzy through the implementation of the RHRS. However, pastoralists in the east, unlike those in the western and central sites, are culturally more aggressive and individually-minded. This is reflected in the fact that in both villages elite households started fencing off land around settlement houses for their own exclusive use even prior to the introduction of the RHRS, as discussed shortly, compared with pastoralists in the central site who did so only after the policy had been put in place. Pastoralists in the east predicted more disputes over both grazing land and the caterpillar fungus harvest after rangeland use rights privatization (on disputes see Yeh, 2003; Williams, 2002). This has turned out to be the reality as the government has seen rangeland use rights privatization has led to more conflicts over rangeland where the policy has been enforced and makes livestock

grazing difficult.⁸⁰ Moreover, households with more livestock are reluctant to compensate those with fewer based on principles of reciprocity. At the same time, the majority of pastoralists requested the government to allocate the use rights of land around houses to individual households as they see land enclosure by elite households as unfair.⁸¹

Under such circumstances, the government has had to stop attempting to privatize rangeland use rights other than that of land around settlement houses. For example, in Research Village 1, some households started to fence off alpine marsh meadows around the settlement houses and use them privately since the mid 2000s. Given the situation, the village committee allowed each household to fence off an area of alpine marsh meadows of half a roll of fencing (100 meters) several years later. In 2009 with the permission of the township government the use rights of the land were officially allocated to individual households. The village leadership had each household fence the land to harvest hay and grow grass by providing it with fencing, which appeared to be required by the township government to show that the land is better managed. Given that not all the grazing land has been allocated to individual households, it is impossible for the government to issue the Rangeland Contractual Management Certificate to each household.⁸² Consequently, pastoralists in the eastern site do not have this certificate as their counterparts in the central and western sites do. In Research Village 2, to date the land around

⁸⁰ In this work report, the government explicitly admits that rangeland use rights privatization has caused more conflicts among pastoralists. ‘A research report on Drachen County by the joint work team under the “ten thousands cadres going to the field” campaign in the TAR’ (*xizang zizhiqu wanming ganbu xia jiceng huodong baqing xian lianhe gongzuo zu diaoyan baogao*). 2007.

⁸¹ A few pastoralists even disapprove of household allocation of land around houses for two reasons. First, if the land is fenced off, it will restrict livestock mobility (if not fenced off, livestock of other households can come to graze). Second, the quality of land varies from household to household, making it difficult for households to gain the same benefit.

⁸² It is impossible primarily because the government needs to record the total rangeland area allocated to the household in the certificate.

houses has not been officially allocated to individual households though some elite families have also fenced them to primarily grow grass inside (see more in Chapter 4).

In fact, social conflicts emergent with rangeland use rights privatization are not limited to the east. The deterioration of social relations at multiple scales (between villages and among households) is a consequence of rangeland use rights privatization (see Yeh 2003). For example, in the central research village, after herding and camping beyond Zuk were restricted by fencing of the *tuimu huancao* program under the context of the RHRS (see more in Chapter 4), two contrary responses emerged. Those households that used to go to graze in other Zuks' grazing land complained that this has resulted in inadequate forage, making their livestock weaker, while those households whose land used to be grazed by other Zuks' livestock welcomed the change because of more forage left for their own livestock, making them stronger. This reflects a decline of traditional values and norms of sharing, assistance and reciprocity in the course of disputes over grazing land triggered by rangeland use rights privatization. Here the majority of pastoralists said that they would have preferred not to have the policy if the government had offered an option. Damaged social relations are cited as an important reason as explained by a pastoralist when asked his views on the policy:

This policy makes people behave selfishly, only thinking of one's own gain or loss. As the livestock have become used to grazing where they did and do not know the land has been divided, they are always trying to go to graze where they used to. When they do so, people would complain, ending up in bitter argument sometimes. This puts us under a lot of pressure, both mentally and physically. Mentally because we are worried about the livestock going to others' land or livestock of others coming to our land; for this reason, physically we need to go to watch the livestock more carefully. I really miss those days when the livestock could go to graze freely and we people did not need to fight over land. If the government had asked me whether I wanted to divide the land or not, I would definitely have said no. But it never asks for our opinions.

In sum, rangeland use rights privatization is China's basic policy on rangeland management and pastoralism. It is not simply a replica of farmland use rights privatization in the

agricultural area, which aimed to enhance economic efficiency, during decollectivization in the early 1980s, though today officials and many researchers erroneously consider the two identical. Instead, it has been launched as an initiative to better protect and manage rangeland resources based on a tragedy of the commons assumption and as a basis for converting the traditional pastoral production system into an “environmentally-friendly” and efficient production system. However, in the absence of a uniform national policy by the central government, the pace of implementation of the policy has varied greatly among regions, relying on local government initiatives. Furthermore, inconsistencies among laws and policy directions with regard to the basic unit (households or collectives) of rangeland use rights allocation and ambiguities with regard to how the grazing land should be used (privately or collectively) after the privatization of its use rights have made it legitimate for local officials to offer options of either household-based or community-based rangeland use after the allocation of use rights to individual households. This has made it difficult to enforce private use, leading to a situation in which grazing land is not necessarily used privately as might be expected given the policy’s grounding in a logic of the tragedy of the commons. In the TAR, policymakers have put forward the concept of rangeland as capital as a rationale for use rights privatization in addition to the aforementioned rationales suggested by national policymakers. They attempt to bring an end to the traditional practice of rangeland use free of charge and commodify rangeland use rights through its transfer. Local officials and pastoralists understand it as a pro-poor policy that helps narrow disparities between rich and poor.

However, the RHRS has turned out not to be a pastoralism-friendly policy that benefits all three components of pastoralism: people, livestock and rangeland. For people, through a user fee policy under the context of use rights privatization, households with fewer livestock earn

some money from their land. At the same time, a user fee policy likely discourages pastoralists to raise many livestock. These are positive changes resulting from the policy from the perspective of both pastoralists and the government, as it is a pro-poor policy for pastoralists and for the government it works toward the goals of commodification of grazing rights and control over livestock numbers. However, the case of the eastern site shows that it is not easy for the government to introduce a user fee policy in places where pastoralists are culturally more individually-minded and aggressive and there are precious natural resources (in this case caterpillar fungus) because the combined effects of these two factors trigger more disputes over access to the precious natural resources. If grazing land is used collectively without a user fee under the context of use rights privatization, an unfair situation emerges, in which fenced pastures are used privately while unfenced pastures are shared among households. In addition, disputes and conflicts over rangeland derived from use rights privatization have deteriorated social relations, traditional values and norms of sharing, reciprocity, and assistance.

For livestock, the policy makes it difficult for them to graze due to restriction of formerly accessible grazing areas, which is especially true in places where the quality of grazing land is poor. Fencing makes the situation worse. The RHRS and fencing have promoted each other in the sense that the former needs the latter as physical boundaries while the latter makes the former functional (see more in Chapter 4). The results are weaker livestock, higher mortality rates and reduced productivity. Furthermore, this policy discourages pastoralists from moving livestock temporarily to other places during severe weather conditions, such as snowstorms. Given such circumstances, a hybrid policy under which livestock continue grazing in collectively-used grazing land, while households with more livestock compensate those with fewer has proved to be the best alternative in the context of the RHRS. In terms of the third component, rangeland, RHRS

ironically tends in concert with fencing to cause localized rangeland degradation, as I will discuss in Chapter 3 and 4. Ironically, it leads to the very problem it is designed to prevent.

Overall, it is infeasible and unrealistic to apply the RHRS drawn on the tragedy of the commons to rangeland management in Tibet. Although it is important, as many researchers have done (see Igoe, 2003; Cullis and Watson, 2005; Buck, 1985; Feeny et al., 1998; Richard et al, 2006), to clarify that the communal grazing system is not an open access system as Hardin presumed, it is equally or even more important to point out that neglecting the livestock component of pastoralism, the policy has become infeasible and resulted in negative socioeconomic and ecological consequences (see Williams, 2002). Cases from this research show that ultimately the socioecological and economic problems (social conflicts, localized rangeland degradation, and lower productivity) derived from household-based rangeland use are associated with livestock grazing. Thus, as an economic approach and solution to rangeland use and management, the RHRS is not appropriate for pastoralism, of which livestock grazing is an inevitable part.

3. Transhumance Today: Hard Work and Hard Living for the Sake of Livestock

Having reviewed changes in rangeland access over time and examined China's basic policy (the rangeland Household Responsibility System) governing rangeland management, I will now discuss transhumance, which is an important feature of rangeland use in pastoralism, in the three sites today. Here transhumance refers to the seasonal migration of people with their livestock from home bases, where their houses are. 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. A few wealthier families in central Nagchu had houses to live in and a few wealthier families in eastern Nagchu had small stone buildings for storage. 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 was especially true in emergencies such as snowstorms. By the end of the 1990s, all families in the central site had houses. In the eastern and western sites, most households built houses by the late 2000s, though a few households in the eastern site still live exclusively in tents as of 2011.⁸³

In the central site, slightly over half (31 families) the surveyed families do not migrate at all and the remainder of the families (29 families) migrate once in spring annually, typically to the public reserve pasture (see more on this pasture in Chapter 4) or high in the mountains for around two months (usually between February and May).⁸⁴ In either case, the satellite camps are not far from the settlements (within eight kilometers). Movement once a year in spring or no migration has been the practice over the past three decades. Prior to this, but after 1959, families moved either once a year in the spring, or twice, in spring and fall. Today, combined effects of a constantly increasing ratio of population to land,⁸⁵ increasingly strictly enforced administrative boundaries, the implementation of the RHRS and the widespread use of fencing have made

⁸³ Until the implementation of the housing project in 2006 (see the next section), pastoralists in all three sites built houses on their own. Since then some households in the central and western research villages build new houses (or upgraded old houses) through the project, which has not been started in the two eastern villages yet. This appears to be partially because the government tends to launch development programs first in more accessible places.

⁸⁴ A supposed non-mobility household recommended by the village leadership turned out to practice transhumance. Thus in the 60-household survey in the central site, 31 households migrate and 29 households do not.

⁸⁵ The ratio of population to land is much higher in the central site among the three sites. For example, the largest allocated land to a household among the surveyed households in the central village is 170 hectares, compared to 1894 hectares in the west. On the other hand, the central site has the best quality grazing land with sandy pastures accounting for only 5% whereas in the west sandy pastures dominate the grazing land.

pastoralists have fewer pastures to move to. Furthermore, some pastoralists report that the improved standard of living has made them less able to endure hard living during migration, especially when there is an obvious difference between living conditions at the settlement and the satellite camp (for example, houses versus tents), hence they tend not to be able to migrate as they did in the past.⁸⁶

Among the households that do not migrate there are two different reasons for it. For those families located close to the public reserve pasture or high in the mountains, there is no point in moving because there are no better alternative pastures they can move to—they are already within the walking distance of the spring pastures that other families would come to. Typically, these households would say “There is nowhere to move to” when asked why they do not move. Those households that used to move to other Zuks’ grazing land cannot do so any more since the enforcement of boundaries between Zuks by fencing of *tuimu huancao* since 2007 (see more in Chapter 4). A few families in one natural village have lost their sandy spring pasture within their own Zuk after it was been fenced off under the *tuimu huancao* program.⁸⁷ Consequently, they reported that without being able to graze in the sandy pasture in spring, their livestock cannot gain weight as they did in the past as vegetation greens up earlier there. Thus, fencing under *tuimu huancao* program restricts seasonal migration in some places.

By contrast, in the western site unified seasonal migration, in which all the households move together to seasonal pastures, has been sustained since Chinese rule and insures equal access to seasonal pastures among the households. As discussed earlier, since Chinese rule in 1959 the government has gradually regulated seasonal migration by encouraging pastoralists to

⁸⁶ Some pastoralists in the western and eastern sites also report this. But under mandatory and unified migration policy as discussed below, they have to move.

⁸⁷ This fenced zone is located near a main road, hence the pastoralists have to refrain from grazing in the fenced zone because they would be seen by passing officials, compared to those ones far from roads—pastoralists continue to graze in many of them without being seen by officials.

move to the same place in the same season. This practice has remained more or less ever since, especially in Research Village 2 where the village leadership, which is needed for the practice to be implemented, has appeared to be stronger.⁸⁸ Prior to this, pastoralists did not have to migrate much given much lower ratio of population to land at the time. For example, in the case of Research Village 1, pastoralists would stay for three months in the south within their area partially to avoid robbers. They would stay for the rest of the year in the north of their area, where migration depended on forage availability and pack yak (or sheep) availability, which varied from household to household (as discussed in Section 1). 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. Unlike in the central site where pastoralists usually leave some livestock and people at the home bases when they migrate to the satellite camps, in the west all of the people and livestock move to the seasonal pastures. Only the poorest families with few livestock are allowed to remain at the settlement most of the time. For example, in Research Village 1, the poorest three families stay at their settlement year-round, compared to three seasonal pastures for the rest of the households as shown in Table 7.

Table 7 Seasonal pastures in research village 1 in the west

	Spring-Summer ⁸⁹	Fall	Winter
Timing	late 12 th month-late 7 th month	late 7 th month-the beginning of 10 th	the beginning of 10 th month-late 12 th

⁸⁸ 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.

⁸⁹ Some families usually move to their winter pastures during the greening-up season, which is not mandatory. In 2009, my host family (Puntar) stayed there from May 20 to July 6. According to Puntar, if livestock stays in one place for a long time, it is not good for their physical condition. In 2010 after boundary fencing between the spring/summer and winter pastures was set up, the village committee made a new policy that families camp in the winter pasture have to leave before the 15th day of the 5th month. Puntar's sheep stayed there from May 5 to June 6. He did not move goats as he realized after a snowstorm in spring 2009 that they have become less adaptable to severe weather conditions once they leave the shelter at the settlement (see more in Section 4).

		month	month
distance from settlement (km) ⁹⁰	0	40	8
Usual duration	7 months	2.5 months	2.5 months

In the case of Research Village 2, only one poor family is allowed to remain at the settlement for three seasons, i.e. he uses two different seasonal pastures, compared to three different seasonal pastures (here the summer and winter pasture are the same at the settlement) as shown in Table 8

Table 8 Seasonal pastures in research village 2 in the west

	Summer	Fall ⁹¹	Winter	Spring
Timing	mid 5 th month-mid 7 th month	mid 7 th month-early 10 th month	early 10 th month-late 12 th month/early 1 st month	late 12 th month/early 1 st month -mid 5 th month
distance from settlement (km) ⁹²	0	20	0	30
Usual duration	2 months	2.5 months	3 months	4.5 months

Even so, he has to move his livestock to other places no later than the 15th day of the 4th month (usually mid May) when vegetation starts greening up to ensure his livestock is 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, let alone trucks⁹³)

⁹⁰ Road distances from the village center (one of the natural villages).

⁹¹ A few families have a different fall pasture area.

⁹² Road distances from the village center (one of the natural villages).

⁹³ Since the early 1980s across the prefecture a few families (usually wealthy families or families that had young men who were so fond of automobiles that they were willing to purchase a truck for many of their livestock) started having trucks to move campsites, transport goods and people to (and from) towns. But it was not until the early 2000s that average families started moving campsites by truck (pick-up or tractor) in the western site. For example, in Research Village 1 in the west, nearly half the households (37 households out of 83 households) either have a truck, a pick-up or a tractor (Village Record for 2009). Pastoralists in the western site have more trucks than their counterparts do in the central and eastern sites. This is partly because of the natural topography -between campsites pastoralists can just drive safely on the flat plains without roads. It is also partially because comparatively they move more frequently and longer distances-thus having a truck is desirable. Most of them have learned to drive by doing and do not have a driver's license. When a pastoralist who barely knows how to drive purchases a truck from a fellow pastoralist, the former would ask the latter to turn the truck toward the direction of his home, so he could manage to drive the truck home. All these trucks are second-hand ones with outdated registration. Thus pastoralists cannot drive them to towns. They are totally for home use. By contrast, although pastoralists in the east move longer distances when they move to the pastures in the north, it is impossible for them to drive a truck safely without good skills and experience because they need to go down and up valleys and hills. Pastoralists in the central site find it unnecessary to have a truck for home use given they migrate only once a year (or many do not at all) for a very short distance (see Chapter 2). Pastoralists in the central and eastern sites tend to purchase trucks for commercial purposes (working on construction sites, transporting goods for others, etc).

or camping facilities (tents, *yol la*⁹⁴) that make migration possible, or they lack adequate labor power; furthermore, they have few livestock.

This unified migration is helpful during snowstorms. For example, during the snowstorms of 1997/8, all the families at the same fall pasture area when the snowstorms hit reported that they migrated together and assisted each other during the migration, allowing all the families to have equal access to alternative pastures and the migration less difficult (especially for poor families).⁹⁵

Similarly, in the eastern site, in recent years unified migration of livestock has also been adopted. But it is much complicated because of a southern and northern pasture area division as discussed in the introduction of the dissertation. In the case of Research Village 1, since 2007, households have been divided into four groups and each group needs to move to the north with their yaks⁹⁶ to stay for ten months every four years as shown in Table 9.

Table 9 Seasonal pastures in research village 1 in the east

Group 1-3	When	Where	Pasture	Distance from settlement (km) ⁹⁷	Livestock
	July 1-Sept 1 -summer (2 months)	South	Ngatoktang	5	all yaks ⁹⁸ , sheep
	Sept 1-Oct 1-fall (1 month)		Vurjungpu settlement	7 0	all yaks ⁹⁹ , sheep all yaks ¹⁰⁰ , sheep
	Oct 1-Mar. 25 -fall, winter (6 months)	North	Tsokar ¹⁰¹	80	adult male and non- milking yaks
			Sona ¹⁰²	85	

⁹⁴ A portable livestock pen made of wool blankets set up on the ground to protect livestock from wind and cold at night, see more in the next section.

⁹⁵ It should be noted that where there are distinct seasonal pastures, timing of snowstorms matters in pastoralists' migration. If snowstorms hit in spring, there is no point of moving livestock to other places because there is little vegetation left in other pastures as it is the end of the annual grazing circle.

⁹⁶ They need to have other households look after their sheep in the south as they find it difficult to move sheep to the north.

⁹⁷ Road distances from the village center (one of the natural villages).

⁹⁸ Adult male yaks are left grazing in the mountains without coming home at night.

⁹⁹ Same as above

¹⁰⁰ Same as above

¹⁰¹ It takes the yaks about three days to walk to Tsokar from the home bases in summer, while about seven days to come back in spring.

¹⁰² It takes the yaks about 3 days to walk to Sona from the home bases in summer

Group-4	Oct 1-20s of Nov -winter (2 months)	South	Zonyen	4	milking yaks sheep
	20s of Nov-June 30 -winter, spring (7 months)		settlement	0	milking yaks sheep
	Mar 25-April 25 -spring (1 month)	North	Lhamar ¹⁰³	50	adult male and non- milking yaks
	May 1 ¹⁰⁴ -June 30 -spring (2 months)	South	settlement	0	all yaks sheep
	July 1-Aug 15 -summer (1.5 months)	North	Lhamar	50	all yaks
	Aug 15-April 25 fall, winter, spring (8.5 months)		Tsokar	80	all yaks
	May 2-June 30 -spring (2 months)	South	settlement	0	all yaks sheep

This policy has been adopted by the village committee for two reasons.¹⁰⁵ First, while people are better off living in the south (lower altitude and warmer, better access to markets and social services such as health care and education) livestock are better off remaining in the north (more forage available). Without making it mandatory for all households to move to stay in the north every four years, many households tend to be unwilling (harder life in the north) and unable (a lack of labor power and pack yaks, etc) to move, leading to insufficient forage in the south. When it is made mandatory, those that are unwilling to move have to move and those that are unable to move manage to go with the help of other families or at least manage to find families (relatives) in their group that are willing to take care of their yaks. Second, the use rights of the northern pasture land are unclear and disputed between this community of Nagchu and a neighboring pastoral community in Zaduk County of Yulshul Prefecture, Qinghai Province. In order to seize the rangeland in the north, the government made a policy in the 1990s that some households should stay in the north permanently and that there should not be migration between

¹⁰³ It takes the yaks about two days to walk to Lhamar from the home bases in the summer, while about six days to come back in spring.

¹⁰⁴ It takes the yaks about six days to come back to the home bases from Lhamar.

¹⁰⁵ Both in the western and eastern sites, it is the village committee that has adopted this policy on transhumance and included it in the Village Rules and Regulations (*yul srol dmangs khrims*), which are subject to approval by the township government.

the south and north. But since the early 2000s most of these households have gradually come back to the south as they found there were some big disadvantages to remaining in the north, such as access to caterpillar fungus (none in the north), markets and social services (health care, education, etc). Consequently, the policy has been gradually abandoned. In recent years, Zaduk pastoralists have been gradually seizing and claiming some pastures by building houses and setting up fences. Correspondently, moving to stay in the north is also a strategy to protect their traditional grazing land. When it is a family's turn to stay in the north, all the yaks have to go. As shown in the table male yaks and non-milking yaks of other families also need to go to the north for some time every year. As it is in the west, virtually all the surveyed families (especially poor households) said that unified migration is good for two reasons.¹⁰⁶ First, it helps to avoid a situation in which rich families with more labor power and transportation and camping facilities always go first to graze wherever there are better pastures while poor families are left behind (i.e., equal and fair access to pastures). Second, it helps to ensure more forage is left in the south.

Table 10 Seasonal pastures in research village 2 in the east

When	Where	Pasture	Distance from settlement ¹⁰⁷	Livestock
July 5-Aug 25 -summer (2 months)	South	Churu	5	all livestock
Aug 25-Sept 15 ¹⁰⁸ -fall (nearly 1 month)		Kongmeda	4	
Sept 15-July 5 -fall, winter, spring (nearly ten months)	South	settlement	0	sheep, milking yaks
Sept 15-Feb 28 -fall, winter (5 months)	North	Tsirikongma	80	adult male and non-milking yaks
Mar 1-April 15 -spring (1.5 months)		Tsiridaka	85	
April 15-30	South	Rakjinpu	60	
April 15-30	South	Churupu	8	

¹⁰⁶ Only one family said that with mandatory unified migration, he has to move even if it is really difficult for him.

¹⁰⁷ Estimated road distances from the village center (one of the natural villages).

¹⁰⁸ This pasture cannot be used since 2010 as it is fenced off under *tuimu huancao* program. It is supposed to be closed for five years. Pastoralists have to either continue maintaining at the summer pasture or come back to the settlement.

spring (half a month)			
May 1-June 1 -spring (1 month)	Kongmepu	5	
June 1-July 5 -spring (1 month)	Settlement	0	all livestock

Research Village 2 has adopted a slightly different approach to the northern pasture area. As Table 10 shows, every household is required to move with their adult and non-milking yaks to the north every year.¹⁰⁹ Those households (only a few) that are still based in the north have two clearly distinct pastures-fall/winters (October-March) and spring/summer (March-September). This shows that when forage is sufficient, pastoralists can remain in one place for a longer time.

In the two eastern villages, all the interviewed pastoralists report that closure of some pastures has led to a weakening of livestock over the past decade. In both villages, fenced alpine marsh meadows are closed from the beginning of July until the following spring as reserve pastures for trema (year one milking yaks) and their calves, and for snowstorms (see more on fencing in Chapter 4) under the Village Rules and Regulations (*yul srol dmangs khrims*), which are subject to approval by the township government. This means, as the tables show, unlike pastoralists in the west (and to a lesser extent those in the central site) who close a seasonal pasture when livestock are not present, which obviously does not affect livestock grazing, pastoralists in the east have to close off pastures while livestock are still there. This makes the livestock weaker during the grazing control period even though more forage is reserved for spring and snowstorms. As a pastoralist in Research Village 1 explained:

Today, we tend to have meat with less fat, showing the livestock are weaker because of grazing control in summer. So there is not only less grass available for the livestock, but also not letting them go where they want to makes them unhappy. As a result, they become

¹⁰⁹ Only two households are allowed to remain at the settlement all year around-one is a very poor household with a very old family member (too old to move) and the other is the only household in an isolated settlement (natural village).

weaker. On the other hand, grass left over is really helpful for them during spring and snowstorms. But too much control over grazing is not good.¹¹⁰ It is as if I have only one bowl of tsampa [roasted barley], if I eat some in the morning and then the rest in the evening, I may not feel hungry both during the day and at night though I am not full either in the morning or in the evening. But if I just have all the tsampa in the evening but none at all in the morning, then I may feel very weak during the day even if I can eat to my satisfaction in the evening...

Thus, closure of pastures when livestock are present is in fact grazing control. It makes livestock not gain weight, even though it may be helpful during spring and snowstorms. Furthermore, pastoralists think that effects of grazing control on livestock are not limited to their physical wellbeing, but also include their mental well-being as I will discuss in the next section.

In sum, seasonal pastures and migration varies from place to place, primarily depending on local ecological conditions. Thus, it is important to clarify the following claims, which often appear in the literature, and which are misleading if assumed to apply to the entire Tibetan Plateau. First, pastures around settlements (home bases) are winter pastures. Second, winter pastures are grazed for a longer period of time. For example, Wu and Yan (2002, p. 7) allege that, “With regard to the pastoral regions on the Tibetan Plateau as a whole, winter pastures generally account for one third of the total rangeland area and support two thirds of the year’s grazing time.” The above cases from three geographic locations (west, central and east) in Nagchu, which is the largest pastoral prefecture on the plateau in terms of rangeland area and stocking rate, do not support such a statement. For example, in the central site, many pastoralists stay at the settlement all year around; the rest only move to the spring pasture for around two months,

¹¹⁰ In the case of Research Village 1, the village committee has also decided to control grazing in some unfenced pastures by having each adult member of a household patrol the pastures on a rotational basis. During the grazing control period, fines will be imposed if livestock are found grazing within the closed pastures (1 *yuan* per yak per time and 0.5 *yuan* per sheep per time). The individual on patrol will be fined 50 *yuan*. If s/he did not go to patrol, then s/he will be fined 100 *yuan*. Many pastoralists complained about this excessive grazing control policy, but it appeared that they could not influence the village leadership to change the policy because the latter was supported by the government and wanted to receive credit from the government for enforcing it as the policy was part of the Village Rules and Regulations (*yul srol dmangs khrims*) and the government considers grazing control as a “rationale” use of pastures, particularly in the context of reserving forage for snowstorms.

i.e. pastures around settlements are used for around ten months during the period of summer, fall and winter. In the case of Research Village 1 in the western site, winter pastures are not around settlements, while pastures around settlements are used for a total of seven months of spring and summer; in Research Village 2, pastures around settlements are grazed for a total of five months of winter and summer. In the eastern site, there is a clear distinction between southern and northern pasture areas while pastures around settlements are grazed for a total of ten months of fall, winter and spring (though not by all of the livestock). Seasonal pastures in the central and eastern sites are not far from settlements (less than eight kilometers). Therefore, alternatively, it is safer to point out that in Nagchu grazing land around and near settlements is used during longer periods of the year.

Unified migration in some places (for example, the western and eastern sites) helps poor pastoralists to have equal access to seasonal pastures and migrate during snowstorms. In places such as the eastern research site where pastoralists close off pastures in the presence of livestock for spring and snowstorms, livestock tend to become weaker during the grazing control period even though more forage is reserved during spring and snowstorms. These cases also show that transhumance is hard work and hard living, but depending on local conditions, pastoralists have to practice it for the sake of livestock, which are their principal source of income and livelihood.¹¹¹

4. *New Pastoral Facilities as A Technology of Governmentality*

Having examined rangeland access, management and use, I will now turn to pastoral development efforts that concern pastoralists (sedentarization) and livestock (livestock pens and

¹¹¹ Many pastoralists refer being pastoralists as a result of bad karma [*las ngan*] as they see it as a hard livelihood, particularly in the context of being aware of government officials receiving decent salaries without much hard work and hard living.

shelters) that the government has been implementing since 1959. Sedentarization of pastoralists has been a national policy in pastoral China since the early 1950s. Development of infrastructure and improvement of the quality of life of pastoralists are stated goals of sedentarization in China, as elsewhere (Gefu, 1991, p. 182). In the early 1950s, a policy called “sedentarized pastoralists with mobile livestock” (*dingju youmu*) was put forward by the Mongolian communist leader Ulanfu and endorsed by the central government. The essence of the policy was to build home bases for pastoralists where basic infrastructure and facilities (electricity, water, schools, clinics, etc) would be developed and provided, while at the same time allowing them to continue transhumance. The Government Administration Council (today’s State Council) of the Central People’s Government advocated in 1953 that the policy of “sedentarized pastoralists with mobile livestock” should be adopted in the pastoral areas of Inner Mongolia, Qinghai and Xinjiang: ¹¹²

Sedentarization and transhumance have their advantages and disadvantages. Sedentarization is beneficial for people...but unfavorable for livestock development and breeding. Transhumance helps livestock often have access to good pastures...But all the family members, old and young, have to move with livestock. Thus, it is unfavorable for people. Sedentarized pastoralists with mobile livestock under current production conditions can make use of the advantages and overcome the disadvantages. Therefore, where the conditions are met, “sedentarized pastoralists with mobile livestock” should be advocated. Some family members (mainly young adults) move with livestock while others (the elderly and children) stay at the settlement, building homes, setting up clinics, growing grass and vegetables, establishing schools, etc.

Thus, policymakers at that time recognized that pastoralists should not be sedentarized like farmers given the nature of the pastoral production system. They understood that sedentarized pastoralists with mobile livestock would benefit both pastoralists and livestock. In Inner Mongolia, the policy was adopted in 1951 and produced very positive results (Zhang and Gai, 2008).

¹¹² Collection of Statutes of the Central People’s Government (*zhongyang renmin zhengfu faling*). P. 167. Law Press (*falu chubanshe*). 1953.

However, this policy has gradually been abandoned with the privatization of rangeland use rights and widespread use of fencing starting in the 1980s (Wang, 2006). It has been replaced by a policy of concentrated settlement, which forces pastoralists to settle down in one place. In the TAR this policy was advocated and emphasized as a strategy for dealing with future snowstorms by regional policymakers after devastating snowstorms of 1997/8.¹¹³ They reasoned that relief efforts can better reach pastoralists if the latter reside in more accessible locations and are not scattered, and pastoralists can better prepare for snowstorms and be better equipped with facilities (livestock shelters, fencing) in the settlement. They deem that, “Sedentarization is not only favorable to coping with snowstorms and developing efficient pastoralism, but also helps school-age children receive education.” Hence, the rationale for sedentarization is stated in terms of achieving triple goals of transforming traditional pastoralism, enhancing natural hazard coping capacity, and providing infrastructural facilities and services simultaneously.¹¹⁴ Subsequently, a sedentarization program (*yomumin dingju*) was launched in 2001 as one component of a broader regional pastoral development program known as “rangeland construction and sedentarization of pastoralists” (*xizang caochang jianshe yu yomumin dingju gongcheng*) during the Tenth Five-Year Plan (2001–2005).¹¹⁵ This was the first large scale sedentarization program sponsored by the state in the region. This comprehensive pastoral development program also included building livestock shelters, pens, sheds, drilling wells and pasture construction (*cao*

¹¹³ ‘Rethinking prevention and mitigation of natural hazards in pastoralism’ (*guanyu dui xumuye fangkangzai gongzuo de fansi*) by Regional Planning Commission of the TAR in “Snowstorms, Rethinking and Development” (*xuezaizai, fansi, fazhan*) P. 102-103, Tibetan People’s Publishing House, 1999.

¹¹⁴ Political control over pastoralists was suggested as an important reason for sedentarization of pastoralists in China (Williams, 2002) and elsewhere, for example, in Iran (Rosman et al. 2009) and in Africa (Gefu, 1995; Chatty, 1996, 2007)

¹¹⁵ It was one of the major Aid Tibet programs designed at the fourth (2001) Tibet Work Forum by the Chinese Government. The total state investment in the program was 200 million *yuan*. ‘Forty thousand pastoralists in the TAR have settled down during the Tenth Five-Year Plan’ (*shiwu qijian xizang si wan yomumin shixian dingju*). Xinhua News Agency, April 30 2006. http://tibet.cn/news/xzxw/shjj/t20060430_112627.htm

chang jianshe) and it aimed “to strengthen rangeland construction, to transform the [traditional] production system, to accelerate pastoral economic development, and improve the standard of living of pastoralists.” After the implementation of the program, the regional DAAH reported that the program “has improved pastoralists’ production and living conditions, improved livestock resilience to natural hazards and built a sound foundation for pastoral development.”¹¹⁶ Then, in April 2007, sedentarization of pastoralists in Tibet and Xinjiang was listed as one of the nine programs designed to achieve China’s goals of sustainable use of rangeland resources, improvement of rangeland ecological environment and sustainable socioeconomic development in the National Comprehensive Plan for Grassland Protection, Construction and Utilization by the Ministry of Agriculture.¹¹⁷ The Plan articulates the triple goals of sedentarization of pastoralists in the program:

Some pastoralists in the TAR, Tibetan areas in Qinghai and Sichuan, and Xinjiang with tough natural conditions and frequent snowstorms still engage in traditional nomadic pastoral production systems with low productivity and low coping and mitigating capacity. [To alter this status quo] is the focus and the most difficult part of developing new pastoral areas. Through improving infrastructure (housing conditions, livestock shelters and pens, forage bases, sheds, wells), this project will sedentarize 150,000 pastoralists in 148 counties (cities, districts) in the four regions [in order to] improve their production and living conditions, alter pastoral production systems, enhance their natural hazard coping capacity, improve their standard of living...

The title of the project, “the integrated project of people, rangeland and livestock” (*yomumin ren cao xu sanpeitao gongcheng*) indicates that policymakers believe the project will benefit all three components of pastoralism (pastoralists, rangeland and livestock).

¹¹⁶ It appears that these benefits are overstated as shown in the cases of the two western research villages discussed in the following paragraph. Moreover, it is hard to assess the roles of pastoralists’ vulnerability to snowstorms as thus far no devastating snowstorms have hit since the last ones of 1997/8.

¹¹⁷ ‘National Comprehensive Plan for Rangeland Protection, Construction and Utilization’ (*quanguo cao yuan baohu jianshe liyong zongti guihua*). Ministry of Agriculture, 4 April 2007.

Nonetheless, concentrated settlement of pastoralists like farmers or town dwellers is infeasible because it makes it difficult for pastoralists to raise livestock. The two western research villages were targets of the program in 2005. The government decided that there must be at least ten households in each settlement, which also serve as the village headquarter, and that houses must be built in neat orderly rows, standing next to each other. Today, most of the houses, ranging from one-room ones to four-room ones depending on household size, are left unoccupied and some are in ruins after useful materials (roofs, windows, doors, etc) have been removed, as in the case of Research Village 2. The village head of Research Village 1 explained how the program was implemented and why the program did not meet the needs of pastoralists:

When we heard about this program, we requested the government to build the houses at the home bases, and some said at seasonal camps. But the county officials told us that under this program it is not allowed to build separate, single family houses at the home bases because it would make it impossible to connect every single family to electricity. And besides, the officials said a target family would need to cover 30% of the cost of building the house. In my case, it is a four-room house. I would have to pay 6200 yuan. Most families were unwilling to participate in the program not only because of this payment, but also because of concern over livestock raising in the settlement. The officials persuaded the top twenty richest families to accept the program. In the end, we had to pay nothing. Instead, the officials made us contribute stones and mud bricks and had Chinese workers build the houses. However, no electricity was connected to the settlement. They just drilled two wells. Today, only one family lives in the settlement while others stay there only when there is a public gathering at the village center. We find it impossible to settle down there because there is nowhere to keep the livestock in such a crowded place as we worried. So it was kind of a waste of government funds. If the government had paid attention to our wishes, even a small room at the home base or at a seasonal camp would have been very useful.

Hence, the attempt to sedentarize pastoralists in one concentrated settlement failed completely.

In this case a specific rationale stated by the government for concentrated settlement was to provide electricity. It is sensible for the government to see it is more feasible to provide electricity to pastoral communities when pastoralists are not scattered over vast areas.

Nonetheless, pastoralists' priority is to care for livestock, which are their sources of income.

Accordingly, they are not attracted to any interventions that make it difficult for them to raise

livestock even if they are tempting (in this case electricity), because they threaten their livelihood. Concentrated settlement is such an intervention. It is infeasible for pastoralists to sedentarize in a concentrated settlement even though it is desirable in terms of better access to facilities and services because it not only makes it difficult to keep livestock in the settlement (no space), but also makes it difficult to herd livestock and use rangeland efficiently as the livestock would have to graze in the same pasture area. This is especially true in places characterized by vast but poor quality rangeland, such as western Nagchu. For example, in Research Village 1, distances between households are at least one kilometer, compared to less than five meters in the concentrated settlement. An underlying reason for the failure of the program was the undemocratic nature of top-down development, in which pastoralists' wishes are not considered and respected.

In 2006, the TAR government launched a large scale housing project (literally comfortable housing project) that aims to improve and upgrade housing conditions of rural residents. In Nagchu, in what appears to be based on lessons learned from this sedentarization program, the government basically allows pastoralists to build the houses according to their will (in terms of locations, styles, constructors, etc) with government subsidies. Consequently pastoralists embrace the project with enthusiasm. As the village head continued:

By contrast, the new housing project is really good. People can just build new houses where they want to and the government just provides the money. Every family competes for it. But we the twenty families were not targets of the project because we were recipients of the

*concentrated settlement program.*¹¹⁸

By comparison with concentrated settlement, pastoral facilities (livestock pens and shelters) function as a technology of governmentality (Foucault, 1995; Li, 2007; Agrawal, 2005) as they have become a way of configuring pastoralists' desires to better care for livestock. There were no livestock pens, let alone livestock shelters, across the region prior to 1959. A few wealthier families in the west had *yol la*, portable livestock pens made of wool blankets set up on the ground to protect livestock from wind and cold at night. Today, more families in the west have *yol la* as they are now more able to afford them, and materials other than wool, such as canvas, are increasingly available to make them more cheaply.¹¹⁹ It was not a tradition for pastoralists in central and eastern Nagchu to make and use *yol la*, due in part to a scarcity of

¹¹⁸ The housing project launched in 2006 consists of five components, namely, house renovation (*nongfang gaizao*), sedentarization of pastoralists (*yomumin dingju*), poverty reduction through resettlement (*fupin banqian*), resettlement of residents from endemic areas (*difangbing zhongbingqu banqian*), development in border counties and townships (*bianjing xianxiang xingbian fumin*). In Nagchu, except for those pastoralists with few livestock who are being resettled near major roads or county towns (township headquarters) under the "poverty reduction through resettlement" program, pastoralists are allowed to either build new houses or upgrade existing ones at home bases. As local governments and officials tend to implement development projects as "image projects" (*xingxiang gongcheng*), and or "credit projects or political achievement projects" (*zhengji gongcheng*) in easily accessible places, they require residents in some areas (for example, farmers near the capital city Lhasa) to meet certain standards (concentrated along main roads, not built of mud bricks, the separation of cowsheds from dwelling, a set of furniture for the house, etc), which makes the residents discontented with the project and has left some in debt. However, most residents in Nagchu do not have to meet such standards and some in remote areas such as the two western research villages even have some money left over from the subsidies (typically 15,000 yuan per new house) after the project. Therefore, for a thorough and fair assessment of the impacts of the project, more empirical research in various locations is needed. It was reported that the total investment in the project was 17 billion yuan and 274,800 households were involved in the project (1.4 million people) by May 2011. 'Investment in the Comfortable Housing project in the TAR [has reached] 17 billion yuan, benefiting 1.4 million farmers and pastoralists' (*xizang anju gongcheng touzi 170 yi yuan, huiji 140 duo wan nongmumin*). Xinhua News Agency, 27 May 2011. http://news.xinhuanet.com/society/2011-05/27/c_13896944.htm; Some individuals abroad have produced an unfavorable report on the project partly because they erroneously assume that the housing project in the TAR is the same as the (ecological) resettlement of pastoralists in Qinghai and Sichuan, i.e. just a resettlement project. For such reports, see 'China relocates over 300,000 Tibetans in 2008: Report'. Phurbu Thinley, 2008. <http://www.phayul.com/news/article.aspx?id=23524>; 'The destructive of mission of Tibet's Comfortable Housing Project' (*xizang anju gongcheng de pohuai xing shiming*). Moli, 2011. http://2newcentury.net/blogspot.com/2011/07/blog-post_6577.html. For a detailed discussion on resettlement projects in Tibet, see Ptackova 2011; Human Rights Watch, 2007; For a detailed discussion of the housing project in the TAR, see Yeh, forthcoming; Melvyn et al., 2010; Zhang, 2010; Kelzang Tenzin 2008.

¹¹⁹ For example, my host family in the west had their first *yol la* in 1995 (They hired people to make one) and bought another one later for seven sheep and goats. About 50 kilograms of wool is needed to make one. They made the third one on their own from canvas.

wool due to relatively fewer sheep (especially in eastern Nagchu). Instead, they would build yak dung walls wherever they camped to insulate livestock against wind and cold at night,¹²⁰ which was not a tradition in western Nagchu where there were fewer yaks. While this is still the case, some families in the central site have also started to use *yol la* over the past decade when they migrate in spring.

Beginning in 1959, the government encouraged pastoralists to build livestock pens as one of its efforts to promote livestock production. For example, in the central research site, every household had to build a livestock pen at its home base; these were built with sod. Then during the commune period starting from the early 1970s, the government made the pastoralists tear down the old individual pens and build communal pens with mud bricks and stones for each brigade. When the commune was abolished in mid 1980s, once more the government asked the pastoralists to build individual livestock pens. This time they were required to meet certain standards, e.g. mud brick walls of a certain height. Today, all households in the three research sites have built livestock pens on their own initiative at their settlements.¹²¹ Some families in the central and eastern sites grow barley in the pens in summer and harvest barley hay in fall.

Starting in the early 1990s, the government had pastoralists build livestock shelters by providing roof wood in the central site. Then, starting from 2008, large stone-walled and glass-roofed livestock shelters are being introduced as a pastoral development initiative by a

¹²⁰ In some areas in central Nagchu near Nagchu Town where pastoralists did not migrate often, yak dung walls were regarded as livestock pens.

¹²¹ Some households also have corrals at their seasonal campsites.

government department in the central research village.¹²² The shelters are designed with the dual function of a livestock shelter in winter and spring, and a greenhouse in which pastoralists grow vegetables in summer. In Research Village 1 in the western site, the county government launched a goat development program in 2006.¹²³ The target families needed to raise a certain number of goats, and build a goat shelter and a pen as the components of the program.¹²⁴ The government funded the purchase of goats (20,000 *yuan* per household) and provided roof wood for the shelters. In the eastern site no pastoralists have livestock shelters thus far.¹²⁵

All the families in these two villages that have livestock shelters find that livestock shelters are truly functional and they are highly desirable, keeping weak livestock warm at night during winter and spring, especially under severe weather conditions and growing vegetables in summer in the case of the glass-roofed shelters. A pastoralist in the west explained:

At the beginning when we were told by the government to build goat shelters, we complained by saying it is an absolutely crazy idea that we should keep the goats inside houses-if we only have a dozen of goats, it might be possible, otherwise, it is totally impossible. But in fact, it has turned out to be the best idea. Now we really wish we had several of them-I regret we did not build a larger one (at that time we even wished we could build a smaller one just to save labor and materials while fulfilling the government task), so we can keep more goats and the sheep inside as well. Now we have realized it would be great to have a shelter for the sheep, too. We would just keep them inside at night in winter as the saying goes, 'A warm pen outside the valley is better than good grass deep in the valley', meaning keeping the

¹²² In some places in the TAR a government organization is assigned to assist in development in an administrative village. In this case, a prefectural government organization launched this livestock shelter program as an aid project in this village. In 2008 it had pastoralists build shelters on their own with a subsidy of 4000 *yuan* per shelter. In 2009 it had Chinese and Tibetan migrant workers build the livestock shelters while the target families needed to contribute the stones (240 m² with a height of 1.8 m (front) and 1.5 m (back)). For the project for 2009, the target households must be those living near the public reserve pasture who can either afford to provide the stones or pay 7000 *yuan*. As a result, relatively better-off families with more livestock have received the project. Local pastoralists believe that the reason why only the households living near the public reserve pasture were the targets of the project is that when officials pay visits to the place, they can see the reserve pasture and the livestock shelters at the same time as anti-snowstorm preparation facilities, which would impress them. Thus, it appears to be a kind of political achievement project (*zhengji gongcheng*).

¹²³ The government attempts to promote cashmere harvest and sales as a core industry of the region in western Nagchu.

¹²⁴ The criterion for receiving the program was that the family needed to have 40 goats prior to the implementation of the program. Fifty families became the targets of the program. These families needed to raise 95 female goats and five rams. The area of the shelter should be 60 m² and that of the pen 100 m².

¹²⁵ The government tends to introduce and employ new practices first in more accessible places.

*livestock warm is as important as keeping them well fed.*¹²⁶ *The current goat shelter has just enough space for rama (female goats), zipu (two-year-old goats) and a few weak rams. We keep them inside the shelter from the 10th month to the 3rd month. The shelter is also incredibly useful when we need to separate the livestock-keep one herd inside the shelter, one inside the pen and others outside.*

A pastoralist in the central site told me how she uses the shelter:

*Our livestock shelter was built in 2009. We keep yarma (year-two milking yaks), yaru (two-year-old yaks), calves and weak shipomo (three-year-old yaks) inside the shelter from the 9th month until the 1st month. The shelter does not have enough space for both weak yaks and sheep. We decide to keep the yaks inside instead of the sheep because we are afraid the sheep would become less adaptable to cold stress than the yaks once they are used to staying in the shelter. The shelter is highly beneficial to the livestock. The yarma tend to produce more milk than before in the same period and do not need to be covered with blankets. It is so warm inside the shelter that even the livestock urine does not get frozen as it does in the pen. We grew cabbage, bok choy, potatoes and radish in the shelter this summer. It looks like they are growing very well.*¹²⁷

Another pastoralist in the central site explained why he does not need to cover weak livestock blankets during the cold season because of the shelter:¹²⁸

We used to cover tremo (year-one milking yaks) and calves with blankets in the winter. But now thanks to the state, we put all calves and weak tremo from the late 9th month till the 3rd month in the shelter. They do not need the blankets any more. Actually, it is warmer inside the shelter than in our house. We also put mamo (female sheep) and rama (female goats) with their kids in the shelter during the lambing period (2nd-3rd month). We are really grateful to the state, which, as you see, has provided houses not only for we people, but also for our livestock.

However, those pastoralists who migrate seasonally from one pasture to another find that their livestock are less adaptable to severe weather conditions when they move to a seasonal camp where there is not a shelter. My host family Puntar and his brother in law Tsedor experienced different livestock losses during a spring snowstorm in late May and early June

¹²⁶ *phus tsa' yag las mdos lhas dro yag* in Tibetan

¹²⁷ I interviewed this lady on Aug 17, 2010 and saw vegetables were growing very well in her shelter.

¹²⁸ Pastoralists in Nagchu cover weak livestock blankets to protect them from cold during winter and spring, and snowstorms.

2009 exactly because of the goat shelter.¹²⁹ The Puntar family migrated to an alternative pasture where they do not have a goat shelter from their settlement one week before the snowstorm hit without being aware that it would have occurred. The Tsedor family did not move as they usually do not and continued to use the goat shelter at the settlement throughout the snowstorm period. As a result, the Puntar family lost more livestock as shown in Table 11 because their goats became more vulnerable to the effects of cold stress during the snowstorm after they spent the whole winter and spring in the shelter at night at the settlement and then moved to the winter pasture where there is not a shelter.

Table 11 Livestock deaths of two families in the spring snowstorm of 2009

Livestock number		Puntar	Tsedor
Sheep	Adult-before	200	128
	Adult-deaths	2	0
	Lambs-before	50	19
	Lambs-deaths	10	8
Goat	Adult-before	130	70
	Adult-deaths	30	7
	Lambs-before	36	45
	Lambs-deaths	30	10

When asked what he thought of the main reasons why his family lost more livestock, he responded:

The livestock died from cold after they got wet in the rain and snow, but not from starvation because the snows melted right away and did not prevent the livestock from grazing. On the one hand, if we had stayed at the settlement where we have the goat shelter and had not moved to the winter pasture where we do not have a goat shelter before the snowstorm, or if we had had a goat shelter at where we camped, we might have lost fewer goats. On the other hand, if we had never had the goat shelter, we might have lost fewer goats as the shelter has made the goats more sensitive to cold. A nearby (within easy calling distance)

¹²⁹ The spring snowstorms of 2009 hit western Nagchu Prefecture, including the western research county. According to Puntar's account of this snowstorm, during the period of May 27 and June 11, 2009, it first rained and then snowed heavily. Livestock died from cold (after getting wet in the rain and snow) and starvation. Livestock death rate was 6% for the two research villages together (an estimated death rate of 2% for the western research township). Household interviews; 'Work Report on Prevention and Mitigation of Natural Hazards in Bengun County' (*bangexian fangkanzai gongzuo baogao*). CPC Bengun County Committee and Bengun County Government, 6 June, 2009.

family¹³⁰ in the winter pasture whose other conditions were similar to ours (for example, the same grazing area, and similar labor power and livestock numbers) except they did not have a goat shelter lost few livestock in the snowstorm (in fact, our livestock management might be better than theirs). However, even without the goat shelter, we still would have lost more goats than sheep because goats are biologically weaker than sheep. For example, goats have thin hair. Comparatively, sheep have a thick wool coat, which prevents them from getting wet easily. Overall, the goat shelter made our goats more vulnerable to the snowstorm.

Comparatively, the Tsedor family lost fewer livestock because he was able to continue to put weak goats in the shelter at night as they did not leave the settlement. When asked what he thought caused the difference between him and Puntar regarding livestock deaths, he responded:

Unlike Puntar's livestock, our livestock died due to starvation toward the end of the snowstorm period. We stopped keeping the goats in the shelter about two weeks before the snowstorm. Then when the snowstorm hit, we kept the goats and sheep lambs in the shelter at night as they got wet and cold after they came back home from grazing. Usually we put rama (female goats), zipu (two-year-old goats) and goat kids in the shelter from the early 10th month to the late 3rd month, depending on weather conditions. Without the shelter, we might have lost many livestock. I think the shelter made the difference in livestock deaths between us and Puntar as there was little difference in vegetation availability between us.

It appeared that the spring snowstorm killed the livestock through combined effects of cold and starvation. But Tsedor was able to mitigate the effects of cold by keeping the livestock inside the shelter at night. Thus, the effects of starvation appeared to be more severe for Tsedor's livestock while the effects of cold appeared to be more severe for Puntar's livestock.

In order to overcome this problem of his goats being less adaptable to severe weather conditions once they leave the shelter, Puntar decided to have them keep remaining at the settlement while his sheep migrated to the alternative pasture in 2010. Interviews with other families in this village indicate that they also reduce the migration of goats since the utilization of the shelters. Thus this is a common practice among households that have shelters at the settlement. Puntar explained his decision:

¹³⁰ I talked to one of the sons in law of this family and he told me that they still lost some livestock but fewer compared to the Puntar family. He also thought that it was because the goat shelter made Puntar's goat more susceptible to cold.

Last year, if we had known there would be a snowstorm during that period in advance, we would have not moved the goats from the settlement where we have the shelter to the winter pasture where we do not have one. Because of this lesson, this year we did not move our goats with the sheep to the winter pasture. We were afraid once the goats left the shelter, they might die if severe weather hit just like last year. Of course, if it did not snow, it would be better for the goats to migrate as well because if they stay in one place for a long time, it is not good for their physical condition. Actually this year it did not snow during that period. But we had to make that decision as we cannot foresee the weather. Ideally we wish to have a shelter at each of the three seasonal camps (spring/summer, fall and winter), especially at the winter camp, which we wish, dare we suggest it, the benevolent state would fund. Alternatively, if we did not have one at all, then the goats would not be spoiled in the first place.

Therefore, for those households, such as those in the central site, that do not migrate seasonally or migrate only once in spring, livestock shelters function as new facilities that help them mitigate the effects of adverse weather conditions on livestock. For these households, the practice of covering weak livestock blankets has been replaced by this new practice of keeping weak livestock in shelters at night. The positive aspects of this change include saving labor power, increased number of livestock that can be protected from cold stress and its efficacy. However, keeping livestock in shelters makes livestock less adaptable to severe weather conditions. How this will affect the physical condition of livestock (hence their adaptation to the environment) in the long run remains to be seen as it has not been long since the adoption of livestock shelters in Nagchu. But in the short run, this makes those households that migrate seasonally (as those in the western site) more vulnerable to snowstorms once they move to seasonal camps where they do not have livestock shelters. Consequently, they have to let those weak livestock remain at the settlement where they have the shelters until the warm season. Therefore, livestock shelters have become a technology of governmentality (Foucault, 1995; Li, 2007; Agrawal, 2005) in the sense that it is the government that has introduced them to pastoralists and now pastoralists have no option but to desire to reduce livestock migration and

depend on livestock shelters, thus helping the government to fulfill its goals of transforming the traditional production system.

Nevertheless, pastoralists perceive that it is not desirable to completely abandon the traditional production system, for example, to raise livestock in pens with fodder without letting them graze on range forage. Pen-feeding (or partial pen-feeding) has been one of the goals of transformation of China's extensive rangeland grazing system into an intensive production system.¹³¹ The Opinion issued by the State Council (see more in Section 2) in September 2002 first advocates pen-feeding in areas of grazing bans (*jinmu*), grazing restrictions (*xiumu*) and rotational grazing (*lunmu*) by suggesting it will be subsidized by the state in the form of grain and cash. Subsequently, the Grassland Law of 2002 states (Article 35), "the state advocates pen-feeding in agricultural areas, semi-agricultural areas and pastoral areas where conditions are met to gradually change the production system that relies on grazing on range forage." Afterwards, directives on rangeland management issued by the Ministry of Agriculture and the latest suggestions on pastoral development by the State Council¹³² reiterate that pen-feeding (or partial pen-feeding) is a scientific pastoral production system that helps to reduce grazing pressure and protect rangeland from being overgrazed.¹³³ Therefore, policymakers intend to achieve dual goals of promoting economic efficiency and protecting rangeland environment through pen-feeding (or partial pen feeding). Nonetheless, officials from the Ministry of Agriculture down to the county Bureau of Agriculture and Animal Husbandry comprehend that under current

¹³¹ *shesi juanyang* in Chinese

¹³² 'Suggestions regarding Promoting "Good and Fast" Development in Pastoral Areas' (*guanyu cujin muqu youhao youkuai fazhan de ruogan yijian*). State Council, 1 June 2011.

¹³³ These directives include 'Regulation on Maintenance of Forage and Livestock Balance' (*caoxu pingheng guanli banfa*). Ministry of Agriculture, 19 January 2005; 'National Comprehensive Plan for Grassland Protection, Construction and Utilization' (*quanguo caoyuan baohu jianshe liyong zongti guihua*). Ministry of Agriculture, 4 April 2007; 'Notice regarding Accelerating Implementation of the RHRS' (*guanyu jiakuai tuijin caoyuan jiating chengbaozhi de tongzhi*). Ministry of Agriculture, 19 March 2007; 'Suggestions regarding Further Strengthening Rangeland Work' (*guanyu jinyibu jiaqiang caoyuan gongzuo de yijian*). Ministry of Agriculture, 26 November 2010.

conditions it is impossible to adopt pen feeding in pastoral areas on the Tibetan Plateau given a lack of fodder. But they think partial pen-feeding (a hybrid of pen feeding and grazing on rangeland) should be attempted to gradually transform the traditional production system.

Pastoralists also see feeding livestock in pens as infeasible. But their primary concern is not a lack of fodder but rather livestock wellbeing.¹³⁴ Virtually all the interviewed pastoralists across the region expressed concern over and reached a consensus on the mental well-being of livestock. They are concerned that livestock would be unhappy even if they are physically satisfied if they have to be raised in pens with fodder. Asked his opinions on pen-raising, an old pastoralist responded:

From people's perspective, it looks like livestock would be better off living in pens with fodder without having to suffer cold in the mountains. But from the livestock's perspective, they are happier to graze and play around on rangeland. If we people have to stay inside all the time, we would fall sick even if we have lots of food to eat and are physically healthy because we cannot go out. I believe the same is true with livestock. If livestock have to stay in pens all the time, it would be just like keeping them in prison. Plus, livestock do not like eating sown fodder as much as natural grass.

Another pastoralist gave a similar response to the same question:

If we do not let the livestock go to graze on rangeland but keep them in the pen all the time, they would not survive and all would die. Feeding them food supplements would not make them satisfied (mos in Tibetan). Even if they are physically full, they would gradually die of unhappiness as they cannot move around. For example, today, when fenced pastures are open, they rush into them. But around ten days later, they come to the gates of the fences and sit on the ground rather than go to graze even if there is plenty of grass inside the fences, showing they are unhappy because they cannot move around to graze. Once the gates are open, they then go to graze deep in the valley and do not want to come back home in the evening, making it difficult for us to drive them back home those days.

Therefore, for the government and a Western scientific perspective livestock are just animals that provide milk and meat for people, thus, the purpose of intensive pastoralism is to promote

¹³⁴ Only a few pastoralists' first response was that they would not have sufficient fodder to feed the livestock. These pastoralists also expressed their worry about the mental well-being of livestock if they have to be raised in pens as the conversations went on.

livestock production by taking care of the physical well-being of livestock. But for Tibetan pastoralists, livestock are not just animals, but they are sentient beings who have the same feelings as people, thus they are not only concerned with the physical well-being of livestock but also with the mental well-being of livestock. They believe that pen-raising would leave livestock mentally worse off as their mobility (hence their freedom) is restricted, which would ultimately leave them physically worse off. Then asked if the livestock would adapt themselves to the new system, this same pastoralist continued:

They all would die before they are used to the new life in pens. For example, they are still not used to staying inside fences for a long time although we have been using fences over ten years. They like to be inside the fences only during snowstorms when grass is covered with snow elsewhere.

Most pastoralists doubt livestock would be able to adapt themselves to pen-raising even if they are raised in such a way since their birth. A few perceive that they would. This remains an open question for the time being.¹³⁵ Moreover, more than half the interviewed pastoralists think that pen-raising is hard labor for people compared to herding livestock on rangeland. As a pastoralist explained:

Herding the livestock on rangeland is easier-they would just graze on their own. If we have to raise the livestock in the pen, there would be more hard work to do-grow and harvest grass, and then feed the livestock the grass and water the livestock. Plus, we would be more anxious for the livestock-whether the livestock are well fed and watered. If the livestock are unhappy because of not being let go to graze on rangeland, then we would never be happy.

¹³⁵ The head of the Prefecture Grassland Station told me that an experimental yak fattening program sponsored by the government in a village near the central county town that attempted to fatten yaks through pen-raising failed due to poor management by the local pastoralists. When I interviewed a pastoralist in the central site on his opinions on pen-raising, he mentioned this failed yak fattening program as an example of why he does not think pen-raising would be feasible. He saw the yaks there were weaker and smaller. Cases of pen-raising in Inner Mongolia show that it is infeasible for three main reasons having to do with the fundamental characteristics of pastoralism. First, livestock cannot obtain a wide variety of nutrients from feed as they do from range forage given that feed is not as diverse as range forage (Zhang, 2003). This affects the physical condition of livestock. Second, as pastoralists in Nagchu worry, pen-raising consumes more labor, which increases the overall costs of pen-raising (Li and Zhang, 2009). Third, pastoralists in Inner Mongolia observed that it is very hard to keep livestock in pens when the livestock smell fresh forage in spring (Li and Zhang, 2009).

5. *Livestock as A Symbol of Wealth?*

In addition to the Tragedy of the Commons model and modernization paradigms, another important conventional view deeply rooted in Chinese policy on pastoralism is the Cattle Complex theory. Policy advisors and policymakers in China believe that pastoralists value herd sizes as a symbol of wealth, making them unwilling to reduce herd size, leading to overstocking and overgrazing. For example, when they proposed to the central government that a CES program should be initiated in the TAR, policy advisors from the Committee for Population, Resources and Environment (CPRE) under the Chinese People's Political Consultative Conference (CPPCC) national committee suggested that the government should make efforts to change what they consider pastoralists' rationale behind overgrazing:¹³⁶

[The government] should try hard to change these concepts [and practices] in traditional pastoralism: judging wealth by livestock numbers, perceiving rangeland as free resources, using [rangeland] without a limit, and the unwillingness to slaughter or sell [livestock]...

Local officials also believe in the Cattle Complex theory. Two deputy heads of the county BAAH in the west responded when asked about their policy on livestock off-take rates:

We have been encouraging pastoralists to increase off-take rates in order to reduce grazing pressure on rangeland, to increase their income and to reduce livestock loss during

¹³⁶ The CPPCC national committee is a national level advisory entity consisting of members from various political parties and organizations, as well as independent members, but largely controlled by CPC. The Committee for Population, Resources and Environment is one of CPPCC's nine special committees and its members include leading cadres and specialists in population, resources and environment. Its major responsibilities include giving advice to the CPC and the State Council in the fields of population, resources, environment and sustainable development. 'Research report on establishment of long-term rangeland ecological protection compensation mechanism in the TAR' (*guanyu jianli xizang caoyuan shengtai buchang changxiao jizhi de diaoyan baogao*) in 'Proposals on Sustainable Development-2007' (*2007 keshixu fazhan jianyanji*). Committee for Population, Resources and Environment, CPPCC national committee, January 2008. CPPCC national committee's proposal 'Plan for *tuimu huancao* in the TAR' (*xizang zizhiqiu tianran caodi tuimu huancao guihua*) along with 'Research Report on Rangeland Protection and Improvement in the TAR' (*guanyu xizang zizhiqiu caochang baohu yu jianshe de diaoyan baogao*) to the CPC and the State Council in 2003 helped to have the TAR included as a target region of *tuimu huancao* since 2004. 'Work Report of the Standing Committee of the Eighth CPPCC Regional Committee of the TAR' (*zhengxie dibajie xizang zizhiqiu changwu weiyuanhui gongzuo baogao*). CPPCC Regional Committee of the TAR, 2003. http://www.chinatibetnews.com/zhuanti/2004-06/02/content_25998.htm

snowstorms.¹³⁷ But some of them including former township officials and village heads never listen to us due to their backward way of thinking. They think the more livestock they have, the richer they are. This is a big mistake in the long run because when severe snowstorms hit, they would lose most of their livestock and become very poor overnight.

However, pastoralists find it desirable to have larger numbers of livestock, for three overlapping reasons that are different than those posited by the cattle complex theory. First, herd sizes do not reflect the actual livestock that pastoralists can use immediately. Biologically, yaks and sheep/goats in Nagchu first give birth at the age of three and two respectively.¹³⁸ Culturally, pastoralists regard slaughtering livestock or selling them to butchers at a younger age than the locally accepted one as a demerit (Gaerrang, 2012). The typical slaughter age of yaks and sheep (and goats) starts at seven and five respectively. Poor households tend to slaughter or sell livestock to butchers at a younger age out of economic pressure, but they still refrain themselves from slaughtering or selling yaks and sheep to butchers under the age of four and three respectively.¹³⁹ Economically, pastoralists receive lower revenue due to size and weight, and a lower price if they sell younger livestock.¹⁴⁰ Therefore, they prefer to wait to sell their livestock in order to obtain higher revenue. Thus, it takes time for livestock to yield benefits (a time lag between livestock birth and actual production) owing to all these biological, cultural and economic factors. In addition, religiously, pastoralists set a few livestock free, letting them live

¹³⁷ In 2008 the prefectural government launched an off-take compensation policy in which the government pays (20 yuan per SEU) those households whose annual off-take rates exceed the official off-take rates. The officially reported livestock off-take rate for the prefecture as a whole is 30%, which is higher than the real rate according to an official at the prefectural BAAH, who asked me not to report the fact that the real off-take rate has been lower than 30% because a higher off-take rate is desirable for the government. ‘A Strong Momentum of Economic and Social Development in Nagchu Prefecture’ (*naqu diqu jingji shehui fazhan shitou qiangjing*). Xiong Yuhua, 26 June 2011. http://www.chinatibetnews.com/caijing/2011-06/26/content_729087.htm;

¹³⁸ In some unusual cases, some yaks give birth to their first calf at the age of two and some give birth for several consecutive years (rather than every other year as is usually the case) thanks to the quality and adequacy of forage.

¹³⁹ Given Tibetans in Nagchu, particularly urban Tibetans prefer not to eat goat meat, goats are rarely sold to butchers.

¹⁴⁰ This is due to the meat without much fat, which is Tibetan’s criterion for measuring how good meat is.

until they die naturally (Holler, 2002; Thargyal and Huber 2007).¹⁴¹ Hence, not all livestock are necessarily available for production.

Second, raising more livestock is a long-term strategy of pastoralists for ensuring livelihood security and flexibility, i.e. insurance against uncertainties (Hesse and MacGregor, 2006). Vaba who has the most yaks (156) and sheep (330) in the central research village responded when asked whether a large herd is a symbol of wealth:

If people say keeping more livestock is a symbol of wealth, then can we say saving their salaries by government workers is a symbol of wealth? I am afraid they will not agree because they save their salaries for future use, such as buying houses, etc. The same is true with us. We pastoralists need livestock, which are like our salaries, to secure our livelihood for both present and future. The difference between government workers and we pastoralists is they need not worry much about their present because their income is stable thanks to salaries. But we pastoralists' income from livestock is unstable due to many unpredictable factors, such as bad years or snowstorms, which will kill many livestock. This is one reason why we need to keep more livestock.

As Vaba mentioned, periodic snowstorms cause a large number of livestock deaths and threatens pastoralists' livelihood.¹⁴² Pastoralists in Nagchu adopt three strategies for coping with snowstorms, which cover vegetation and cause vegetation shortages, causing livestock to die from starvation. In order to mitigate this effect of snowstorms, pastoralists attempt to move livestock to another location and feed weak livestock food supplements. Third, livestock also die

¹⁴¹This practice (ritual) is called *tshe thar* in Tibetan, meaning life liberation.

¹⁴² For example, the livestock death rate was 14% for the prefecture, 40% for the research county and 44% for the two research villages together in the east in snowstorms in the winter of 1989/90, and 12% for the prefecture, 40% for the central research county and 34% for the research village in the central site in snowstorms in the winter of 1997/8. My host family Jekzi in the east lost 124 yaks out of 140 in the harsh snowstorms in the winter of 1989/90. 'A Collection of Data on Fight against Three Snowstorms in the 1990s' (*naqu diqu jiushi niandai sancu kang xuezhai douzheng ziliao huibian*). Office of CPC Committee of Nagchu Prefecture, TAR, December 2000. ; household interviews.

from severe cold after a sharp drop in temperature after snowstorms. In order to mitigate this effect, pastoralists cover weak livestock with blankets to protect them from cold.

Nonetheless, when devastating snowstorms hit, the effects of these coping strategies are very limited. Livestock census data for the three research counties show in devastating snowstorms livestock mortality rates can be independent of the density of livestock (see Chapter 3), which is consistent with earlier research in western TAR by Goldstein et al (1990). This ultimately leaves Tibetan pastoralism as an industry of uncertainty (see Scoones, 1995) and makes it not desirable for pastoralists to raise a small herd. Under such circumstances, raising more livestock is the best strategy that pastoralists can come up with in the long run to restock and recover after natural hazards (snowstorms and to a lesser extent, droughts) and disease outbreak, which are unpredictable (Goldstein et al., 1990). In destructive snowstorms they are more concerned with how many livestock survive than how many die, as a pastoralist in the east explained:

It is true that if I have fewer livestock, I can better take care of them in minor snowstorms, so they may survive-so fewer livestock, fewer deaths in minor snowstorms. But I cannot guarantee they would survive big snowstorms. Plus, livestock do not just need snowstorms to kill them. They may die for other reasons at any point beyond my control, for example, diseases. That is to say if I just raise a few livestock, I risk losing my livelihood at any time. It is also equally true that if I have more livestock, I may lose more in snowstorms. But at the same time, some will survive, so more livestock, more deaths [meaning a larger economic loss], but still some left-this helps me to secure my livelihood.

Third, pastoralists desire to improve their standard of living by raising more livestock after ensuring livelihood security and basic subsistence. Vaba explained another rationale for raising many livestock:

As people in other societies, we also want to improve our life. But unlike government workers who live on salaries, or people in the east who live on bu (caterpillar fungus), we pastoralists here have to entirely rely on livestock, which I said are like our salaries. So we need more livestock to get all the money to realize our goals. Of course, for those poor families with

only a few livestock, their immediate purposes are to escape from hunger and cold and to secure their livelihood.

Vaba's remark on livestock as a source of improvement in the standard of living is supported by my field observations in the three sites, particularly in the central and western sites.¹⁴³ Compared to pastoralists who can barely secure their basic subsistence from their small herds, pastoralists with large herds enjoy a higher standard of living (for example, more meat and milk to consume, larger and nicer houses to live in, more able to afford healthcare, pilgrimages and children's higher education, etc). Among the surveyed households in the three sites, households with larger herds slaughtered more livestock either for home consumption or for sale during the annual winter slaughter in 2009 as Goldstein and Beall (1990, p. 97) observed in Pala in the mid 1980s.¹⁴⁴ Therefore, the income and the standard of living of pastoralists who do not have access to off-range income (such as caterpillar fungus) correlate highly with their herd sizes (cf. Bauer, 2004, p. 33). This shows that a statement by policy advisors from CPPCC national committee that "the only way for pastoralists (in northern western TAR) to improve their economic conditions is to increase livestock numbers" in their above-mentioned proposal is an accurate observation.¹⁴⁵

¹⁴³ In the eastern site, income from harvesting and selling caterpillar fungus as the most important source of cash income has contributed significantly to the improvement in the standard of living of pastoralists over the past decade.

¹⁴⁴ In a year pastoralists do not slaughter livestock until late summer and fall (usually August and September). The annual winter slaughter (usually in November and December) is the time when most slaughtering takes place. Buddhist pastoralists (those in the central and western sites) finish the slaughtering by the 25th day of the tenth month, the day when Tsonkhapa, the founder of *dge-lugs-pa* sect of Tibetan Buddhism passed away. In recent years pastoralists in eastern Nagchu tend not to slaughter many livestock for sale thanks to income from harvesting and selling caterpillar fungus. But those households with more livestock still slaughter more for home consumption.

¹⁴⁵ 'Research report on establishment of long-term rangeland ecological protection compensation mechanism in the TAR' (*guanyu jianli xizang caoyuan shengtai buchang changxiao jizhi de diaoyan baogao*) in 'Proposals on Sustainable Development-2007' (*2007 keshixu fazhan jianyanji*). Committee for Population, Resources and Environment, CPPCC national committee, January 2008.

Hence, these three factors (the difference between herd sizes and actual livestock available for production, subsistence and livelihood security and flexibility, and livestock as a source of improvement in the standard of living) explain why pastoralists appear to raise more livestock than they currently need. Specifically, the first and second factors apply to all households while the third one applies more to rich and medium households given that poor households merely own small herds that barely meet their subsistence needs. This shows that when they point out that pastoralists are unwilling to slaughter or sell their livestock (Ch: *xisha xishou*), policy advisors and policymakers (including local officials) fail to see the underlying rationales behind it. Policy advisor and policymakers may argue that the facts that pastoralists are unwilling to slaughter or sell younger livestock and set a few livestock free for religious purposes still make their observation of “*xisha xishou*” valid. This is an issue of whether pastoralists need to adapt their religious cultural rights and practices to a new mode of production introduced by the government, a discussion of which is beyond the scope of this dissertation (but see Gaerrang, 2012).

In practice labor power, rangeland and economic status are three primary overlapping factors constraining pastoralists from raising more livestock. Tibetan pastoralism is a labor-intensive production system. There is a consensus among the pastoralists that for livestock, good care and management is as important as forage. As an old pastoralist explained:

*In our concept, we think we are the servants of livestock rather than the owners of them. That is why we say we serve the livestock (zog **gyog** rgyag) rather than manage them (zog **bdag po** rgyag). A good pastoralist should be one who gets up when the livestock get up and sleeps when the livestock sleep... Many livestock died during the commune because people did not care for them...*

Therefore, pastoralists understand that without being able to take good care of livestock due to a shortage of labor power, it is senseless to raise more livestock than they can handle even

though it is desirable. For example, Dongtse is a poor pastoralist with merely twenty-eight yaks without any other sources of income in the central research village. He did not think he could handle more livestock even though he wanted to. When asked whether he wanted to have more livestock, he stated:

To be honest, with only 28 yaks we cannot enjoy a decent life. So on the one hand, we really wish we had more livestock, especially sheep, so we can have milk in spring and meat in fall.¹⁴⁶ But on the other hand, I am afraid if we really do, our life may not necessarily be improved because the livestock would either get very weak, or lost, or killed by wolves (in the case of sheep) without good care, which we will not be able to provide due to a lack of people (only himself and his wife). This actually happened three years ago when all our three children had left for school. In the end, we had to sell all the sheep. So it is useless to have more livestock when we cannot manage them well. We have to be happy with these 28 yaks.

Another factor that constraints herd sizes is rangeland. Pastoralists think it is worthless to raise more livestock than their rangeland can handle. Satisfactory livestock output and productivity are their criteria for determining whether their rangeland can handle a certain number of livestock (see more in Chapter 3).

In addition to labor power and rangeland, economic status plays a role in determining individual households' herd sizes in several ways. First, annual herd reduction varies from household to household due to different economic status. For example, rich households with more livestock may kill or sell more livestock without cutting into their herd sizes for further improvement in the standard of living while on the other hand poor households may have to kill or sell some livestock for basic subsistence even if it means reducing their herd sizes. Second,

¹⁴⁶ As yaks give birth later than sheep and goats, those households with only yaks do not have access to milk in spring. As it is warm in late summer and fall (Tibetan pastoralists do not slaughter livestock until late summer and fall), pastoralists find it less desirable to slaughter yaks than sheep because it takes a longer time to consume a whole yak than sheep, during which the meat may decay. Thus, pastoralists with only yaks do not have access to meat as easily as those with sheep (Thargyal and Huber, 2007). Thargyal and Huber (2007) also suggested that the reason for slaughtering sheep in summer is because it may take less time for sheep to put on weight than yaks, and because sheep are not raised for any other purposes such as pack animals.

some rich households hire labor power to combat labor shortage.¹⁴⁷ Third, under the user fee policy under the RHRS, some pastoralists decide not to raise more livestock than they can afford to pay user charges for (see Section 2). Thus, pastoralists' maximum number of livestock is a function of labor power, rangeland and economic status.

In sum, policy advisors, policymakers and officials deem that pastoralists consider herd sizes as a symbol of wealth, causing overstocking and overgrazing. Nonetheless, pastoralists desire a larger herd size for three overlapping reasons that do not follow the logic of the Cattle Complex theory: the difference between herd sizes and actual livestock available for production, subsistence and livelihood security and flexibility, and livestock as a source of improvement in the standard of living. In practice labor power, rangeland and economic status are three primary overlapping factors constraining pastoralists from raising more livestock.

Conclusion

Reviews and analysis of rangeland access, management and use, and pastoral development efforts over time show that transformation and modernization of traditional pastoralism is China's ultimate goal of pastoral development. As for rangeland resources, until the privatization of rangeland use rights under the RHRS (in the TAR starting from mid 1995 and widespread implementation since 2005), they had been utilized more or less as before though administrative boundaries have been increasingly strictly enforced. Privatization of rangeland use rights has been initiated to better protect and manage rangeland resources based on a tragedy of the commons assumption and to serve as a basis for turning traditional pastoralism into an "environmentally-friendly" and efficient production system. In the TAR, commodification of rangeland use rights through transfer among households is added as a third

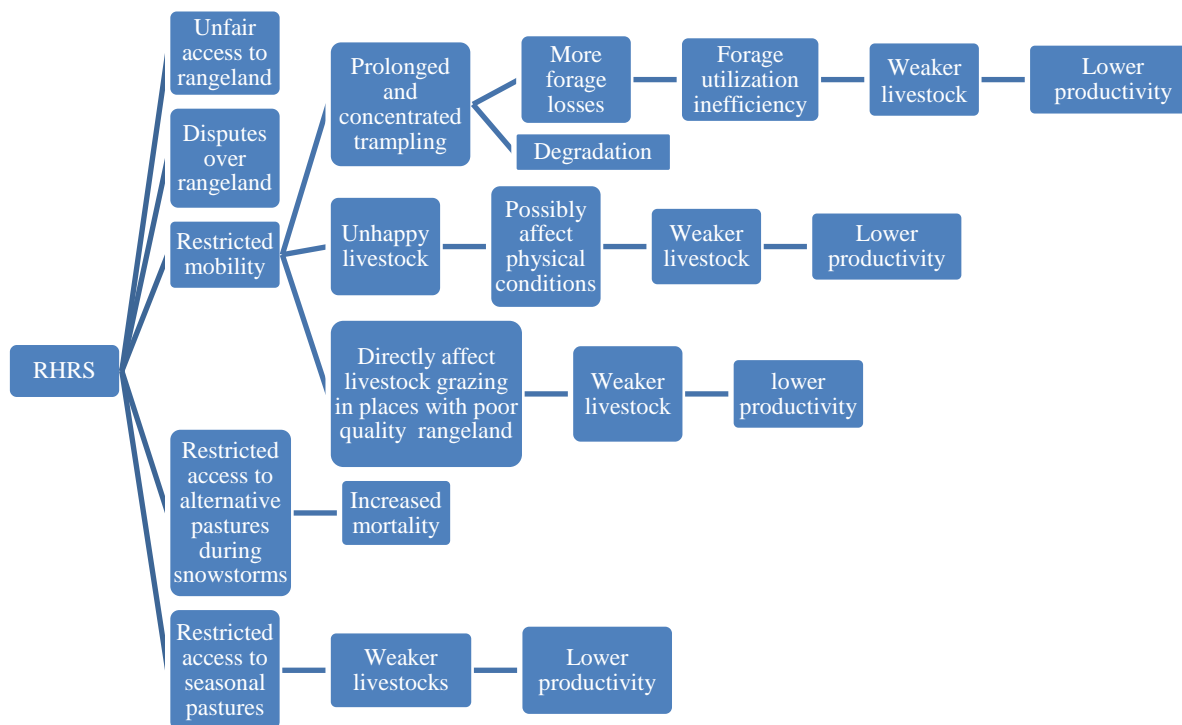
¹⁴⁷ For example, the third daughter of my host family in the western site is hired each year for several months for two sheep a month by her sister's family living in a neighboring village.

rationale for rangeland use rights privatization. However, inconsistencies among laws and policy directions with respect to the basic unit (households or collectives) of rangeland use rights allocation and ambiguities with respect to how the grazing land should be used (privately or collectively) after the privatization of its use rights have created a situation in which grazing land is not necessarily used privately, even though the law is grounded in the tragedy of the commons.

It has turned out that as an economic solution, rangeland use rights privatization can only address an economic issue in rangeland management accordingly. It has led to the formation of a compensation mechanism in which households with fewer livestock receive compensation, i.e. user fees, from those with more, which is viewed as positive pro-poor policy outcomes both by local officials and pastoralists. User fees may discourage pastoralists to raise many livestock, helping control livestock numbers, which is an underlying goal of the RHRS. However, the RHRS has turned out not to be a pastoralism-friendly policy because it neglects livestock, which, as a result, has become the source of all the negative socioeconomic and ecological consequences resulting from the RHRS as Diagram-1 shows. Socioeconomically, unfair access to and disputes over rangeland deteriorate social relations, and traditional values and norms (of sharing, reciprocity and assistance). The fundamental reasons why unfair access to and disputes over rangeland occur is that pastoralists want to have more forage for their livestock. Thus, they are for and over livestock grazing. Furthermore, restricted livestock mobility and access to seasonal pastures can ultimately lead to weaker livestock, and hence lower productivity. Moreover, the RHRS may discourage pastoralists from searching for alternative pastures in the absence of government coordination during snowstorms, thus restricting their access to usable pastures and increasing livestock mortality. Ecologically, restricted livestock mobility can cause

localized rangeland degradation through constant trampling in addition to more trampling losses of forage (see Chapter 3)

Diagram 1 Negative socioeconomic and ecological consequences of RHRS



As for pastoral development efforts, the case of failed concentrated settlement of pastoralists and pastoralists' enthusiasm for new houses at the existing homes and livestock shelters in Nagchu show that in order for development interventions into pastoralism to be appropriate and feasible, they need to benefit all three components of pastoralism-people, livestock and rangeland. Stated rationales for sedentarization of pastoralists include transformation of traditional pastoralism, enhancement of natural hazard coping capacity, and provision of infrastructural facilities and services. However, even though improvement in living conditions and better access to social services are tempting, rationally pastoralists are not interested in any interventions that make livestock grazing more difficult. Concentrated

settlement is such an intervention.¹⁴⁸ By contrast, new houses at the existing home bases and livestock shelters do not directly affect livestock grazing, while at the same time they allow pastoralists to enjoy improved living conditions and better care for livestock. Thus, pastoralists welcome such interventions. Nonetheless, such interventions indirectly reduce mobility as improved living conditions make pastoralists less able to endure hardships associated with life during transhumance and livestock shelters make livestock less adaptable to severe weather conditions once they leave them. Nevertheless, pastoralists are willing to accept such change because such interventions have configured their desires to improve their living conditions and better look after livestock. Such aspirations are consistent with the ultimate goal of the government of transforming traditional pastoralism and pastoralists. Thus, such interventions function as a technology of governmentality.

Therefore, being unable to address the integrated nature of pastoralism consisting of people, livestock and rangeland is the fundamental reason why the RHRS and pastoral development efforts do not work as policymakers intend and lead to negative consequences. Policymakers do not appreciate pastoralism from the standpoint of pastoralists (for example, why pastoralists graze livestock the way they do, why pastoralists make the decisions that they do, how livestock graze, how vegetation functions, etc). They simply single out rangeland (for rangeland protection) and people (for productivity promotion and improved living conditions) as targets but neglect the livestock part. Instead, they have primarily focused on providing technical analyses and solutions to rangeland management and pastoral development through the “rules of experts” assumption that pastoralists should receive technical advice from “experts,” but have

¹⁴⁸ It should be noted that concentrated settlements in the form of so-called ecological migration (*shengtai yimin*) are ongoing programs in some other pastoral areas on the Tibetan Plateau, for example, in the Three River Region in Qinghai (Human Rights Watch, 2007, Ptackova, 2011)

nothing to offer underlies Chinese policy. Nonetheless, cases from Nagchu also show that pastoralism is a complex system involving cultural and moral dimensions that cannot be simply explained and addressed by economic theories, modernization paradigms and “received wisdom” on pastoralism, principles of which are not always appropriate to issues in pastoralism. For example, Tibetan pastoralists’ decisions about herd size in fact do not follow the logic of the Cattle Complex theory (Bodley, 2011). The case of the western site shows communal use of grazing land is a more efficient use of patchy rangeland resources. This suggests that the free market economic ideology that holds that privatization inevitably brings greater efficiency does not apply to rangeland and livestock management. It also demonstrates that community-based rangeland use is a more efficient use of patchy rangeland resources, suggesting that what decides total supply of rangeland largely depends on how the rangeland is managed and with what goal, rather than on the simple total area of rangeland as is assumed in standard calculation of carrying capacity.

Politically, underlying reasons why policymakers fail to consider the integrity of pastoralism as pastoralists do are the unequal power relationships and political representation between the political dominance of a majority nationality (Chinese), and the political subordination of minority nationalities (Williams, 2002) and the undemocratic nature of top-down development, in which alternative knowledge and wishes are not considered and respected. In Chinese-dominant China, Chinese farming culture is the dominant culture and ethnic minorities are culturally and politically marginalized. Consequently, the sophisticated pastoral culture and wisdom of ethnic minorities (Mongols, Tibetans and Kazakhs) that engage in pastoralism is not well represented and appreciated in policymaking.

Chapter 3

An Ecological Approach and Solution: Scientific “Truth” of Degradation

According to statistics by the Grassland Monitoring and Supervision Center (GMSC) under the Ministry of Agriculture, at present 90% of our country’s rangeland has been degraded to various extents...Ma Youxiang [the director of the GMSC] thinks that overgrazing is the direct cause of rangeland degradation and ecosystem deterioration and that [we] must take action to reduce the extra livestock to gradually reach forage and livestock balance...

This is an excerpt from an official news report in 2011 on the condition of China’s rangeland.¹⁴⁹

Similarly, in a proposal in 2011 for rangeland protection, the regional Department of Agriculture and Animal Husbandry in the TAR (DAAH) stated:¹⁵⁰

In the TAR, the overall deterioration of rangeland ecosystems has not yet been reversed and the overall low productivity of rangeland has not yet been changed. First, the rangeland is severely degraded with degraded area of 40 million ha...Second, the rangeland is severely overstocked with an overstocking rate of over 39%...

These statements clearly suggest that there exists widespread rangeland degradation in China and in the TAR and that overgrazing is the principal cause of it. Yet, pastoralists in Nagchu contest both the magnitude and causes of rangeland as reported by the government. This chapter examines and explores this contrast between official reports on rangeland degradation and pastoralists’ observations of it.

1. Equilibrium Assumptions and Carrying Capacity

In China, policymakers deem that all its rangelands are equilibrium systems in spite of their diversity. Hence, rangeland management policies are based on equilibrium assumptions with livestock density being regarded as the most important factor affecting rangeland health (Ho,

¹⁴⁹ ‘Severe Overstocking and Overgrazing and Deteriorated Eco-environment in the Pastoral area in Our Country’ (*woguo muqu caoyuan guozai guomu yanzhong shengtai huanjing ehua*). Xinhua News Agency, 11 July 2011. http://www.gov.cn/jrzq/2011-07/11/content_1903875.htm

¹⁵⁰ ‘A Brief Introduction to the Rangeland Protection Project in the TAR’ (*xizang zizhiqu tianran caodi baohu gongcheng guihua jianjie*). Department of Agriculture and Animal Husbandry of the TAR, 2011

2001). A concept of forage and livestock balance (*caoxu pingheng*) has been adopted in rangeland management to protect rangeland since the early 1980s. For example, a 1983 official article stated (Shishan, et al., 1983, p. 855):

In pastoralism no efforts are made to construct pastures and the quantitative relationship between forage (availability) and livestock (population) is ignored. All efforts are directed towards promotion of livestock numbers. This disturbs balance between forage and livestock, destroys the ecological balance and leads to overgrazing...

Thus, although these words do not explicitly posit that China's rangelands are equilibrium ecosystems, the assumption is clearly made that they are. The concept was officially included in China's first Grassland Law of 1985. It stated that rangeland users should prevent overgrazing, which leads to rangeland desertification, degradation, soil erosion (Article 12). Afterwards, the Opinion issued by the State Council in September 2002 advocates the concept literally for the first time by stating that:

The amount of available forage within a certain period of time within the area should determine the number of livestock that should be raised, achieving forage and livestock balance...government at various levels should...encourage pastoralists to control livestock numbers and gradually resolve the problem of overgrazing, and achieve a dynamic equilibrium between forage and livestock.

Shortly afterwards, the Grassland Law of 2002 reiterates the importance of forage and livestock balance in terms of utilization (Article 33), protection (Article 45), and responsibility (Article 73). In 2005, the Ministry of Agriculture specially issued Regulations on Maintenance of Forage and Livestock Balance (*caoxu pingheng guanli banfa*) "in order to protect, construct and rationally utilize rangeland, safeguard and improve the ecological environment, promote sustainable pastoral development."¹⁵¹ Directives on rangeland management issued afterwards by

¹⁵¹ The Regulations state that carrying capacity should be updated every five years (Article 10). But in practice, this is not always the case. For example, the RHRS carrying capacity in the western and central research counties determined in the early to mid 2000s was left unchanged on paper until the implementation of the destocking policy in 2009. It is reasonable to surmise that if not for the implementation of the destocking policy, it might still remain unchanged.

the Ministry of Agriculture restate that maintenance of forage and livestock balance is both a means and a goal of protecting rangeland.¹⁵² Given that the Grassland Law and these policy directives do not specify where the policy of maintenance of forage and livestock balance should apply, it is supposed to be applied to all rangelands across the country regardless of the diversity of the rangelands. Thus, the perception of equilibrium rangeland dynamics has been adopted beyond question as the only possible paradigm in range management in China. Accordingly, adjustment of stocking rate to carrying capacity is both a means and a goal of range management.

However, pastoralists' conceptualization and observations of rangeland and livestock interactions suggest that the concept of carrying capacity may be inappropriate to range ecosystems in Nagchu, both because pastoralists do not conceptualize their relationship with their herds and pastures through this concept, and because of the nature of the ecosystem dynamics there. The carrying capacity of rangeland is defined as the maximal number of livestock that the rangeland can support without degradation, as discussed in Chapter 1. It is generally discussed in relation to the condition of the rangeland, rather than to the condition of the livestock.

For Tibetan pastoralists, carrying capacity is not an indigenous concept. Thus, they do not have an indigenous term for carrying capacity. They use the literally translated term (*shong tshad*) only in the context of government policies, and not in other contexts. Instead, pastoralists conceptualize the “carrying capacity” of their rangeland through livestock productivity.

¹⁵² ‘Notice regarding Accelerating Implementation of the RHRS’ (*guanyu jiakuai tuijin caoyuan jiating chengbaozhi de tongzhi*). Ministry of Agriculture, 19 March 2007; ‘National Comprehensive Plan for Grassland Protection, Construction and Utilization’ (*quanguo caoyuan baohu jianshe liyong zongti guihua*). Ministry of Agriculture, 4 April 2007.

Moreover, they do not have or use a single term for this. This is illustrated by the response of pastoralist Nyama to the question of why he does not want more than what he states as his desirable number of livestock (70 yaks and 100 sheep); his response is typical of the understandings of pastoralists in all three sites regardless of economic status. Nyama is the head of the household of an average family in the central research village in terms of herd size (50 yaks, 60 sheep and ten goats), population (six people with five laborers) and off-range income (none):¹⁵³

If I keep more than this, there would not be enough forage. More would die in spring and become useless. That is to say it is useless to keep more than the grassland can support. Even if the livestock survive the spring, but if their meat is barely edible or the females do not produce much milk, then there is no point of keeping many livestock.¹⁵⁴ It would be just more work and more worries without more benefits. Of course, if the grassland is large, the more [livestock], the better if the family can manage them.

Here are two points that are noteworthy. First, he did not use *shong tshad*, the literally translated term for carrying capacity when Nyama expressed his sense of “carrying capacity.” Instead, he articulated it through forage availability and livestock conditions. Second, for Nyama, the effects of having more livestock than his rangeland can support is reduced livestock productivity, rather than degradation. That degradation is not a concern for Nyama reflects the fact that grazing to date has not caused any degradation, as I will discuss in Section 3. Thus, his indication of a desirable number of livestock is not the same as carrying capacity in terms of exceeding it leading to degradation. Rather, it is in terms of exceeding it leading to reduced livestock productivity, which in his observations does not lead to degradation. Similarly, Li and Zhang

¹⁵³ The mean livestock numbers of the 60 interviewed households in the central site are 49 yaks, 86 sheep and nine goats. The most yaks, sheep and goats a single household has are 156, 330 (the same household for yaks and sheep) and 30 respectively. The mean number of laborers is four.

¹⁵⁴ Fat is Tibetans’ criterion for measuring how good meat is.

(2009) found that pastoralists in Inner Mongolia use milk production as an indicator of whether their pastures can support their herds, rather than measures of grassland condition.

Furthermore, pastoralists' observations suggest that the rangeland ecosystems in Nagchu possess a mix of equilibrium and non-equilibrium characteristics with more disequilibrium features in the west, due to different rangeland types and different annual precipitation. This too reduces the relevance of carrying capacity, a concept that applies most readily in equilibrium systems. In terms of forage availability, pastoralists, particularly those in the west, observe that it varies noticeably from year to year primarily because of variation in precipitation in the early part of the growing season (May and June). The growing season in Nagchu is between May and September, starting later and ending earlier from the southeast to the northwest (Liu et al., 2002). When asked whether livestock conditions vary significantly from year to year, Puntar, the head of my host family in the west responded:

As what livestock need is forage, which in turn depends on the weather, the livestock will surely recover from winter-spring loss of weight and build up stores of fat if we get plenty of precipitation in the 4th and 5th month [usually May and June]. For example, we had the best livestock conditions last year [2009] over the past two decades thanks to good forage growth after the early rainfall and snowstorms during this period. Almost all adult female sheep and goats got pregnant. As a result, this year [2010] we have 92 baby sheep and 81 baby goats, the most since we got married. But the problem is, as the saying goes, "The weather does not always do as you wish; it does not always rain in the early summer", precipitation in these two crucial months tends to be very changeable and far too unpredictable.¹⁵⁵ When we experience a shortage of precipitation during this period, it certainly affects forage growth and livestock conditions. For example, sheep can be over ten rgyama [half kilogram] lighter in weight than in an average year...

Pastoralists' observation of noticeable variation in precipitation in the early part of the growing season (May to June) is consistent with meteorological data from the nearest meteorological

¹⁵⁵ *bsam tsad gnam gyis mi byid, dbyar stod char pa mi 'bab*

stations to the three research sites respectively.¹⁵⁶ Table 12 shows the precipitation coefficient of variation (CV) from the three nearest meteorological stations. The annual precipitation CV and the precipitation CV of the latter part of the growing season (July to September) are below 33%, the threshold for determining whether equilibriums dynamics or non-equilibrium dynamics predominate. However, the precipitation CV of the early part of the growing season (May to June) is over 33% (near 33% in the case of the eastern site) with that of the western site being far over (53%) the threshold. It should be noticed that given that the western research site is located to the northwest of the meteorological station and that precipitation in the TAR decreases from the southeast to the northeast, its precipitation CV should be higher than that from the meteorological station.

Table 12 Precipitation coefficient of variation from the nearest meteorological stations¹⁵⁷

Location	Annual precipitation (mm)	Annual precipitation CV (%)	Growing season precipitation (May-June) CV (%)	Growing season precipitation (July-Sept) CV (%)
Bengun (western site)	317	23	53	24
Amdo (central site)	447	17	40	21
Sogzong (eastern site)	587	14	27	22

Furthermore, meteorological data show drought frequency is higher in the early summer (May-June) than during the prime summer months (July-August) in all three locations and increases from the east to the west as shown in Table 13.

¹⁵⁶ The western site is about 88 km northwest of Bengun; the central site is about 36 km southeast of Amdo; the eastern site is about 68 km northwest of Sogzong.

¹⁵⁷ Precipitation data are from Nagchu Prefectural Meteorological Station, TAR. Bengun (1957-2011), Amdo (1966-2011), Sogzong (1957-2011).

Table 13 Drought frequency (%) from the nearest meteorological stations¹⁵⁸

Location	Early summer (May-June)	Prime summer (July-August)
Bengun (western site)	37.8	17.8
Amdo (central site)	20.4	11.4
Sogzong (eastern site)	20.6	9.1

Therefore, both pastoralists' observation and meteorological data suggest that the carrying capacity of the rangeland in the three research sites, particularly that of the western site is subject to seasonal variability and may vary significantly from year to year because of significant variation in precipitation in the early summer. Similarly, research in arid rangeland in western Nepal bordering Tibet (Bauer, 2003) and in Inner Mongolia (Yang and Hou, 2005; Li and Zhang, 2009) suggest that there it may be infeasible to determine carrying capacity because forage productivity varies significantly due to changeable precipitation.

In addition, however, in all three sites density-dependent dynamics may play a role in livestock productivity from a historical perspective, suggesting some degree of equilibrium dynamics, and partial relevance of the carrying capacity concept. At the same time, density-independent mortality occurs under unfavorable weather conditions (Desta and Coppock, 2002). A few pastoralists reported weaker livestock and reduced productivity due to a constant increase in the ratio of population to land from a historical perspective. Those in the central site use the phrase "people and milking yak balance" (*bza' 'bri tho thug*) to describe the higher livestock productivity they heard of in the past, as an old pastoralist put it:

We heard of "bza' 'bri tho thug" in the past: if each family member had one milking yak, then they did not need to be worried about food because one yak could support one person. This must have been many generations ago because today milk from one yak is barely enough to feed one person...

¹⁵⁸ Liu et al, 2003

Thus, although stocking rates for the three research counties have merely fluctuated, rather than trending clearly in any direction, from 1980 to the present, as I will discuss in Section 3, an increase in stocking rate between today and prior to 1951 may show density-dependent interactions in determining herd productivity, and thus some degree of equilibrium dynamics.¹⁵⁹ On the other hand, pastoralists also report density-independent interactions under unfavorable weather conditions. When asked about forage and livestock interactions, a pastoralist in the central site responded:

It is true that if the land is small, but we want to have many livestock, we may end up not having enough forage to have robust livestock. But this does not necessarily mean if we have fewer livestock, we can guarantee good productivity because in bad years, in which forage does not grow well, many of them may not survive, let alone bring us good meat and milk.

This is especially true after destructive snowstorms. As discussed in Section 3 and in Chapter 2, between 1980 and 2009 the sharpest decreases in stocking rate in the three research counties occurred after devastating snowstorms, from which mortality rates were density-independent. Consequently, stocking rate was reduced to the lowest level after snowstorms. This contributes to reduced grazing pressure and gives rise to non-equilibrium dynamics (Goldstein et al, 1990; Miller, 1998; Kerven, 2004). This is similar to density-independent livestock mortality in prolonged droughts in sub-Saharan Africa and plays a similar role as rainfall variability and drought in African pastoralism (Homewood and Rodgers, 1987; Ellis and Swift, 1988; Oba, 2001). All these facts illustrate that range ecosystems in the three research sites in Nagchu may function as a hybrid of equilibrium and non-equilibrium dynamics with more disequilibrium characteristics in the west (Wiens, 1984, 1989; Ellis et al., 1993; Ellis, 1995; Oba et al., 2000;

¹⁵⁹ According to census data, the total number of livestock in the TAR increased from 9.55 million in 1951 to 23.21 million in 2010. National Bureau of Statistics of China.

Sullivan and Rohde, 2002). Hence, the concept of carrying capacity as understood based on premises of equilibrium dynamics are not very appropriate to range ecosystems in Nagchu.

In addition to the limited relevance of the concept of carrying capacity to range management in Nagchu, its application in practice is simply flawed even from the government's own perspective even though it claims the application of carrying capacity to range management is scientific (Ho, 2001; Sillitoe, 2010; Shelby and Heberlein 1984). This is illustrated by the determination of county RHRS carrying capacity. After implementation of the RHRS in the mid 2000s each county BAAH reported to the higher levels of government (prefectural and regional) its RHRS carrying capacity. It was an aggregate of the carrying capacity of each township reported by the township government. Similarly, the township carrying capacity was an aggregate of the carrying capacity of each administrative village reported by the village committee. Under the RHRS, each household was allotted a livestock quota based on its allocated rangeland and a carrying capacity of the rangeland estimated by the county BAAH. Accordingly, an aggregate of all household quotas in the county should be the county's RHRS carrying capacity. However, this has turned out not to be the case. For example, in the case of the western research county, the county's RHRS carrying capacity (1.47 million SEUs) reported to the higher levels of government was an underestimate of the aggregate of all household quotas in the county recorded in the rangeland certificates (1.98 million SEUs). This occurred for two overlapping reasons.

First, some villages reported a low carrying capacity to show how poor their rangeland was in order to receive more state aid such as fencing because pastoralists had been told by officials during the implementation of the RHRS that if the RHRS was implemented, they would receive more rangeland improvement programs as a way of convincing them to accept the RHRS

(see Chapter 2). Second, the way the RHRS carrying capacity was calculated is as follows. With the total area of rangeland provided by pastoralists the county BAAH estimated the carrying capacity of a selected standard rangeland type in the form of the amount of rangeland needed to support one SEU per year and its ratios to that of other rangeland types. Thus, first the areas of other rangeland types needed converting into that of the standard rangeland type. Then, the total carrying capacity of an administrative village should be the value of the sum of the area of the standard rangeland type and the converted areas of other rangeland types divided by the carrying capacity of the standard rangeland type.¹⁶⁰ But, some villages simply reported the value of the total area of rangeland divided by the carrying capacity of the standard rangeland without first converting the areas of the three higher productivity rangeland types into that of the standard rangeland due to a lack of understanding of the formula.

Furthermore, in some villages the total area of rangeland was underestimated during the implementation of the RHRS due to any or all of the following reasons even if they correctly reported the RHRS carrying capacity. First, when they measured the area of their rangeland by pacing and using ropes, they were not able to measure some steep mountain pastures. Second, some rocky mountain and poor sandy pastures where livestock graze for some time were excluded as wasteland from the total area of the rangeland partially because they thought it was not worth paying for this land when they heard a user fee policy would be adopted under RHHS (see Chapter 2). Third, they purposely underestimated the area of the rangeland, in order to maintain some collective land for the whole village. Thus, the county RHRS carrying capacity reported by the county BAAH was ultimately an aggregate of figures provided by pastoralists out

¹⁶⁰ For example, in the western county, the county BAAH estimated the carrying capacity of Tangtsa at 40 *mu* per SEU and its ratios to that of the other three rangeland types, Jakma, Bang, and Na at 1/4, 1/6 and 1/8 respectively. The carrying capacity ranged from 17 SEUs to 40 SEUs among the administrative villages because of different amounts of the four rangeland types. It should be noted that within an administrative village rangeland types are regarded the same though rangeland quality may differ among households.

of political-economic calculations. Similarly, the determination of carrying capacity under the destocking policy under the Compensation for Ecosystem Services program demonstrates that in practice it has more to do with political and economic factors than what carrying capacity is from a scientific perspective (see Chapter 6).

In sum, ecologically, China's range management policies are based on equilibrium paradigms and focus on adjusting stocking rates to carrying capacity. However, both pastoralists' conceptualization of rangeland and livestock relationships, and the nature of the ecosystems dynamics in Nagchu suggest the concept of carrying capacity may be inappropriate to rangeland ecosystems there. Pastoralists conceptualize "carrying capacity" as an indicator of whether their rangeland can support their herds in terms of livestock productivity rather than in terms of rangeland degradation, reflecting the fact that grazing to date has not led to any degradation. Density-dependent dynamics in herd productivity in all three sites from a historical perspective suggests equilibrium dynamics to some extent. On the other hand, significant variation in precipitation in the early part of the growing season and density-independent mortality under unfavorable weather conditions suggest some degree of non-equilibrium dynamics. All these suggest that range ecosystems in Nagchu encompass elements of both equilibrium and disequilibrium over time and in space. The determination of carrying capacity in practice illustrates that although the government claims the application of carrying capacity is a scientific approach to range management, it is in fact flawed and driven by political and economic factors.

2. Credibility of Official Reports on Pervasive Rangeland Degradation

Having examined the application of some received wisdom on the equilibrium ecosystem paradigm, the concept of carrying capacity, the Cattle Complex theory, and the Tragedy of the Commons in China's rangeland protection policies in Chapter 2, I will now discuss reports of

rangeland degradation by the government and pastoralists respectively. Twenty years ago in 1992, the United Nations Convention to Combat Desertification (UNCCD) defined land degradation in dryland systems, or desertification as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.” Some ecological indicators of desertification include reductions in vegetation productivity, cover and diversity; decreased soil organic matter content and fertility; increases in soil salinization and increased erosion (Klein et al, 2012). Although this definition of desertification by UNCCD has remained the most authoritative one among the more than 100 formal definitions (Geist, 2005, p. 2) there has been a lack of consensus about the definition of rangeland degradation because of continuing debates in range ecological theory and range management, a lack of basic long-term data and different definitions by different stakeholders with different objectives for rangelands (Niamir-Fuller, 2010). In addition, there is a lack of consensus on the magnitude and drivers of degradation as well as its possible solutions (Klein et al, 2012).

Here, rangeland degradation refers to the Chinese term *caoyuan tuihua* (literally meaning a movement backward in rangeland conditions), which is widely used in China in scientific reports, policy statements and news reports as a standard phrase, broadly meaning any negative changes in rangeland conditions. In the 1980s and today it was commonly reported that the percentage of degraded rangeland had been 15% and over 30% by the mid 1970s and by the mid 1980s respectively (He, 1989; Qiao, 1989; Zhang, 2009) though a large body of literature provided inconsistent figures. Of the three figures (total usable rangeland, amount and percentage of degraded rangeland), usually two were given in the literature, from which the third figure can be calculated. For example, a report by the Ministry of Agriculture in 1982 claimed

that 46.7 million hectares of rangeland had been degraded, accounting for 17.5% of the total usable rangeland. From these two figures, China's usable rangeland should be 266.7 million hectares.¹⁶¹ Table 14 shows these figures from selected literature in the 1980s on China's economy and environment that examines rangeland degradation as an important theme.

Table 14 Degradation figures in selected literature in the 1980s

Literature	Year	Total usable rangeland (million ha)	Degraded rangeland (million ha)	Percentage
An overview China's agricultural economy ¹⁶²	1982	266.7	46.7	17.5
A collection of papers on ethnic economy research ¹⁶³	1985	186.7	46.7	25
Rational organization of China's productivity (Tian and Lin, 1986)	1986	220	55	25
Typical surveys on society and economy in rural China -1985 ¹⁶⁴	1987	190.5	53.3	28
China's crises and thinking (Li, 1989)	1989	224.3	46.7	21
China on cols: problems, dilemmas and painful options (He, 1989)	1989	177.8	53.3	30

As the table shows, among these studies figures for total usable rangeland varied significantly, ranging from less than 190 million ha to over 260 million ha. The amount and percentage of degraded rangeland differed in some years, which is plausible due to rangeland resilience, while they were identical in some other years.¹⁶⁵ But they were different for the same year (1989) and varied considerably between consecutive years (for example, from 46.7 million ha in 1985 to 55 million ha in 1986). Moreover, the figures were identical in the early and late 1980s (46.7 million ha both in 1982 and 1989), which is worth questioning. All these inconsistent accounts in

¹⁶¹ Outline of China's agricultural economy (*zhongguo nongye jingji gaiyao*). 1982. p. 154. Ministry of Agriculture

¹⁶² *zhongguo nongye jingji gaiyao*. Policy Research Office, Ministry of Agriculture. Agricultural Publishing House.

¹⁶³ *Minzu jingji yanjiu lunwenji*. Minzu Publishing House.

¹⁶⁴ *zhongguo nongcun shehui jingji dianxing diaocha, 1985 nian*. Chinese Academy of Social Sciences Publishing House.

¹⁶⁵ Dailintai and Enhe (2006) found that loss of vegetation cover due to drought can recover after the drought ends. For example, three successive years (1999, 2000 and 2001) of drought made a pasture in Siziwang County in Inner Mongolia almost bare of vegetation, which made some scientists believe that the vegetation was lost permanently and that conditions for vegetation growth was gone. However, an ample rainfall in 2002 made the vegetation cover recover to the level of 1998. Similarly, many pastoralists in the central site report a phenomenon what they call *sa mgo rgyag*, in which vegetation that has disappeared for unknown reasons comes back naturally (mainly after lots of rainfall) some years later.

the literature make the credibility of the official claim that 15% and 30% of China's rangeland had been degraded by the mid 1970s and the mid 1980s respectively highly questionable.

Similarly, the official statement today that 90% of China's rangeland has been degraded is questionable. Article 11 of China's amended Environmental Protection Law enacted in 1989 stipulates that the national and provincial environmental protection agencies should issue a report on environmental conditions on a regular basis. Accordingly, the State Environmental Protection Bureau started issuing an annual national Report on Environmental Conditions (REC) since 1989. In the reports, rangeland degradation is defined specifically to include degradation (*tuihua*), desertification (*shahua*) and alkalization (*jianhua*). Table 15 shows figures for rangeland degradation in the reports from 1989 to 2010.

Table 15 Degradation figures in national Report on Environmental Conditions (1989-2010)

Year	Total usable rangeland (million ha)	Degraded rangeland (million ha)	Degradation rate (million ha/yr)	Percentage
1989	312	66.7 (total)	1.3	No figure
1990		No figures		
1991	No figure	67 (severely)	No figure	No figure
1992	No figure	73 (severely)	No figure	No figure
1993	No figure	90 (severely)	No figure	over 33% (severely)
1994-1996		No figures		
1997	No figure	130 (moderately)	2.0 (0.5%)	90 (overall)
1998	No figure	130 (moderately)		90 (overall)
1999	No figure	130 (moderately)		no figure
2000		135 (not classified)	2.0	90 (overall) 50 (moderately)
2001	No figure	135 (not classified)	2.0	90 (overall)
2002	No figure	no figure	2.0	90 (overall)
2003	No figure	180 (severely)	2.0	90 (overall)
2004	No figure	no figure	2.0	90 (overall)
2005	331			90 (overall)
2006-2010		No figures		

As the table shows, only in two years (1989 and 2005) was a figure for total usable rangeland reported. But there was a 19 million ha difference between the two figures. In the report for 1989, 66.7 million ha was given as the total amount of degraded rangeland regardless of the level of degradation. However, the figure for the following three years (1991-1993) after 1990 was

classified as the amount of severely degraded rangeland. It appears to be implausible that the level of degradation would have deteriorated significantly within two years (from 1989 to 1991). In 1993 it was reported that 90 million ha of rangeland had been severely degraded, accounting for over one-third of the total usable rangeland. The amount of the total usable rangeland determined by these two figures should be approximately 273 million ha, which was far from the figures provided in the reports for 1989 (312 million ha) and 2005 (331 million ha). It was reported for the first time in the 1997 report that 90% of the total usable rangeland has been degraded or degrading.¹⁶⁶ The figure (130 million ha) for the amount of degraded rangeland provided in this report remained the same for the following two years (1998 and 1999) and was claimed to be the amount of moderately degraded rangeland. The figure slightly increased (135 million ha) in the reports for 2000 and 2001 with the amount of moderately degraded rangeland reported to account for 50% of the total usable rangeland in 2000. The figure dramatically increased to 180 million ha and was claimed to be the amount of severely degraded rangeland in the 2003 report. This is striking for two reasons. First, this means that the amount of severely degraded rangeland had been doubled within a decade (from 90 million ha in 1993). Second, within two years there was an increase of 45 million ha of degraded rangeland (from 135 million ha in 2001), which appears extraordinary given the annual degradation rate was reported to be two million ha during the period of 1997 and 2004. In addition, it means that the level of degradation worsened from being moderate to severe within four years (from 1999 to 2003) at most (given the figure was not classified in 2000 and 2001 and there was no figure for 2002). These plainly problematic reports make the credibility of the official claim that 90% of China's rangeland has been degraded highly questionable (see Harris, 2010). In fact, Liu Jiawen (2009), a

¹⁶⁶ Harris (2008, p. 38; 2010) appears to incorrectly report that it was in 2002 that China estimated 90% of its usable rangeland had been degraded.

deputy director of Grassland Monitoring and Supervision Center (GMSC) under Ministry of Agriculture acknowledges in an official paper in 2009 that the statement that 90% of China's rangeland has been degraded is not based on any data:

When [we] describe rangeland ecological conditions, [we] often state that 90% of the rangeland nationwide has been degraded at various levels with approximately one-third of it having been severely degraded. In addition, there are corresponding figures for the areas of desertification, rocky desertification and salinization of rangeland. But overall, these figures are basically "probable figures" and "guessed figures." [In some cases,] there are several inconsistent figures. These figures are neither based on uniform, commonly recognized criteria, nor results of detailed ground surveys and continuous ground observations, lacking scientific or objective [validity].

Similarly, apparent contradictions among and within official reports on rangeland degradation in the TAR make it sensible to be skeptical about the magnitude of rangeland degradation reported by the government. Rangeland degradation began to be reported as a problem in the TAR in the early 1980s. For example, in 1982 the TAR government cited rangeland degradation as one of the major factors that hindered pastoral development in the region.¹⁶⁷ Table 16 shows information on rangeland degradation reported in some important official writing (books, documents and an article) that discuss ecological themes in the region since 1992 when results of the very first two rangeland resource surveys in the region were published in two books, *Rangeland of Tibet*, and *Land Resource Data of the TAR (Rangeland)*.¹⁶⁸

¹⁶⁷ Development Research Center of the State Council. 1982. China Economic Yearbook (*zhongguo jingji nianjian*). p. 165. Development Research Center of the State Council (*guowuyuan fazhan yanjiu zhongxin*)

¹⁶⁸ The first survey was started in 1973 by a team of scientists from the Chinese Academy of Sciences and the second in 1987 by a group of professional and technical personnel organized by the Land Management Bureau and the Animal Husbandry Bureau of the TAR.

Table 16 Degradation figures in official writing in the TAR

Official writing	Year of publication	Usable rangeland (million ha)	Degraded rangeland (million ha)	Percentage of total rangeland area (unless otherwise specified)
Rangelands of Tibet by Chinese Academy of Sciences	1992	66	20-26.7	25-40 ¹⁶⁹
Land Resource Data of the TAR (Rangeland) by Land Management Bureau and Animal Husbandry Bureau of the TAR.	1992	64	11	14.1 (11.6% of which severely degraded)
Annual Reports on Environmental Conditions by the regional Department of Environmental Protection of the TAR (EPD)	1992-2010	55 (since 2003)	No figure	degradation within some small areas
Eco-environmental Improvement Plan of the TAR by the TAR Government	2000	No figure	11.4	13.9
Pratacultural Development and Eco-environment on the Tibetan Plateau by China Tibetology Research Center	2000	No figure	No figure	43 ¹⁷⁰ (15% of which severely degraded)
Ecological Improvement and Environmental Protection in Tibet (White Paper) by the State Council Information Office ¹⁷¹	2003	No figure	No figure	natural degradation within some small areas
Research Report on Rangeland Protection and Improvement in the TAR by the Committee for Population, Resources and Environment under the National Committee of the Chinese People's Political Consultative Conference	2003	No figure	42.7	51.45 (30% of which severely degraded)
Request regarding Increasing Investment in <i>tuimu huancao</i> in the TAR by Department of Agriculture and Animal Husbandry of the TAR (DAAH)	2005	No figure	42.7	95 ¹⁷²
Report on Rangeland Protection and Construction (first draft) by the regional DAAH	2009	55	42.7	95 ¹⁷³
Development of Eco-pastoralism is an effective way to Resolve the Rangeland Degradation Dilemma by	2010	66	43.3	>50 (12.2% of

¹⁶⁹ 25-40% of the area of usable rangeland

¹⁷⁰ The book does not specify whether the percentage is of the total area of rangeland or that of the area of usable rangeland.

¹⁷¹ The State Council Information Office is the Chinese government's chief information office. To date it has issued nine White Papers on Tibet: "Tibet-Its Ownership and Human Rights Situation" (1992), "New Progress in Human Rights in the Tibet Autonomous Region" (1998), "The Development of Tibetan Culture" (2000), "Tibet's March toward Modernization" (2001), "Ecological Improvement and Environmental Protection in Tibet" (2003), "Protection and Development of Tibetan Culture" (2008), "Regional Ethnic Autonomy in Tibet" (2004), "Fifty Years of Democratic Reform in Tibet" (2009), "Sixty Years since the Peaceful Liberation of Tibet" (2011).

¹⁷² 95% of the area of usable rangeland

¹⁷³ Same as above

the head of the Rangeland Research Center under the Chinese Academy of Agricultural Sciences (Hou, 2010)					which severely degraded)
The TAR's implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011 by the regional DAAH	2011	69	No figure	/	

As shown in the table, there arise several contradictions among these official publications.

First, the figures are inconsistent with one another even when they were made public in the same year. Specifically, the figures in *Rangeland of Tibet* are twice those in *Land Resource Data of the TAR (Rangeland)*. Neither surveys discussed how these numbers had been figured out or what methods were employed. In the case of the first book, it just says, “according to statistics...” Similarly, the percentage of degraded rangeland (43%) reported in *Pratacultural Development and Eco-environment on the Qinghai-Tibet Plateau* differs significantly from the one (13.9%) provided in “Eco-environmental Improvement Plan of the TAR”, which, though is close to the one (14.1%) in *Land Resource Data of the TAR (Rangeland)*.¹⁷⁴ As is the case with most official writing in China, neither the book nor the document provides any reference to sources of the figures. In the case of the book, it merely states:

According to some relevant data, due to overgrazing and overstocking one third of the rangeland in the TAR has been degraded with around half of which having been severely degraded. Plus, around 10% of the rangeland has obviously been desertified.

¹⁷⁴ *Pratacultural Development and Eco-environment on the Qinghai-Tibet Plateau (qingzang gaoyuan de caoye fazhan yu shengtai huanjing)* was published by the China Tibetology Research Center (CTRC), which is a government think tank under the United Front Work Department of CPC Central Committee that gives advice on China's policies on Tibet. This book is one of the series of books from the “Research on Environment and Development on the Qinghai-Tibet Plateau”, a key research project initiated in 1994 by CTRC. A team of researchers from Gansu Agricultural University and Gansu Rangeland Ecology Research Center compiled the book. As of May 2011, eleven books have been published under the research project. The CTRC plans to produce a total of fifteen books under this research project. “Eco-environmental Improvement Plan of the TAR” (*xizang shengtai huanjing jianshe guihua*) was issued by the TAR Government based on the “National Plan for Eco-environmental Improvement” and the “National Program for Eco-environmental Protection” formulated by the State Council in 1998 and 2000 respectively. The TAR Government means the Plan to be an overall guideline on eco-environmental improvement in the region until 2050. On February 18, the State Council endorsed the “Plan for Ecological Security Barriers Protection and Improvement in Tibet (2008-2030)” with a budget of 15.5 billion *yuan* proposed by the National Development and Reform Commission. Restoration of degraded rangeland and pika control, among others, are two major goals of the program.

Second, what was reported in the annual “Report on Environmental Conditions” since 1992 by the regional EPD and in the White Paper “Ecological Improvement and Environmental Protection in Tibet” by the State Council Information Office forms a striking contrast with the figures reported in the rest of the writing, particularly with those provided in “Research Report on Rangeland Protection and Improvement in the TAR” by the Committee for Population, Resources and Environment (CPRE) under the Chinese People’s Political Consultative Conference (CPPCC) national committee given both the latter two reports were issued in the same year (2003). In the Report on Environmental Conditions, there are merely two sentences that describe the rangeland conditions, which are virtually identical every year except that the figures for the total area of rangeland and the area of fenced pastures slightly differ in some years. Each year, the second sentence concludes, “due to global climate change and overgrazing, rangeland degradation and desertification has occurred within some small parts of the region (Chi: *jubu diqu*).”¹⁷⁵ Similarly, in its one sentence on rangeland degradation, the White Paper proclaims that, “in some areas in Tibet, pastureland has suffered a natural deterioration, and some of it has been reduced to sand and stone.”¹⁷⁶ In the Chinese version of the White Paper, “in some areas of Tibet” is phrased as *jubu diqu*, which means some small parts of a region. Moreover, “natural deterioration” suggests a natural process. Therefore, this statement implies that rangeland degradation has merely occurred to a very limited extent as a natural process. However, this was contradicted by “Research Report on Rangeland Protection and Improvement in the TAR,” which claimed that 51.45% (42.7 million ha) of the total rangeland area of the region had been degraded with the area of severely degraded rangeland accounting for approximately 30% of the total area of the rangeland.

¹⁷⁵ Since 2007, the sentence just starts, “due to factors such as global climate change...”

¹⁷⁶ This is the original sentence in the English version of the White Paper.

In addition, the regional DAAH merely repeated the figures reported in “Research Report on Rangeland Protection and Improvement in the TAR” in its documents in 2005 and 2009, though it reported different figures in 2008 that remain valid to date. In “Request regarding Increasing Investment in *tuimu huancao* in the TAR” in 2005, citing the “Research Report on Rangeland Protection and Improvement in the TAR” and adding that “95% of the usable rangeland has been degraded to various extent and the degradation rate has been accelerating,” DAAH requested the Ministry of Agriculture to increase investment in *tuimu huancao* in the region. This conveys an essentially contradictory message because the total area of usable rangeland in the TAR is usually said to be 55 or 66 million ha.¹⁷⁷ Accordingly, 95% of it should be 52.3 or 62.7 million ha rather than 42.7 million ha as alleged in “Research Report on Rangeland Protection and Improvement in the TAR.” Nonetheless, four years later in 2009, DAAH virtually copied this piece of information into its “Report on Rangeland Protection and Construction” to the CPPCC national committee. This contradicts the following claim in the report because if the status of degradation remained the same or the degradation rate was still accelerating after five years of implementation of *tuimu huicao*, it means that *tuimu hucancao* was unsuccessful in reversing the degradation trend, but the report claims it was successful:

The implementation of tuimu huancao (since 2004)... has put rangeland degradation and desertification trends in the project areas under control, and promoted rangeland production and restoration of ecological functions.

Moreover, as cited in the official article, “Development of Eco-pastoralism Is An effective Way to Resolve the Rangeland Degradation Dilemma” in 2010 by the head of the Rangeland Research Center under the Chinese Academy of Agricultural Sciences (Hou, 2010), the current widely cited figures for the amount (43.3 million ha) of degraded rangeland and the percentage (12.2%)

¹⁷⁷ A commonly cited figure for the total area of useable rangeland in the TAR until 2011 (69 million ha in 2011) is either 55 million ha (for example, since 2003 to date in the Report on The State of the Environment) or 66 million ha.

of severely degraded rangeland, which are different from the ones reported in “Research Report on Rangeland Protection and Improvement in the TAR”, and the overall percentage of degraded rangeland (over 50%) first appeared in an official press report in 2008.¹⁷⁸ The report cited DAAH as the source. Therefore, it is extraordinary that DAAH duplicated information reported in 2003 in its report in 2009 given that it began offering different information in 2008 that are cited today. Last but not least, it is worth noting the area of usable rangeland reported is inconsistent over time (66 million ha and 55 million ha between 1992 and 2010, and then 69 million ha in 2011).¹⁷⁹ All these contradictory accounts in official writing make official reports on the extent of rangeland degradation in the TAR highly dubious.

Furthermore, contradictory reports on rangeland conditions by the government illustrate how they are shaped by particular political-economic factors. During the period of the mid 1990s and the early 2000s, China faced a storm of criticism of its environmentally damaging activities in Tibet by the Tibetan Government in Exile (or more accurately, the Central Tibetan Administration) and some international sources (Smith, 2008).¹⁸⁰ For example, in its report on

¹⁷⁸ The Xinhua News Agency first reported this, which was later used by many other news agencies. ‘Tibetan Rangeland: the Truth behind “Disappearing” cannot be Ignored (*xizang caoyuan: buneng hushi de “xiaoshi” zhenxiang*). Xinhua News Agency, 11 March 2011.

http://news.xinhuanet.com/focus/2008-03/11/content_7730840.htm

The percentage (12.2%) is calculated from the original press report (10 million ha of severely degraded rangeland out of the total rangeland area of 82 million ha). Hou (2010) misinterpreted the percentage (23.1%) he has come up with (10 million ha of severely degraded rangeland out of 43.3 million ha of degraded rangeland) by stating that that percentage is out of the total area of rangeland.

¹⁷⁹ It appears odd that DAAH cited 66 million ha in this 2008 press report because in the same year it reported 55 million ha in the Monitoring Report on Rangeland Resources and Ecology (*caoyuan ziyuan yu shengtai jiance baogao*), which was started being issued annually since 2007.

¹⁸⁰ The criticism was articulated in these reports: White Paper ‘Tibet: Proving Truth from Facts’ (1996), ‘Demilitarisation of the Tibetan Plateau: An Environmental Necessity’ (2000), ‘Tibet 2000: Environment and Development Issues’ (2000), and ‘China’s Railway Project: Where will it take Tibet?’ (2001).

environment and development issues in Tibet in 2000, the Tibetan Government in Exile strongly accused China of damaging Tibet's environment: ¹⁸¹

Ever since the Chinese occupation of Tibet, widespread environmental destruction has taken place due to logging of virgin forests, uncontrolled mining, water pollution and nuclear waste dumping, which has resulted in the degradation of grasslands, extinction of wildlife, desertification, floods, soil erosion and landslides.

Accordingly, the White Paper "Ecological Improvement and Environmental Protection in Tibet" was the Chinese Government's response to the criticism. In the forward and the penultimate paragraph of the paper it laid out its purpose in issuing it, which was to counter the above-mentioned critiques:

It would help clarify some people's misunderstanding concerning Tibet's eco-environmental problem and enhance their understanding of Tibet to review the progress of the ecological improvement and environmental protection work in Tibet, to present the status quo of this undertaking, and to envisage the prospects of sustainable development for the region.

The Dalai clique and the international anti-China forces shut their eyes to the progress in the ecological improvement and environmental protection work in Tibet. They have spread rumors all over the world that the Chinese government is "destroying Tibet's ecological environment," "plundering Tibet's natural resources" and "depriving the Tibetan people of their right to subsistence," and so on and so forth, in order to mislead world public opinion and deface the image of China....

Therefore, with this political motivation it was rational for the Chinese Government to play down environmental issues in Tibet in the White Paper (Yeh, 2009). This explains why it reported that there was merely natural deterioration of rangeland within some small parts of the TAR in the White Paper. ¹⁸²

¹⁸¹ It should be noted that Tibet referred to by the Chinese Government and by the Tibetan Government in Exile is different. The Chinese Government merely recognizes the Tibet Autonomous Region as Tibet while the Tibetan Government in Exile refers Tibet to all Tibetan-inhabited areas in China, including those in Qinghai, Sichuan, Gansu and Yunnan provinces. Therefore, the Tibetan Government in Exile raises issues in all Tibetan-inhabited areas while the Chinese Government discusses the issues only in the TAR.

¹⁸² This political motivation also applies to the Report on Environmental Conditions (*huanjing zhuangkuang gongbao*) in the TAR because as the name of the reports suggests ("gongbao" literally means bulletin), the report is an official statement intended for broad audiences both at home and abroad.

The opposite is true of official reports on rangeland conditions produced for economic motivation, i.e. the government may overstate environmental problems in order to capture funding. As its title suggests, the purpose of the 2005 document of the regional DAAH “Request regarding Increasing Investment in *tuimu huancao* in the TAR” was to request the Ministry of Agriculture to increase investment in *tuimu huancao* in the region. The document explicitly articulates this:

In 2003 and 2004, the total percentage of funding for tuimu huancao in Inner Mongolia, Xinjiang and Qinghai was 64.3% while only 0.76% in the TAR....The investment ratio in the TAR was obviously too low for the region given that its rangeland area accounts for one fifth of the country’s rangeland and that it is the core area of the Qinghai-Tibet Plateau and the source region of many of the country’s major rivers but with worsening rangeland desertification and degradation. We request that the Ministry of Agriculture...to increase investment in tuimu huancao in the TAR.

Therefore, with this aim of capturing more funding for *tuimu huancao* it was sensible for DAAH to overstate the extent of rangeland degradation in the region. This explains why DAAH added that “95% of the usable rangeland has been degraded to various extent and the degradation rate has been accelerating” in the proposal, which, though contradicts the cited 2003 report by CPPCC national committee, which states that “the area of degraded rangeland has reached over 42.7 million ha,” i.e. 78% or 65% of the usable rangeland.¹⁸³ Furthermore, DAAH claimed in 2011 that the region’s total usable rangeland should be 69 million, more than the previously reported figure (55 million ha or 66 million ha) in order to capture more funding from the national PES program (see Chapter 6).

¹⁸³ A commonly cited figure for the total area of usable rangeland in the TAR until 2011 (69 million ha in 2011) is either 55 million ha (for example, since 2003 to date in the Report on The State of the Environment) or 66 million ha. Therefore the percentage should be either 78% (42.7/55) or 65% (42.7/66). As CPPCC national committee’s proposal “Plan for *tuimu huancao* in the TAR” (*xizang zizhiqu tianran caodi tuimu huancao guihua*) along with “Research Report on Rangeland Protection and Improvement in the TAR” (*guanyu xizang zizhiqu caochang baohu yu jianshe de diaoyan baogao*) to the CPC and the State Council in 2003 helped to have the TAR included as a target region of *tuimu huancao* since 2004, it was rational for the regional DAAH to cite the 2003 CPPCC report because it would increase the credibility of its own report.

Beginning in 1998, the national Report on Environmental Conditions started mentioning causes of degradation as shown in Table 17.

Table 17 Causes of rangeland degradation reported in national Report on Environmental Conditions

Year	Causes of degradation
1998	predatory exploitation of rangeland, reclamation, over-collection of firewood, overstocking and overgrazing
2000	overstocking and overgrazing, irrational use of rangeland
2001	overstocking and overgrazing, irrational use of rangeland
	overstocking rate: 30-50% for rangeland in northern China
2002	overgrazing, unscientific use of rangeland, excavation
2004	overgrazing; reclamation, industrial pollution, pika damage, worm damage; excavation
2005	overstocking and overgrazing; reclamation, industrial pollution, pika damage, worm damage; excavation
	overstocking rate: 35% in 17 monitored provinces (regions); over 40% in Inner Mongolia, Xinjiang, Gansu and Sichuan
2006	overstocking
	mean national overstocking rate: 34% TAR (38%), Inner Mongolia (22%), Xinjiang (39%), Qinghai (39%), Sichuan (40%), Gansu (40%)
2007	overstocking
	overstocking rate: Inner Mongolia (20%), Qinghai (38%), Gansu (38%), Xinjiang (39%), Sichuan (39%), TAR (40%) ¹⁸⁴

As the table shows, overstocking and overgrazing are cited as a major cause of degradation. In addition, starting in 2001, the report emphasized the role of overgrazing in rangeland degradation and magnitude of overstocking by giving specific overstocking rates. For example, the mean rate of overstocking nationwide was reported to be 34% in 2006. In some years forage production and the carrying capacity were reported to have decreased as Table 18 shows.

¹⁸⁴ Interestingly, the TAR's Report on the State of the Environment for 2007 does not specify overgrazing as a factor contributing to degradation. It simply states, "due to factors such as global climate change..." Thus, there exists inconsistency between the regional and national Report on Environmental Conditions.

Table 18 Reduction in forage production and carrying capacity in national Report on Environmental Conditions

Year	
1989	Forage production has decreased by 30-50% in the 1980s compared to the 1950s
1990	The <i>downward trend in forage production has not been reversed yet.</i>
1993	Mean forage production has decreased by 30-50%
2000	The carrying capacity has decreased.
2001	Forage production on natural rangeland has decreased by 30-50% in the late 1990s compared to the early 1990s in northern China and the carrying capacity has decreased significantly
2002	The mean decrease in forage production since the 1980s in northern China is 17.6%. The largest decrease happened for the desert steppes by approximately 40% and the decrease for typical rangeland is around 20%. Regions that experience a large decrease in forage production include Inner Mongolia (27.6%), Ningxia (25.3%), Xinjiang (24.4%), Qinghai (24.6%) and Gansu (20.2). Forage production on natural rangeland has decreased by 30-50% in northern China and the carrying capacity has decreased significantly.

In addition to the fact that, as discussed in the previous section, the application of carrying capacity turns out to be flawed in the first place, we also see here that government reports on overstocking based on carrying capacity are, on their own terms, not trustworthy. In fact, in the previously-mentioned article, Liu Jiawen admits this:

We usually state that rangeland is overstocked by around 34%, but strictly-speaking, this figure is not very reliable. First, the basic data per se (carrying capacity of rangeland, the actual stocking capacity of rangeland and the area of rangeland) that we use when we calculate overstocking rates may be different from the actual. Second, there are multiple sources of feed for livestock-not just range forage...

By comparison with overstocking and overgrazing, although reclamation of rangeland for crop farming is also cited as a cause of degradation, its role may have been underplayed as the government is hesitant to admit that its rangeland reclamation policies have led to a significant reduction in the area of usable rangeland and severe rangeland degradation. For example, as Table-14 shows, in the national Report on Environmental Conditions only in three years (1998, 2004 and 2005) was reclamation mentioned as a factor contributing to rangeland degradation. In addition, the reports did not elaborate on it as they did on overstocking. Nonetheless, the government still has to admit cautiously that during the period between the 1950s and 2008, 20

million ha of rangeland across China have been opened for farming.¹⁸⁵ This figure appears to be insignificant when the total amount of China's rangeland is taken into account. But it is noteworthy that most of the reclamation has occurred in one region, i.e. in Inner Mongolia.

It was officially estimated that a total of 15.5 million ha of rangeland had been reclaimed in Inner Mongolia during the period of 1949 and 2008, accounting for 13% of the region's total land (Han *et al.*, 2011, p. 8). According to Dalintai and Enhe (2006), the amount of rangeland in the region was reduced by 10.4% (9.2 million ha) between the 1960s and mid 1980s, and by 8% (6.3 million ha) between the 1980s and the early 2000s due to reclamation. Moreover, large sections of cultivated rangeland have had to be abandoned because they are not suitable for farming. This leads to increased chances of sand erosion of adjacent rangeland, leading to the desertification and degradation of these rangelands (Dalintai and Enhe, 2006). For example, nearly two million ha of rangeland were reclaimed in Heilongjiang, Inner Mongolia, Xinjiang and Gansu provinces during the decade of 1986 and 1996, but nearly half of it (49.2%) has become sand and has had to be abandoned (Liu, 2008). Dalintai and Enhe found in Damao County in Inner Mongolia that plant biomass of the reclaimed rangeland decreased to 176 kg/ha (from 573.5kg/ha before the reclamation) three years after it was abandoned. Therefore, Dalintai and Enhe conclude that, "the fundamental cause of desertification in Inner Mongolia is not what some people have identified and articulated-overgrazing, but rather over-cultivation!"¹⁸⁶ Lastly,

¹⁸⁵ Rangeland Degradation in the Northern China Continues: Retreated Approximately 200 km to the North and Approximately 100 km to the West (*woguo beifang caoyuan tuihua haizai jixu:xiangbei tuisuo yue 200 gongli, xiangxi tuisuo yue 100 gongli*). Chai Hailiang and Wurihan, 7 July 2007. <http://www.grassland.gov.cn/Grassland-new/Item/755.aspx>

¹⁸⁶ <http://www.fon.org.cn/content.php?aid=387>; Although on a much smaller scale compared to Inner Mongolia, reclamation for crops also took place on the Tibetan Plateau during the period between the Great Leap Forward and the reform era in some pastoral areas in Qinghai, in Hongyuan of Sichuan and in Gannan of Gansu (Deng, 2005) and has led to rangeland degradation (Harris, 2010). In fact, even in recent years rangeland degradation due to reclamation occurred in Gannan in Gansu with a total area of 3516.7 ha of rangeland having been reclaimed over the nearly two decades since 1985 (Li, 2004).

it should be noticed that the national Report on Environmental Conditions does not mention some other factors such as climate change that may contribute to rangeland degradation.

In sum, contradictory, problematic and inconsistent reports of rangeland degradation make it reasonable to query the magnitude and extent of rangeland degradation in China and in the TAR. In the case of the TAR, reports of rangeland degradation are evidently driven by particular political-economic motivations. In addition, it appears that among possible causes of rangeland degradation, some such as overstocking and overgrazing may be overstated while others, such as climate change (Miehe, 1988) and reclamation, may be underreported.

3. *Pastoralists' Observations of Rangeland Degradation*

Pastoralists in the TAR do not observe widespread rangeland degradation. As discussed in Chapter 5, they report that the conditions of what the government labels degraded rangeland are original in their living memory. Instead, they observe localized rangeland degradation caused by off-road vehicles (western Nagchu), by livestock trampling (*rdzi chags*) (central and eastern Nagchu) and by the burrowing of voles (eastern Nagchu).¹⁸⁷

Rangeland damage by off-road vehicles reflects weak enforcement of rangeland protection laws and regulations. As discussed in Chapter 1, western Nagchu is a large plain dominated by alpine steppe and desert steppe with sparse vegetation, making off-road driving easy and tempting, particularly during the dry season either for a short cut or a smoother track.

¹⁸⁷ A few pastoralists in the western and central research sites report rangeland degradation from wind erosion, in which wind expands the extent of exposed soil on the windward side of turf cliffs by wearing away topsoil and making soil further erodible. In addition, several pastoralists in the central site report rangeland degradation from sand erosion and water erosion. Windblown sand buries vegetation, creating new areas of bare ground which also erode. Alpine meadow turfs are fragmented and topsoil is removed after being flooded by water from underground for unknown reasons. Livestock activities (grazing, trampling and digging) can make rangeland more vulnerable to erosion. For example, some Chinese scientists believe that a starting point for wind and water erosion is overgrazing and damage by pikas (LinziDuojie, 2000). But here pastoralists stress that soil exposed to wind erosion has always been present in their living memory and that it is the water coming from underground that is a new phenomenon unassociated with livestock activities. Therefore, future research in this subject is recommended.

Consequently, these vehicles (mainly trucks) cause significant damage to the rangeland. Both local officials at all levels (township up to regional) and pastoralists in the two research villages in the west report damage by off-road vehicles as a major cause of rangeland degradation in the region. Studies elsewhere show that in addition to damaging vegetation and soils, off-road vehicles can increase water and wind erosion (Sheridan, 1979; Wilshire and Nakata, 1976) and spread weeds (Dombeck et al, 2003.p 53). However, it appears that neither various levels of government nor pastoralists can do much to curb off-road driving, albeit rangeland protection laws and regulations explicitly state off-road driving on rangeland should be prohibited, and punished by fine.¹⁸⁸ This shows that rangeland protection laws and regulations remain largely on paper in practice as do many other laws, particularly those having to do with environmental protection regulations (Goldman and Perry, 2002; Muldavin, 2000; Van Rooj, 2006; Ma and Ortolano, 2000, Freeman and Lu, 2008).

Prolonged and concentrated trampling is a major livestock activity that pastoralists report has an impact on forage utilization efficiency and rangeland ecology (Klein et al, 2011). Here trampling refers to the trampling of the vegetation and the soil by the hooves of livestock.

Pastoralists' term for trampling (*rdzi chags*, which literally means stepping (*rdzi*) and breaking

¹⁸⁸ The Grassland Law of 2002 states that if off-road driving on rangeland is inevitable for scientific surveys, permission must be applied from the county rangeland administration department, which should be the county BAAH in the TAR (Article 55), and off-road driving on rangeland without permission or driving beyond the areas or routes allowed should be fined three to nine times the average annual production of the rangeland in the previous three years before the damage occurs (Article 70). Similarly, the TAR's Detailed Regulations on Implementing the Rangeland Law states that off-road driving should be prohibited (Article 11), and fined 50 to 100 *yuan* each time (Article 22). But in practice, it is difficult for pastoralists to protect their rangeland. For example, two Mongolian pastoralists in Inner Mongolia were killed by trucks in two similar but separate incidents in 2011 when the two pastoralists attempted to protest against trucks driving through their rangeland. The first incident sparked the largest demonstration against the local government by ethnic Mongols in twenty years. 'Death sentence for killing Mongol herder'. China Daily, 9 June 2011. http://www.chinadaily.com.cn/cndy/2011-06/09/content_12661308.htm ; 'China Mongols protest in Xilinhot over shepherd's death'. BBC, 25 May 2011. <http://www.bbc.co.uk/news/world-asia-pacific-13547933>; 'Truck kills herder in Inner Mongolia China'. BBC, 24 October 2011. <http://www.bbc.co.uk/news/world-asia-pacific-15428590>; In Nagchu, nonetheless, fencing installation unintentionally and substantially restricts over-road driving.

(*chags*) precisely describes how it functions; trampling crushes and breaks vegetation, resulting in losses of forage (Laycock and Harniss, 1974). There is a consensus among the pastoralists in the three sites that the magnitude of trampling losses of forage depends on livestock species and rangeland types. They observe that sheep and goats cause more trampling losses of forage than yaks and that more forage will be left if there are fewer sheep and goats. This is consistent with earlier research on trampling losses of forage conducted by Laycock and Harniss (1974) on mountainous, forb-grass rangeland in southeastern Idaho and neighboring Montana in the United States. Laycock and Harniss have found that the magnitude of forage lost by sheep trampling is much higher than that of forage lost by cattle trampling. Pastoralists also observe that trampled forage on alpine marsh meadows cannot be easily blown away by wind whereas trampled forage on alpine meadows, alpine steppes and desert steppes can easily be blown away by wind. Thus, the former will still be available to livestock.

The case of the individual rangeland use under the RHRS in Research Village 1 in the west illustrates that trampling losses of forage is a major factor why restricted livestock mobility leads to forage utilization inefficiency and lower productivity. As each household had to graze their livestock in their own grazing land, the mobility of the livestock was restricted, which obviously led to more frequent trampling of the forage. This in turn caused more trampling losses of the forage, which explains why the forage was consumed more quickly during that period as the pastoralists reported. This ultimately resulted in inadequate forage and heavy losses of livestock as discussed in Chapter 2.¹⁸⁹

Prolonged and concentrated trampling not only causes more forage losses, but more seriously leads to localized rangeland degradation, depending on rangeland types. Biologist

¹⁸⁹ Some pastoralists also report that forage in fencing is used up more quickly. More forage losses due to concentrated trampling derived from restricted mobility can be a main factor.

Savory (1999) points out that the effect of trampling by herbivores on rangeland depends on the length of time: short-term trampling may in fact help maintain rangeland health whereas prolonged and concentrated trampling leads to rangeland degradation. Similarly, pastoralists in the central and eastern sites, which are dominated by alpine meadows, observe that restricted mobility due to fencing and the RHRS has added one more area subject to degradation caused by prolonged trampling. Before fencing installation, rangeland degradation due to constant trampling by livestock merely occurred around settlement houses and watering points, and along livestock routes, a phenomenon also reported in Africa (Dejene, 1997; Brits et al, 2002) and Inner Asia (Humphrey and Sneath, 1999). The pastoralists showed me bare ground around fence gates and between crowded fenced pastures. Pastoralists also observe that the effect of trampling is different on different rangeland types. They see that alpine marsh meadows are more susceptible to the effect of prolonged trampling than alpine meadows, and that alpine steppe and desert steppe are resistant to trampling stresses. This former observation is consistent with earlier research elsewhere that wet plant communities are more vulnerable to adverse effects of trampling,¹⁹⁰ and the latter observation is illustrated by the above-mentioned case of the individual rangeland use under the RHRS in Research Village 1 in the west. Although the livestock more frequently trampled and dug the grazing land during that 4-year period (as discussed below), the pastoralists did not notice any rangeland degradation. Lastly, pastoralists in the three sites observe that rangeland damaged by livestock trampling or off-road vehicles can recover if the disturbances are not constant, showing ecological resilience.

In addition to grazing and trampling, sheep, goats and horses dig topsoil with their front feet to eat the newly growing forage below the surface on sandy pastures in late spring and early

¹⁹⁰ For example, General technical report INT, Issues 362-367. Intermountain Forest and Range Experiment Station, Forest Service, U.S. Dept. of Agriculture, 1997

summer before forage grows on meadow pastures (Goldstein and Beall, 1990). Some local officials think this would damage the rangeland, thus encouraging pastoralists to control sheep and horse numbers. But pastoralists observe that this depends on whether the root of the vegetation is dug out. Only those vegetation species that are very loosely rooted in the ground may be completely dug out but there are very few such species of vegetation in the region. In most cases livestock are merely able to remove the soil to access the vegetation, while the root is embedded in still frozen ground. Pastoralists in Research Village 1 reported that their sheep and goats dug more during the 4-year individual household rangeland use period under the RHRS due to inadequate forage, but they did not see any damage to the rangeland.¹⁹¹ Given that livestock do not dig for forage on meadow pastures and that yaks do not dig for forage, it appears to be highly unlikely that livestock digging in areas where rangelands are dominated by meadow pastures (central and eastern Nagchu) or where livestock species are dominated by yaks (eastern Nagchu) leads to widespread rangeland degradation.

In addition to rangeland damage by off-road vehicles (in the western site) and livestock trampling (in the central and eastern sites), pastoralists in the eastern site report rangeland degradation caused by voles (*Microtus* spp (Harris, 2010), *tsi gi* in Tibetan, meaning rats), which the pastoralists report have become more abundant after they were poisoned in the case of Research Village 1.¹⁹² Like pikas (*Ochotona curzoniae*, *a bra* in Tibetan), voles also burrow into the rangeland. But their burrows are shallower than those of pikas, which makes them, as the pastoralists observe, fragile and easily broken by trampling, leading to the collapse of topsoil and

¹⁹¹ On the other hand, this shows that individual household rangeland use under the RHRS also increases the chance of digging, which in turn is likely to cause rangeland damage if the digging occurs on pastures where vegetation is loosely rooted.

¹⁹² Voles, called *tianshu* in Chinese, are small rodents resembling mice, but can be distinguished from mice by their stouter body, slightly rounder heads, a shorter hairy tail, and smaller ears and eyes (Francis, 2008).

rangeland degradation.¹⁹³ For example, portions of a reserved alpine marsh meadow pasture, which is open to female yaks and their calves whenever they give birth (starting in March) and is closed from July in Research Village 1 are different from the rest of the pasture in terms of vegetation species composition and cover. Forbs rather than *Kobresia schoenoides* are the dominant species. There are numerous vole burrows in the ground, which has disrupted the soil structure and led to an increase in exposed soil that is easily compacted by livestock. According to the pastoralists, when they installed the fencing in 2000 the condition of this part of the pasture was the same as that of the rest of the pasture and voles have caused the current condition. Moreover, the pastoralists observe that vole and pika poisoning, which they conducted several years ago because of a government initiative, has increased the abundance of voles and the degraded areas are expanding. A pastoralist laughed when asked whether he observed an increase in voles after he said voles have caused rangeland degradation in recent years:

As we call the poison rat medicine (tsi sman) rather than rat poison, it looks like poisoning has improved the health of the rat. As a result, we seem to have more rats and more black sand areas expanded by rats since then...

Albeit what factors might have caused this type of degradation is an open question, there appears to be substantive credibility to the pastoralists' observation that poisoning has in fact promoted the abundance of voles rather than reducing it.¹⁹⁴ Comparatively, the majority of pastoralists in

¹⁹³ Pikas are classified as relatives of rabbits (Harris, 2008). *Ochotona curzoniae*, also known as the black-lipped pika, is a burrow-dwelling species of pika endemic to the Tibetan Plateau and is widely distributed across the plateau (Smith and Foggin, 1999; Harris, 2008). Pikas eat a wide range of plant species (Schaller, 1998). Smith and Foggin, (1999) consider *Ochotona curzoniae* to be a keystone species for biodiversity on the plateau for four reasons. First, a wide range of small birds and lizards use pika burrows as their primary shelters. Second, microhabitat disturbance stimulated by *Ochotona curzoniae* contributes to plant species diversity. Third, most of the predators on the plateau prey on *Ochotona curzoniae*. Fourth, the presence of *Ochotona curzoniae* has a positive effect on ecosystem-level dynamics.

¹⁹⁴ A research on Brandt's voles (*Microtus brandti*) in Inner Mongolia by Zhang et al (2003b) shows that vole control efforts are in fact counterproductive. Some researchers point out that the abundance of voles or pikas can be an effect rather than a cause of rangeland degradation (Shi, 1983; Cincotta *et al.*, 1992; Holzner and Kreichbaum, 2001; Zhang *et al.*, 2003a; Smith and Foggin, 1999; Harris, 2008). Shi (1983) suggested that an effective way to control pikas is to improve the condition of rangeland.

Research Village 2, where neither voles nor pikas have ever been poisoned, observe that the vole population merely fluctuates over time. Hence, they consider vole damage as a less serious problem than do their counterparts in Research Village 1.

Moreover, pastoralists in the western and central sites, where pika control programs have been conducted since the mid 1960s, also report that pika control efforts are counterproductive. Many of them use exactly the same phrase “one hundred have died but one thousand have returned” (*brgya shi stong lang*) to describe the inefficacy of pika poisoning in recent years. China started its efforts to control pika populations in 1958 in the Four Pests Campaign (Smith and Foggin, 1999; Shapiro, 2001; Harris, 2008).¹⁹⁵ At that time, pikas were considered to be harmful pests because of economic loss resulting from forage consumption and burrowing in addition to the potential for transferring plagues and being used as biological weapons.¹⁹⁶ For example, a 1962 official article stated, “[when] pika or worm damage occurs, the carrying capacity of rangeland will decrease significantly. When it gets serious, many livestock will die due to forage shortage.” (Shen, 1962, p. 34)¹⁹⁷ In the TAR, pika control programs started around the mid 1960s. In the early years, a mix of methods (blocking, smoking and watering burrows, trapping and poisoning) was employed. Later, poisoning has become the sole method with Botulinin C and D being the primary rodenticide since 1995. Although pastoralists across the region also consider the presence of pikas as a problem primarily in terms of digging up soil, which not only damages the soil, but also covers the surface of nearby swards, they do not think

¹⁹⁵ The Four Pests Campaign (*chu sihai yundong*) was one of the campaigns in the Great Leap Forward from 1958 to 1960. The campaign was launched as a sanitary one. The four pests were rats, flies, mosquitoes and sparrows. Pikas were included in the rat category in the campaign.

¹⁹⁶ ‘Reviews and Prospects of Control of Rodent Pests in China (*zhongguo shuhai fangzhi huigu yu zhanwan*). National Agriculture Technology Extension and Service Center, Ministry of Agriculture, 1 September 2009. http://www.cropipm.com/Html/2001_02_19/104022_105658_2001_02_19_106357.html

¹⁹⁷ However, Smith and Foggin (1999) assert that pikas in fact do not compete with livestock for forage where moderate grazing occurs.

it is a serious problem because they observe that the abundance of pikas merely fluctuates over time. For example, pastoralists report that many pikas died after the devastating snowstorms of 1997/8.¹⁹⁸ When asked whether he observed an increase or a decrease in pikas over time, an old pastoralist responded:

As the old saying goes, “it is snow that makes the hill white while it is pikas that make the field black.”¹⁹⁹ Where there are pikas, they not only eat grass, dig out the root of the grass, but also dig holes in the ground, so damaging the grassland. We have always had this pika problem. But it is really hard to tell if we have more or fewer pikas over time. Sometimes there are many, making people wondering where they are from-whether they are from underground, while sometimes they are few, which I do not know why. But one thing for sure is the more efforts made to kill pikas, the more pikas there seem to be. It is as if after one hundred were killed, another thousand came back the following years.

Biologically, pastoralists’ observation that pika poisoning is counterproductive is valid because poisoning presumably also kills pika predators (Schaller, 1998; Smith *et al.*, 2006; Harris, 2008; Guo *et al.*, 2008).²⁰⁰ Hence, it reduces natural control of pikas (Harris, 2008). Furthermore, like most small mammals, pikas have high reproductive rates and extraordinary capacity to recover quickly from declines (Smith, 1988; Schaller, 1998; Harris, 2008).²⁰¹

¹⁹⁸ During my field research in 2008, some pastoralists in Nyenrong County in northeastern Nagchu Prefecture, who were among those most severely hit by the devastating snowstorms of 1997/8, told me that they saw few pikas after the snowstorms, and that even ten years later they appeared to have fewer pikas than they had before the snowstorms.

¹⁹⁹ *la dkar po gtong mkhan kha ba yin, long nag po gtong mkhan a bra yin*

²⁰⁰ Some researchers (Worthy and Foggin, 2008; Lumpkin and Seidensticker, 2011) suggest that pika poisoning has caused an increase in brown bear conflict with pastoralists given that more than half (60%) of the diet of the brown bear was pikas (Schaller, 1998). Field research from this dissertation does not support such observation for two reasons. As shown here, in Nagchu the pika population might have in fact increased or at least not decreased due to poisoning. Second, pastoralists in Research Village 2 in the east, where pikas have never been poisoned, equally report severe human-bear conflict in the past decade. Pastoralists think the increase in bear attacks is due to housing. In the past when there were no houses, tents were never left unattended, hence there were no chances for bears to come to search for food near where pastoralists were settled or camped as bears usually avoid people. But when food (grain and meat) was left in houses without people after pastoralists move to seasonal camps, once bears happened to find food in houses for the first time, they have gradually become habituated (i.e. food-conditioned) to coming to search for food in houses.

²⁰¹ According to Schaller pikas have high mortality rates due to predation, natural hazards such as snowstorms, and diseases. Pika predators primarily include hawks, falcons, Manul cats and polecats. Accordingly, pikas have high reproductive rates. According to Smith (1988), a female pika may give birth twice a year and four to six babies each time and some females reproduce within the same year of their birth.

Moreover, virtually all pastoralists in the three sites, even those in Research Village 1 in the east who perceive that voles have caused rangeland degradation, state that they will never take the initiative to attempt to kill pikas or voles for both spiritual and practical reasons. As one pastoralist responded when asked if he is willing to poison pikas:

When officials from the county BAAH come with poison and barley and ask us to kill pikas, we do not have a choice but to follow the order.²⁰² But if there are choices, I will definitely not kill pikas simply because killing is sinful. Even if I did not care about sins, I do not see the point of killing pikas because pikas are not something new. We always have pikas eating grass and digging the soil, which is a bad thing. But I see they are just part of the grassland. To say the least, as I mentioned earlier, killing seems to increase the number of pikas rather than decreasing it...

In fact, the government has quietly accepted that pika poisoning is counterproductive, which gives credibility to pastoralists' observation, and has been seeking biological control approaches after the 2000s.²⁰³ For example, a government researcher in the TAR was quoted as saying in a news report on pika control in 2006:²⁰⁴

For a long time, people killed pikas with rodenticides, which reduced numbers of animals such as ferrets that prey on pikas. Plateau pikas have a high reproductive capacity and a strong capacity to develop resistance to rodenticides. (Consequently), the reproductive rate of pikas is higher than those of pika predators. This leads to a shortage of pika predators and an increase rather than a decrease in pika populations in recent years, causing more widespread damage.

Biological control methods attempted in Western China in recent years include installation of raptor platforms and use of trained foxes. For example, the TAR started installing raptor platforms in 2007, first along the railroad. All of this evidence shows that pika and vole

²⁰² Usually it is the county BAAH that is responsible for carrying out poisoning. A mixture of rodenticide and boiled barley are placed inside burrows.

²⁰³ Smith and Foggin (1999) has reasonably pointed out that vested interests by agencies responsible for pika control may prevent them from admitting that their efforts are counterproductive. But this does not discourage them to seek new approaches because they can continue requesting funding as long as they do not have to abandon control efforts completely.

²⁰⁴ 'Experts Believe: Pika Poisoning is not Beneficial to the Restoration of Rangeland in Tibet' (*zhuanjia renwei: yaowu shamie shutu buliyu xizang caoyuan de huifu*). Xinhua News Agency, 5 August 2006. http://news.xinhuanet.com/tech/2006-08/05/content_4921554.htm

poisoning is counterproductive, which in turn may accelerate rangeland degradation and expand the extent of degraded areas (Miehe, *et al.*, 2008; Schaller, 1998; Guo *et al.*, 2008) even though pikas or voles may not be an original cause of degradation. This is likely the case in Research Village 1 in the east.

Lastly, as discussed in the previous section, policymakers and officials consider overgrazing resulting from overstocking as a principal cause of rangeland degradation. However, in the case of the three research counties, the government's own census data and reports reveal that no dramatic changes in grazing intensity took place by any means over the past three decades since 1980.²⁰⁵ Livestock census data from 1980 to 2009 (see Figures 1 to 6 below) show the following trends.²⁰⁶ The total number of the four livestock species (yaks, sheep, goats and horses) of the central (Amdo) and western (Bengun) research counties merely fluctuated around one million while that of the eastern research county tended to decrease gradually over time. The stocking rate in SEU tended to increase slightly in the central and western counties while it remained the same in the eastern county. In addition, sharpest decreases in stocking rate occurred after snowstorms or under unfavorable weather conditions in a density-independent manner. For example, livestock decrease rates reached up to 41% (sheep decrease rate in 1990 in Drachin County) in some years (1985, 1990, 1994, 1996, and 1998), in which pastoralists experienced

²⁰⁵ Using stocking rates of merely three counties (Tarlak, Machen and Maduk) in Golog Prefecture in Qinghai Province (1955-1995), Miehe *et al.* (2008) generalize changes in grazing intensity for the whole plateau by asserting, "Especially in the last 30 y [years], rangeland policy has resulted in an increase in livestock numbers in all parts of the highlands (20, 43-48). Thus livestock numbers reached their peak in the early 1980s (Fig. 2) and decreased afterward due to overgrazing, leading to a lower carrying capacity and to drastic losses of livestock following heavy winter snowfalls." But this evidently does not apply to these three research counties in Nagchu prefecture, where the stocking rate in SEU merely fluctuated from 1980 to 2009.

²⁰⁶ Census bureaux of Bengun, Amdo and Drachen counties, 2010.

destructive snowstorms.²⁰⁷ Furthermore, an increase in the stocking rate never occurred for more than four consecutive years. Moreover, the number of yaks increased while the number of sheep tended to decrease slightly in all the three counties, and the number of horses in the western county and the number of goats in the eastern county decreased. This means a decreased chance of trampling losses of forage and of potential rangeland damage caused by digging because sheep and goats cause more trampling losses of forage (Laycock and Harniss, 1974; Li and Zhang, 2009) and may (along with horses) cause rangeland damage through digging where there are vegetation species that are very loosely rooted in the ground as discussed in the previous section.²⁰⁸ Given that the government did not report there has been a reduction in the rangeland area in the region, all these show that grazing pressure was not intensified significantly in any way in terms of the ratio of stocking rate to rangeland in the thirty years since 1980 in the three research counties.²⁰⁹

²⁰⁷ Pastoralists whom I interviewed in 2008 (39 interviews) in another county (Nyenrong) and in the central research county and in the three research sites in 2009/10 (122 interviews) for the NSF research project ““Extreme weather events, state interventions and pastoral livelihoods: spring snowstorms and vulnerability on the Tibetan Plateau.”” recalled devastating snowstorms occurred in these years, leading to heavy losses of livestock. Official records also reported severe snowstorms in these years.

²⁰⁸ It is difficult to know to what extent a decrease in sheep and goat populations and a simultaneous increase in yak population affect forage consumption because the increase in yak population may offset the amount of forage left from less trampling by sheep and goats.

²⁰⁹ In fact, as discussed in the previous section, in 2010, the TAR Government claimed that the total usable rangeland in the region should be 69 million ha, rather than the 66 million ha or 55 million ha as reported until 2010. It should be noted that altered herding practices such as restricted mobility resulted from sedentarization, RHRS and fencing may increase grazing intensity locally.

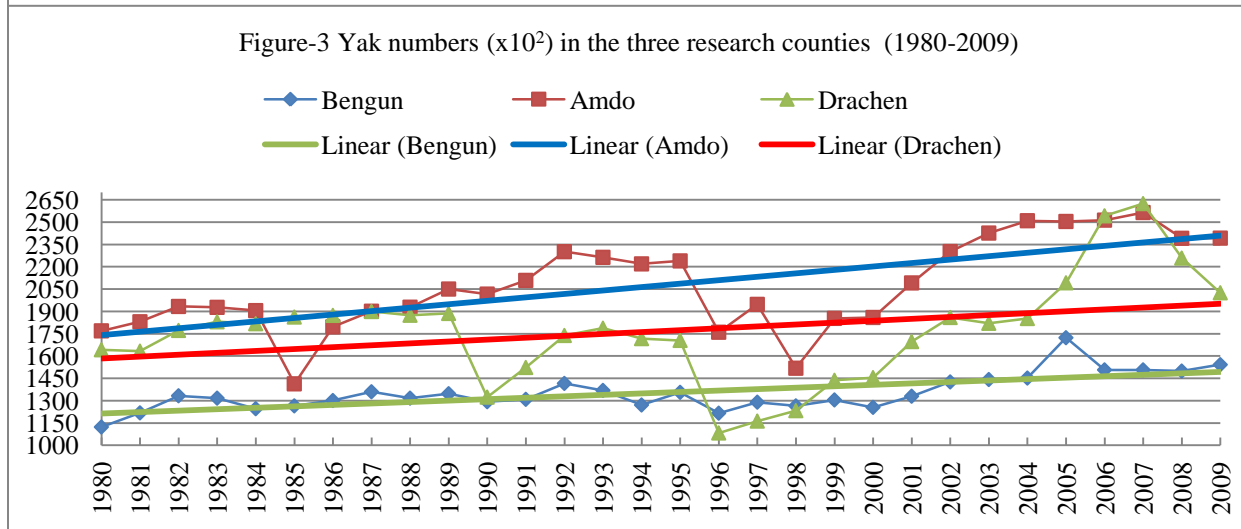
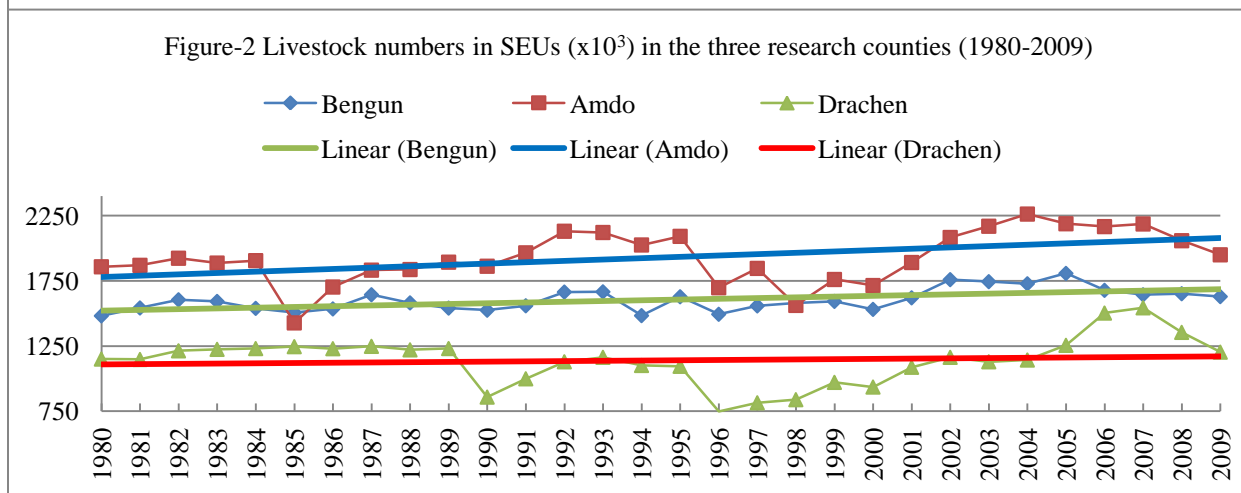
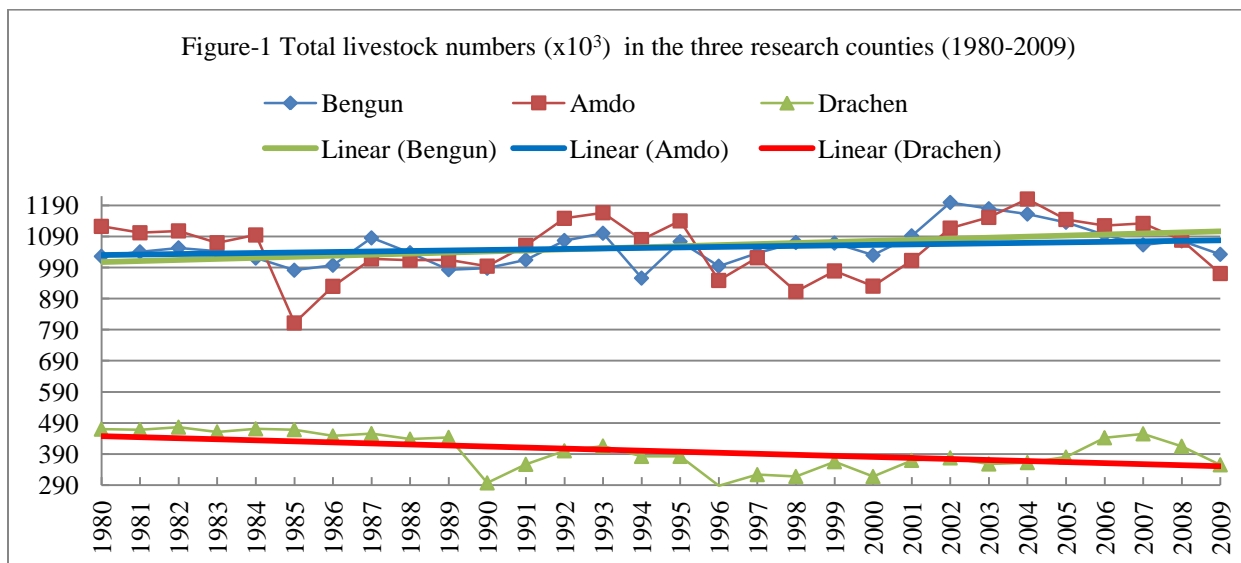


Figure-4 Sheep numbers (x10²) in the three research counties (1980-2009)

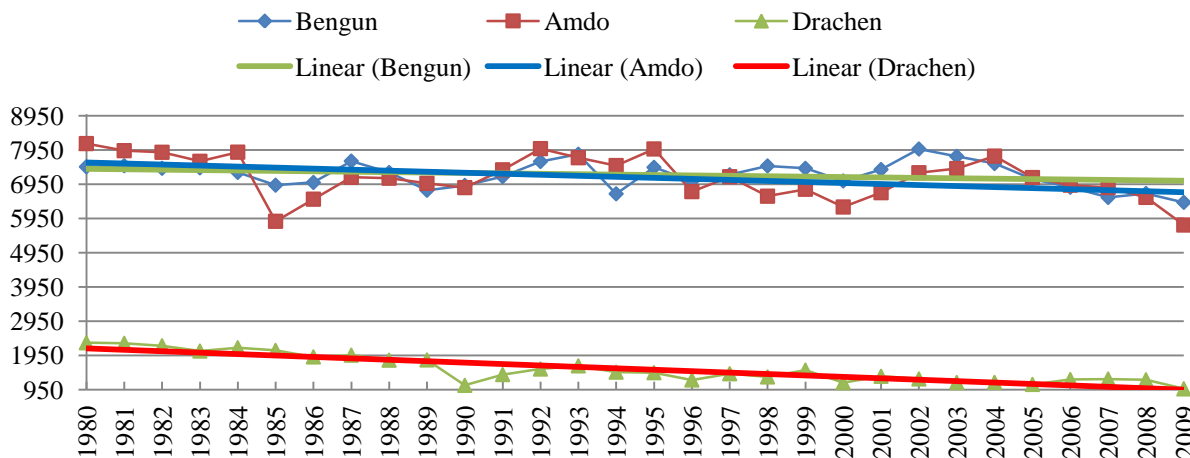


Figure-5 Goat numbers (*10²) in the three research counties (1980-2009)

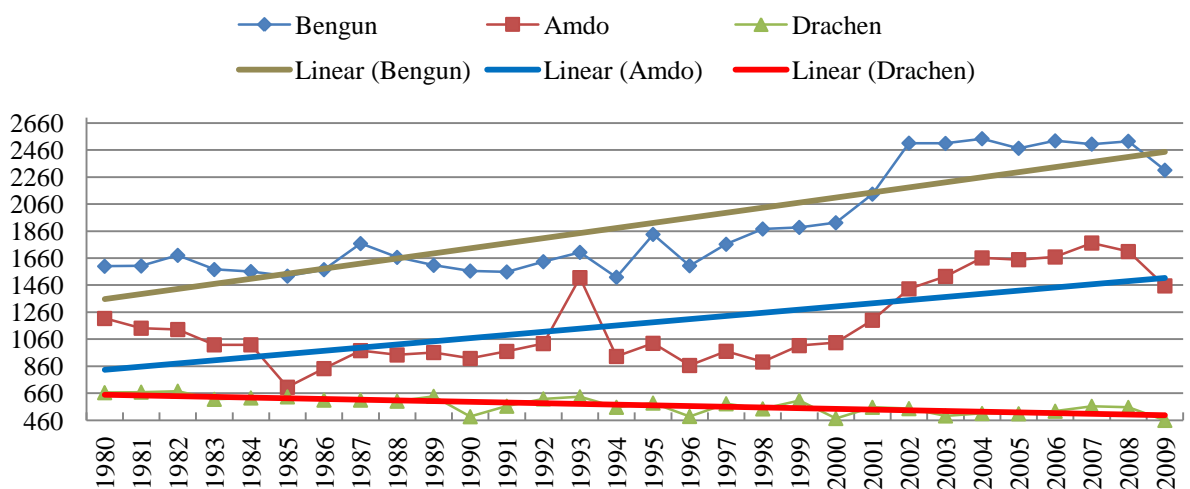
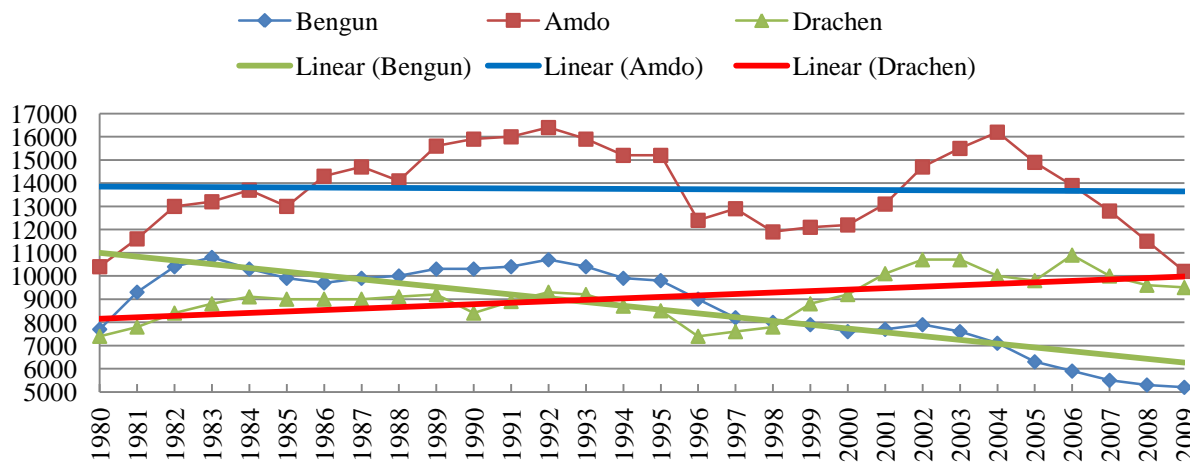


Figure-6 Horse numbers in the three research counties (1980-2009)



If it is true that rangeland degradation has occurred in the region and overgrazing is a major driver of degradation as the government claims, then there appears to be a delay in the effect of livestock grazing. Threshold and nonlinear effects (Friedel, 1991, Laycock, 1991) may explain this. It may take a long time for an ecosystem to reach a threshold point, at which it switches into a degraded state after having been under a certain pressure (grazing, climate change, etc). When the system is pushed past this threshold, the change flips more suddenly, which is not gradual and linear process.

However, evidence from the three research sites does not show that grazing that has taken place up to date has led to any degradation. Virtually all the pastoralists in the three sites do not observe rangeland degradation caused by grazing per se. Thus, they perceive that grazing per se has not damaged rangeland. In fact, some of them observe that in the case of *Kobresia schoenoides*, without adequate grazing the species does not grow well or even gradually disappears. This is consistent with the finding of experiments on the eastern Tibetan Plateau by Klein *et al.* (2005) that moderate grazing assists to modulate species loss under global climate change and with that of a grazing removal experiment in the TAR by Miede *et al.* (2008) that much of *Kobresia Pygmea* is replaced by forbs and graminoids within ten years of grazing removal. Similarly, research on the effects of large mammals on African ecosystems shows that removal of grazing by large mammals with fencing results in changes in both species composition and growth forms, with dwarfed grass in the absence of grazing mammals (McNaughton *et al.*, 1988). Similar grazing experiments conducted by Frank *et al.* (1998) on the effects of herbivores on aboveground production in the Serengeti ecosystem of east Africa and Yellowstone National Park of North America, in which productivity of grazed rangeland was compared with that of ungrazed rangeland fenced off for 1-2 years, also demonstrated that

grazing by herbivores promotes plant growth, indicating that “grazers are important regulators of ecosystems processes in grazing ecosystems.” (p. 520). Thus, it appears possible that the degradation in Research Village 1 in the east might have been caused by undergrazing given that usually the pasture is closed for nearly two-thirds of the year (July-March) and it is open only to female yaks and their calves, though this has yet to be proved (Oba et al., 2000).²¹⁰

At the same time, all the pastoralists in the east, more than half of the pastoralists in the central site and fewer than half of the pastoralists in the west report that livestock have tended to become weaker in terms of size and productivity (milk and meat) over time.²¹¹ They attribute this to grazing control (in the east, see Chapter 2), restricted livestock mobility owing to increasingly strictly enforced administrative boundaries under RHRS and fencing (across the region), declining livestock care in general as elaborated below and declining herding quality in particular. For example, a herder does not stay with livestock all day long or several herders in the east graze their livestock not far from each other in case bears come to attack.²¹² A few

²¹⁰ It is also probable that concentrated grazing due to fencing has led to overgrazing. Using the term “distributional” (*fenbuxing*) overgrazing, Li and Zhang (2009) reported that overgrazing due to concentrated grazing and restricted mobility owing to rangeland use rights privatization and fencing rather than due to the absolute livestock number has contributed to rangeland degradation in Inner Mongolia.

²¹¹ As discussed in Chapter 2, some pastoralists whose grazing land used to be grazed by other Zuks’ livestock before the implementation of the RHRS report their livestock appear to be stronger thanks to more forage left for their own livestock. Similarly, as discussed in Chapter 4, pastoralists in Research Village 2 where fencing is installed as boundaries between other administrative villages and between seasonal pastures report their livestock are stronger as livestock from other villages cannot come to graze in their pastures and they are more able to manage the seasonal pastures.

²¹² Over the past decade, pastoralists in the two research villages in the east and Research Village Two in the west have experienced a bear problem, in which bears come to damage grain, furniture and houses at the settlement when pastoralists are away from home and at the seasonal camps, and in some cases, bears attacked individuals they encountered. During my fieldwork in Research Village One in the east, I witnessed one bear incident and heard of two attacks. One night in May 2010, a bear came to the settlement and killed a goat in the livestock pen next to that of my host family. At that time a village meeting was taking place. Hearing of the bear attack, all the people at the meeting went out to chase the bear (many on motorbike), but the bear ran away, leaving the body of the goat. During my stay in the pastoralists’ winter camp in the north (early November, 2009), a young man from a neighboring community was severely attacked by a bear and left disabled when he and a friend went back home from their winter camp, not knowing a bear was staying in the house (attacked when he entered the house). His friend, who was behind him, was quick to reach for his knife and stab the bear and drove it away. (The bear is said to have died later). One of my interviewees told me he was attacked by a bear when he met it all of a sudden while herding sheep in May 2009. Unable to fight with the bear he did not further provoke the bear, which left after he was left injured.

pastoralists perceive that the weakening of livestock is due to what they think of as an increasing ratio of population to land (as discussed in Section 1) from a historical perspective and decline of what they call “land nutrition”, which can be referred as an overall condition of the environment.²¹³

Although livestock management and the availability of labor power vary from household to household, there is an increasing tendency for pastoralists to be less able to care for livestock and have less labor power for three reasons derived from other changes that pastoralists have been experiencing. First, the improved standard of living makes pastoralists less able to endure hardships associated with pastoralism such as migration, as my host family Puntar in the west said at his fall camp:

Tents are very comfortable to live in during summer and fall. But when the winter is approaching and it is getting colder and windy, we really miss our warm house at the settlement. So if it were not for the sake of the livestock, we would always want to go back to the settlement without moving to the winter camp. We did not have this problem in the past when we did not have a house because at that time we lived in tents all year round.

Second, the younger generation tends not to be able to take care of livestock as the older generation does as a middle-aged pastoralist in the central site said:

The youth of today are not as close to the livestock as our generation has been. Some go to school, which is good for their future. Others just hang around on their motorcycles after having dropped out of school. They are not interested in livestock and do not care for them. When they are sent to herd the sheep, they do not stay with the sheep all day long but come back home several times-with telescopes they just make sure the livestock are safe, but they are not concerned with the principles of herding-driving the livestock to the best pastures in summer and fall and water points in winter and spring. In the evening they are in such a hurry to drive the sheep home without letting them graze while walking back. As a result, the livestock tend to be weaker and do not survive severe weather conditions.

²¹³ *sa bcud yul bcud* in Tibetan. This is Tibetan pastoralists’ concept of the health of the environment. They see it globally rather than just locally-the earth as an integrated being. For example, they believe mining elsewhere will harm their rangeland.

Third, today, a nine-year compulsory education policy has been implemented in pastoral Tibet with the government covering tuition and costs of board and lodging.²¹⁴ Thus parents have no option but to send their children to school for at least several years.²¹⁵ Consequently, pastoralists today have less labor power at home to look after livestock (see Turner, 1999). The second and third issues are much more obvious in the central site. For example, young herders of some households tend not to stay with the sheep all the time as mentioned in the above quote.²¹⁶ This indicates the significant effects of being close to major towns and roads on pastoralists' ways of life and production because they are more exposed to outside influences. As these have been ongoing changes in pastoral Tibet, this decrease in labor power and decreased ability to take good care of livestock has become a growing trend. Because of these other factors, it is difficult to attribute this declining livestock productivity to overstocking (at least entirely) in terms of the absolute stocking rate, which has merely fluctuated over time as discussed earlier.

²¹⁴ Though this is a national policy local implementation varies from place to place. For example, in the western site each school child has to contribute a meat of 20 kilograms (slightly more than one sheep) annually to the township school.

²¹⁵ Pastoralists express a desire to have children leave pastoralism if there is an option of finding a stable off-range job such as working as a government employee, which they find not as hard as engaging in pastoralism, showing that if there is a better way to make a living, pastoralists are willing to leave pastoralism. But the dilemma is that pastoralists' children's chances of finding a government job through education are slim due to poor education in pastoral areas, financial burdens and corrupt governments. When these children come back home after several years at school, they find it hard to adjust to their living as pastoralists and become jobless. Under such circumstances, parents would rather not send children to school in the first place as they believe that though hard, working as a pastoralist is at least a living. However, now with the Chinese language dominating every aspect of modern life, an increasing number of pastoralists have decided to send their children to school not only for the purpose of getting an off-range job, but also having them better equipped to be adapted to the changing socioeconomic environment and participate in modernization.

²¹⁶ During my stay in the central site, I often saw my host family Lhukbak's son Gyaljop come back home frequently when he was sent to herd the sheep. One day Lhukbak received a call from a neighbor telling him that they saw a wolf chasing his sheep while Gyaljop was back at home. Lhukbak and Gyaljop went there immediately on motorcycle and were able to get there before the wolf killed the sheep.

In sum, pastoralists' observations of rangeland degradation stand in sharp contrast to what is reported by the government in terms of both magnitude and causes. In contrast to widespread rangeland degradation primarily driven by overgrazing across the region as reported by the government, merely localized rangeland degradation caused by off-road vehicles (western Nagchu), by livestock trampling (central and eastern Nagchu) and by the burrowing of voles (eastern Nagchu), and by wind, water and sand erosion (in some places) is observed by pastoralists. These different direct causes of rangeland degradation are largely associated with different rangeland types and different topography while the underlying causes of off-road driving more trampling and the abundance of voles are principally related with government policy implementation. Topographically, off-range driving is easy in western Nagchu as it is a large plain dominated by alpine steppe and desert steppe. Practically, weak enforcement of rangeland protection laws and regulations makes off-road driving possible and persistent, leading to rangeland damage.

Of the three major livestock activities (grazing or more precisely herbivory, trampling and digging), pastoralists observe that prolonged and concentrated livestock trampling derived from restricted livestock mobility caused by the RHRS and fencing causes more forage losses, leading to forage utilization inefficiency. They further observe that sheep and goats cause more trampling losses of forage than yaks. Moreover, pastoralists in the central and eastern sites observe that prolonged and concentrated trampling also leads to localized rangeland degradation on alpine meadow-dominated rangeland. Pastoralists see little chance of sand pastures being damaged by livestock digging in late spring and early summer because there are few vegetation

species very loosely rooted in the ground that can be damaged by digging.²¹⁷ Contrary to what policymakers and officials believe, pastoralists observe that grazing to date has not led to any degradation. Many pastoralists report weaker livestock and lower livestock productivity mainly owing to grazing control (in the east), restricted mobility derived from increasingly strictly enforced administrative boundaries under RHRS and fencing (across the region) and a declining livestock care. Therefore, because of these factors, many of which are policy-induced, it is hard to assert that lower productivity of livestock is a sign of overstocking.

Lastly, being considered as pests, pikas and voles have been targets of massive control initiated by the government. Whether the abundance of pikas or voles is a cause or an effect of rangeland degradation remains uncertain. Nonetheless, both pastoralists' observations and changing pika control tactics (started attempting biological control approaches since the 2000s) by the government have proved that pika and vole poisoning is counterproductive, which in turn may accelerate rangeland degradation and expand the extent of degraded areas even though pikas or voles may not be an original cause of degradation. Furthermore, although pastoralists across the region also consider the abundance of pikas or voles as a problem because they dig burrows, they do not desire to kill pikas or voles for both religious (killing as a sin) and practical reasons (observations of fluctuation of pika and vole populations in natural conditions and of killing being counterproductive).

Conclusion

Ecologically, the scientific and theoretical foundation of China's rangeland management policies has been the equilibrium ecosystem paradigm since the adoption of a concept of forage and livestock balance (*caoxu pingheng*) in the early 1980s. This conceptual framework for

²¹⁷ It should be noted that unlike the other species of livestock (yaks, sheep and goats), which are driven back to where pastoralists settle or camp in the evening, horses may graze day and night as they are left alone.

understanding rangeland dynamics posits that rangelands across the country function as equilibrium ecosystems with livestock density as the most important factor affecting rangeland health. The promulgation of Regulations on Maintenance of Forage and Livestock Balance (*caoxu pingheng guanli banfa*) by the Ministry of Agriculture in 2005 highlights equilibrium assumptions made in China's rangeland management policies. In other words, the perception of equilibrium rangeland dynamics has been adopted beyond question as the only possible paradigm in rangeland management despite the diversity of the rangelands and a significant body of research in range ecology since the 1980s that suggests complexity to ecological systems (non-equilibrium dynamics, a gradation between strikingly different ecosystems, the state and transition model, threshold effects, etc). Accordingly, adjusting stocking rate to carrying capacity is both a means and a goal of rangeland management in practice.

Nonetheless, the application of carrying capacity may be of very limited relevance to range management in Nagchu in terms of the concept per se and has proven problematic in terms of its determination in practice. As to the concept, rangeland ecosystems in Nagchu demonstrate both equilibrium and disequilibrium features through significant variation in precipitation in the early part of the growing season, density-dependent dynamics in livestock productivity from a historical perspective, and density-independent mortality under unfavorable weather conditions. This hybrid of equilibrium and disequilibrium dynamics suggests that the ecosystems are subject to spatial heterogeneity and temporal variability. Thus, the concept of carrying capacity may not be very appropriate to rangeland ecosystems in Nagchu. As to the determination of carrying capacity in practice, cases from Nagchu show that it has more to do with political and economic factors than carrying capacity as defined from a scientific perspective and as claimed to be a scientific approach, and is simply flawed.

Therefore, as the determination of carrying capacity turns out to be simply flawed in the first place, it is sensible to question the credibility of official reports of overstocking based on carrying capacity and of rangeland degradation that the government claims is caused by overgrazing. China reported in the 1980s and today that the percentage of its degraded rangeland had been 15% and over 30% by the mid 1970s and the mid 1980s respectively, and that the percentage has been 90% since 1997, with overstocking and overgrazing being considered as a principal driver of degradation. However, an in-depth study of official reports of rangeland degradation reveals contradictory, problematic and inconsistent statements regarding the magnitude and extent of rangeland degradation in China and in the TAR.²¹⁸ This naturally makes it reasonable to question the magnitude and extent of rangeland degradation. In the case of the TAR, reports of rangeland degradation are evidently shaped to meet particular political-economic aims. Moreover, it appears that among possible causes of rangeland degradation, some (such as overstocking and overgrazing) may be overstated while others (such as climate change and reclamation) may be underestimated.

In fact, no evidence of pervasive rangeland degradation claimed by official reports is observed by pastoralists in Nagchu, which is the largest pastoral prefecture on the Tibetan Plateau in terms of area (rangeland area of 340,000 km²) and stocking rate (approximately 15 million SEUs over time). Instead, pastoralists in Nagchu observe localized rangeland degradation caused by off-road vehicles (western Nagchu), by prolonged and constant livestock trampling (around settlement houses, watering points, fencing gates, between crowded fenced pastures, along livestock routes in central and eastern Nagchu) and by the burrowing of voles (eastern

²¹⁸ Some researchers uncritically take official reports of degradation and overstocking as fact. For example, Tashi Nyima (2003, p. 167), Miller (2005, p. 319).

Nagchu), and by wind, water and sand erosion (in some places). Furthermore, contrary to what policymakers and officials believe, pastoralists do not observe and perceive that livestock grazing per se, or more precisely herbivory, has caused rangeland degradation. Thus, pastoralists' observations of rangeland degradation stand in sharp contrast to what is reported by the government in regard to both magnitude and causes. Pastoralists' observations of rangeland degradation are based on observable physical changes through their close engagement with rangeland and livestock. Hence, different rangeland types and different topography matter. This makes a strong contrast with official reports of rangeland degradation that are largely based on carrying capacity calculation and the conditions of what is assumed by outsiders to be degraded rangeland, but which are in fact original in pastoralists' living memory. Moreover, rangeland damage caused by off-road driving reflects weak enforcement of rangeland protection laws and regulations while the RHRS and fencing increase the chance and frequency of prolonged and constant trampling. In addition, pika and vole poisoning, which has proven counterproductive, may accelerate rangeland degradation and expand the extent of degraded areas even though pikas or voles may not be an original cause of degradation. Therefore, all these causative agents of rangeland degradation reported by pastoralists are ultimately associated with government policy implementation. Lastly, if the rangeland has been degrading to an extent and at a rate as the government claims it must significantly affect livestock productivity, and hence pastoralists' livelihood. Should we not expect pastoralists to report it for help? But they do not, the implication of which is clear: There does not exist pervasive rangeland degradation in Nagchu, TAR as government "received wisdom" suggests.

Lastly, in addition to the inappropriate equilibrium assumption underlying China's range management policies, considering the impact of grazing on rangeland from an evolutionary

perspective (Milchunas et al, 1988; Cingolani et al, 2005) and a long history of grazing on the Tibetan Plateau (Miehe et al, 2009), this dissertation suggests that current policies on rangeland management may be inappropriate to the Tibetan rangeland.

Chapter 4

“Retire livestock, Restore Rangeland”: China’s Strategy for Restoring and Improving Rangeland: Rationales and Incentives

I think we have been doing a good job with the tuimu huancao program in our prefecture. For example, by the end of last year [2008], the program had been implemented in nine counties out of the eleven counties [in the prefecture] with an investment of over 300 million yuan from the central government. We are trying our best to make the higher-level government satisfied with our work... A handful of pastoralists were not enthusiastic about the program at the beginning. But through our education [literally “thought work”], these pastoralists have now also happily accepted the program...

This quote is from an official at the prefectural BAAH who was telling me how *tuimu huancao* was being implemented in Nagchu. This chapter examines why the central government has launched *tuimu huancao*, what provides an incentive for local officials from the regional down to township levels to implement the program, and how pastoralists respond to the program. It begins with a review of rangeland enclosure in Nagchu before the implementation of *tuimu huancao*

1. *Fragmenting the Pastoral Landscape: A Review of Rangeland Enclosure in Nagchu*

In terms of the function of fencing, rangeland enclosure has gone through four stages in Nagchu Prefecture as it did across the entire TAR (Bauer, 2005, Wang, 1992) (see Table 19). Fencing was introduced to Tibetan pastoralists during the campaign of Learn from Dazhai in Agriculture in the 1970s (1964-78) (Shapiro, 2001) when pastoralists built stone walls to reserve pastures for the purpose of future use or hay harvest.²¹⁹ From the reform era until the implementation of the policy of rangeland use rights privatization, the primary function of fencing was to reserve pastures. Under the policy of rangeland use rights privatization

²¹⁹ Enclosure of portion of grassland to reserve it temporarily from livestock grazing was an indigenous practice in the Inner Mongolia known as *kulun* in the local language. During China’s collective era in the 1950s, several brigades began enclosing and setting aside the most fertile meadows as communal winter hay reserves. In 1963, a fencing experiment was initiated at the Wushenzhao (Uxinju) Commune, which was later portrayed as a national model (Williams, 1996).

pastoralists have to use fencing as boundaries to protect their grazing land. Today, pastoralists have to fence “degraded” rangeland under *tuimu huancao*. In eastern Nagchu, where there is caterpillar fungus, pastoralists also use fencing to save labor during caterpillar fungus harvesting season and where there is a land dispute they also use fencing to seize land. Today, in many places, the two primary functions (i.e. to reserve pastures and use as boundaries) overlap with each other.

Table 19 Functions of fencing in Nagchu Prefecture, TAR

Year	Western Nagchu	Central Nagchu	Eastern Nagchu	Material
Learn from Dazhai (from 1973)	to reserve pastures (<i>'jagma, na</i>) and to harvest <i>'jagma</i> at the commune level	to reserve pastures (<i>na</i>) at the commune level	to reserve pasture (<i>na</i>) at the commune level	stones
During the reform era	/	from early 1980s to reserve pastures (<i>na</i>) at the administrative village (or <i>zuk</i> level) level	from late 1990s -to reserve pastures (<i>na</i>) at the administrative village level -to seize disputed land (from Zaduk pastoralists in Qinghai Province) -to use during the caterpillar fungus harvesting season (June) at the administrative village level	wire fencing
RHRS	from 2003 to use as inter-village (or inter-household) and inter-seasonal pasture boundaries	from 2005 appearance of individual family fences to reserve <i>na</i>	from late 2000s appearance of small individual family fences around houses to reserve <i>na</i> ²²⁰ or to seed	
<i>tuimu huancao</i>	from 2007 to improve “degraded” land and to seed (<i>sa nag</i>) at the administrative village level -also used as boundaries	started in 2007 -to improve “degraded” rangeland and to seed (<i>spang, sa nag</i>) at the <i>zuk</i> level -also used as boundaries between administrative villages and Zuk	from 2009 to improve “degraded” rangeland and to seed (<i>sa nag</i>) at the administrative village level -reserve pastures (<i>na</i>) ²²¹ at the administrative village level in the north ²²²	wire fencing

²²⁰ Some families fenced communal grazing land even without the implementation of RHRS several years before this period and used them privately

²²¹ As discussed in Chapter 5, in this county *tuimu huancao* fencing is also used to reserve *na* in the north.

²²² This may also function as a strategy to seize the disputed land (from Zaduk pastoralists)

between
administrative
villages

In the central research village, pastoralists started fencing a large alpine marsh meadow (*na*) (about 14 km in diameter)²²³ in 1973 with stones as a reserve pasture during snowstorms. The pastoralists found the fence not useful as it could not prevent livestock from grazing inside and gradually it just crumbled. In 1984 the stone fence was replaced with wire fencing provided by the government.²²⁴ At the same time, several other alpine meadows were fenced for the same purpose. As discussed in Chapter 2, when the policy of rangeland use rights privatization was implemented in 2005 in this village, communal rangeland management practices at the Zuk level were maintained. In practice grazing cross-Zuk was not a big problem, and this fenced alpine marsh meadow remains as a spring pasture (usually from mid Feb to mid June) for the whole village to date. It is also open for emergency during snowstorms. For example, during a snowstorm in October 2009, the alpine meadows (*spang*) were totally covered by snows and could not be grazed, thus many families grazed their livestock on this pasture.²²⁵ As discussed in Chapter 2, since rangeland use rights privatization, rich households and a small group of households have started fencing their alpine marsh meadows near their home bases to reserve forage for the calving and lambing periods or for severe weather conditions. This has led to a situation in which unfenced pastures are shared by all households while fenced alpine marsh meadows can only be used exclusively by those households (Williams, 1996, 2002). In 2008, one of the Zuk decided to remove their communal alpine marsh meadow fence and reinstall it at the natural village level (or several households together) as households near it benefited more from it

²²³ Estimated from a rough calculation based on GPS coordinates of the four corners of the fence; according to the village head, the fenced zone is 14, 000 *mu* (933 ha).

²²⁴ Barbed wire was invented in the American West in 1874 in order to control the motions of cows (Netz, 2003).

²²⁵ During this period I was at my host family whose house is not far from this pasture. It snowed heavily on October 8 and that night. By the morning of October 9, the snow depth was ten centimeters.

by grazing their livestock during the period when it was supposed to be closed off. This shows that in the absence of village regulations reserve pastures at a small scale (the natural village level or several households together) can be better managed.

The implementation of *tuimu huancao* has intensified the policy of rangeland use rights privatization. With the start of the implementation of *tuimu huancao* in 2004 in Nagchu, fencing has been used to enclose “degraded pastures,” which include alpine meadow pastures for the *xiumu* component of the program and sandy pastures for the *jinmu* component of the program in central Nagchu. For pastoralists in alpine meadow-dominated central and eastern Nagchu, fencing alpine marsh meadow pastures is the best for the purpose of reserving forage for winter-spring, snowstorms, calving and lambing periods, and/or for fattening livestock, as the vegetation will not be covered completely by snows during minor snowstorms. Fencing alpine meadow pastures does not make sense to pastoralists other than as boundaries as the vegetation will be easily blown away by wind in winter after it is trampled on by livestock in summer and fall. Vegetation can also be blown away by big winds even without livestock stepping in summer and fall, and easily covered by snows (as shown from the above case).²²⁶ Fencing sandy pastures (*sa nag* or *bye sa*) does not make much sense to pastoralists either other than as boundaries or for the purpose of seeding of grass as the vegetation (e.g. *ldunbu*) will be blown away by wind anyway if it is not grazed by livestock, which will be a waste of resources for pastoralists. As discussed later in Section 5, when officials from the county BAAH made it mandatory for pastoralists to implement *tuimu huancao*, pastoralists in this village had to take advantage of the free fencing

²²⁶ This is because *Kobresia pygmaea* (alpine meadows) is soft and loosely rooted whereas *Kobresia schoenoides* (alpine marsh meadow) is hard and tightly rooted. The former is short (less than three centimeters) whereas the latter is long (over 15 centimeters).

provided by the state to use one side of it as a boundary between a neighboring administrative village or Zuk. Since then grazing cross-Zuk has been restricted.

The case from the western site shows that in places where there are distinct seasonal pastures, fencing set up as boundaries between seasonal pastures helps pastoralists better manage the pastures while it does not restrict livestock mobility given the size of the zones. Pastoralists in sandy pasture-dominated western Nagchu started fencing *'jagma (Trikeriaia hookeri)* pastures with stones for hay harvest in fall and snowstorms in 1973. They also found them useless and as time passed, the stone fences just fell apart. It was not until the early 2000s that the pastoralists started setting up wire fences. In the case of Research Village 2, in 2003 during the implementation of the policy of rangeland use rights privatization, county and township officials encouraged the pastoralists to better manage and “construct” their rangeland. Accordingly, the village leadership requested fencing from the county BAAH through the township government and built it to reserve a portion of the spring pasture, which is not grazed between the period of early June and early Feb, to fatten around 100 yaks to be slaughtered and sold in winter for three months (August-October). The pastoralists found fencing material very useful. But at the same time they found in fact there was little difference between forage availability inside and outside the fence as the spring pasture is not grazed during that period anyway. Thus, the village leadership requested more fencing from the government and removed the fattening fence, and has been able to fence the whole spring pasture as one single zone.

It has also set up boundary fencing between other administrative villages, and between seasonal pastures (between spring and fall, between fall and winter/summer) after the county BAAH launched a fencing program worth 40 million *yuan* in the county in 2005 as boundary

fencing, of which the pastoralists covered half the costs.²²⁷ The county decided to do so because both pastoralists and township and county officials saw without physical boundaries, rangeland boundaries described in the Rangeland Contractual Management Certificate remain on paper and just nominal, making the policy practically meaningless. All the families surveyed for this research in this village made a very positive comment on fencing by saying since the boundary fencing was installed their livestock are stronger and healthier because more forage is left in the fenced pastures as livestock from other villages cannot come to graze in their pastures and they are more able to manage the seasonal pastures. The village leadership arranges for each family to go to patrol it for several days on a rotational basis, according to the size of the family's land in the Rangeland Contractual Management Certificate. Research Village 1 in the west was reinstalling their inter-household boundary fencing set up during the 4-year individual rangeland tenure as inter-village and inter-seasonal pasture boundaries, as in Research Village 2 after the communal rangeland use was restored in 2008 (see Chapter 2). Today, pastoralists in the west have also used fencing to reserve *'jagma* harvesting areas. In 2008/9, the two villages fenced sandy pastures (*sa nag*) under *tuimu huancao* and some sides of the fencing also function as boundaries between administrative villages.

In the eastern site, just like in the western and central sites, in 1973 the pastoralists also built stone fences to reserve alpine marsh meadows for future use, which was not very useful and gradually disappeared as families took the stones to build houses after the campaign. Wire fencing was not used until the late 1990s. After the two devastating snowstorms of 1989/90 and 1995/6 which hit eastern Nagchu severely, the government provided pastoralists with fencing and asked them to reserve alpine marsh meadows as part of its strategies for coping with future

²²⁷ As discussed in Chapter 2, Research Village 2 in the west decided to maintain the communal rangeland management practices within the village. This village used a total of 690 rolls of fencing (200 meters one roll).

snowstorms.²²⁸ For example, in the case of Research Village 2, in 1998 the township government gave the pastoralists 20 rolls²²⁹ of fencing and the pastoralists fenced one alpine marsh meadow pasture in the south where their home bases are and another alpine marsh meadow pasture in the north bordering a community in Zaduk County of Yulshul Prefecture, Qinghai Province. The fences are closed off usually between July and January and are used during the calving and lambing periods and snowstorms, and during the caterpillar fungus harvesting season (June). This has become a new function of fencing, enabling the pastoralists to spend less time on herding livestock by putting the livestock in fences during the daytime and driving them back home in the evening. It appears that putting up the fencing in the north is also the pastoralists' strategy to claim land from the community in Zaduk as use rights are unclear between the two communities. In recent years, according to pastoralists here, Zaduk pastoralists take advantage of having more fencing (provided by their government) to seize their pastures.

After the establishment of the fencing two spring snowstorms occurred but the pastoralists did not lose many livestock. Therefore, they found fencing very useful and bought 121 rolls on their own in 2001 and fenced an alpine meadow that is open to weak livestock (i.e. calves, milking yaks, two-year-old yaks and lambs) for two months (May and June) and during snowstorm. The problem is that poor families who did not contribute money when the fencing was purchased cannot graze in the fenced zone as the village head told them, "Although the land is state land, the fencing is private fencing."²³⁰ Some elite families have also fenced small land around their houses and grown grass inside, which they find very useful during snowstorms. In

²²⁸ Livestock death rate for this county was 40 % in the 1989/9 snowstorm and 25% in the 1995/6 snowstorms 'A Collection of Data on Fight against Three Snowstorms in the 1990s' (*naqu diqu jiushi niandai sancu kang xuezhai douzheng ziliao huibian*). Office of CPC Committee of Nagchu Prefecture, TAR, December 2000; Drachen County Census Data (1980-2009), Drachen County Census Bureau, 2010.

²²⁹ One roll 200 meters

²³⁰ In this village, the policy of rangeland use rights privatization has not been implemented yet as discussed in Chapter 2

Research Village 1, the use of fencing is similar to the case of Research Village 2, fencing alpine marsh meadows for future use and snowstorms. In this village as discussed in Chapter 2, the village committee privatized the use rights of pastures near the settlement houses in 2009. Families are encouraged to fence the land to grow grass inside, which appears to be required by the township government. In fact some alpine marsh meadows around the settlement houses were fenced off and used privately by households starting in 2005, and around 2007 each household was allowed to fence off an area of alpine marsh meadows of half a roll of fencing (100 meters) by the village committee. In 2009, the two villages fenced sandy pastures under *tuimu huancao*.

Across the region, where large areas of alpine meadow pastures are fenced off, pastoralists will have to graze the livestock on alpine marsh meadow pastures in the summer. They will end up having inadequate forage during the period of late winter and early spring or no emergency fodder during snowstorms as the vegetation on the alpine marsh meadow pastures is used up in the summer while the one on alpine meadow pastures is either blown away by wind or covered by snows. Furthermore, regardless of rangeland types, if large pastures need closing through fencing during the growing season, livestock will end up having not enough forage during the critical period when they are recovering from the winter, even though they have more forage in the fall when the fenced pasture is open. This tradeoff is not worthwhile for pastoralists.

In sum, cases from the three research sites illustrate that as material, fencing is neutral. The usefulness or harmfulness of fencing depends on how it is used based on local conditions. The best-case scenario for meadow pasture-dominated central and eastern Nagchu is just to fence alpine marsh meadows at the natural village level (or several households together) to reserve pastures, depending on the local situation, and in sandy pasture-dominated western Nagchu,

fencing set up as boundaries between seasonal pastures is the best-case scenario. Other than for these two purposes, too much fencing restricts livestock mobility, which increases the chance and frequency of trampling as livestock have to move between fenced pastures, leading to localized rangeland damage (around fence gates and settlements, and between fenced pastures) as discussed in Chapter 3, but also makes livestock unhappy as discussed in Chapter 2. Fencing can make it more difficult for livestock to navigate around fencing in the search for usable pasture during snowstorms. Furthermore, as discussed in Chapter 2, the policy of rangeland use rights privatization together with fencing damages the traditional social norms and harmony among pastoralists (Williams, 1996, 2002). As a pastoralist in the central site put it, “An ideal situation would be that nobody has fencing and we graze as before because fencing has become the source of conflicts over grazing” (Yeh, 2003). Unfortunately, under the policy of rangeland use rights privatization and *tuimu huancao*, fencing has become a technology of governmentality (Foucault, 1995; Li, 2007; Agrawal, 2005) as have livestock shelters, as discussed in Chapter 2 in the sense that the government initiated the policy and introduced fencing to pastoralists and now pastoralists have no choice but to have fencing to protect their pastures from being used by livestock from other villages or households, thus helping to fulfill the government’s goal of breaking up the traditional communal rangeland land use system. As a young pastoralist in the central site put it when asked if he wants to set up a family fence:

It is not good to have a private fence because it is not good to graze in others’ land while I do not let others come to graze in my land. But if other families set up fences and do not let my livestock go to graze in their land, then I will have to do the same.

Therefore, pastoralists still desire fencing if it can be used for a particular purpose derived from desires shaped by governmentality, for example, reserving alpine marsh meadows or as boundaries.

2. *Central Government: Manipulating the Tool of Three Sheng (Shengtai/Environment, Shengchan/Production and Shenghuo/Livelihood to Transform Traditional Pastoralism*

The central government policymakers articulate the rationale for the implementation of *tuimu huancao* in three aspects: environment, production and pastoralists' livelihood. As discussed in Chapter 3, they believe that there exists widespread rangeland degradation in the country, which not only hinders pastoral and economic development of the region and affects pastoralists' livelihoods, but also threatens the country's ecological security and affects its sustainable socioeconomic development.²³¹ In the case of the Tibetan Plateau, the "upstream downstream" argument (see Blaikie and Muldavin, 2004; Forsyth, 1996; Ives and Messerli, 1989) is adopted to state that rangeland degradation on the plateau, the source region of China's major rivers, affects the environment and sustainable socioeconomic development in downstream China.²³² Therefore, the central government policy makers have designed *tuimu huancao* not only to reverse rangeland degradation, but to promote pastoral production, and to improve pastoralists' livelihood.

In practice, rangeland use rights privatization, rather than rangeland degradation, has turned out to be the principal precondition for the implementation of *tuimu huancao*. The first central government document on *tuimu huancao* states that the policy of rangeland use rights privatization should be further implemented (*jinyibu wanshan*) as a prerequisite for *tuimu huancao* to make sure individual households are responsible for managing (*jingying*), protecting (*baohu*) and constructing (*jianshe*) rangeland, and that the policy of rangeland use rights

²³¹ 'Notice regarding Assigning Tasks of Implementing the *tuimu huancao* Program in 2003' (*guanyu xiada 2003 nian tuimu huancao renwu de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 18 March 2003.

²³² 'National Comprehensive Plan for Grassland Protection, Construction and Utilization' (*quanguo caoyuan baohu jianshe liyong zongti guihua*). Ministry of Agriculture, 4 April 2007.

privatization is a basic policy in China's pastoral area.²³³ Central government documents issued after this document reiterate the importance of the implementation of the policy of rangeland use rights privatization as a policy for implementing *tuimu huancao*, but all these documents give no explanation of why the implementation of the policy is necessary before *tuimu huancao* is implemented.²³⁴ The head of Grassland Office of Department of Animal Husbandry under the Ministry of Agriculture explained:

The Rangeland Household Responsibility System is our Party's basic policy on rangeland management in our country's pastoral areas, which was initiated in the 1980s and is supported by local governments and pastoralists. The rangeland household responsibility system has proved to an effective way to solve the problem of eating out of one big pot in rangeland management and use rangeland sustainably. In terms of how project counties are decided, good implementation of the rangeland household responsibility system is a precondition for tuimu huancao. That is to say that the potential project sites must be places where the rangeland use rights have been contracted out to individual households. Otherwise it would be difficult and impossible to give the compensation, meaning it would be difficult to decide to whom the compensation should be paid.

She conveys two messages here. First, the policy of rangeland use rights privatization is China's basic policy in its pastoral area. Thus it should be a base for any other policies on rangeland and pastoralism. Second, in terms of the implementation of *tuimu huancao*, through the policy of rangeland use rights privatization the government needs to know how much grazing land of an

²³³ 'Notice regarding Assigning Tasks of Implementing the *tuimu huancao* Program in 2003' (*guanyu xiada 2003 nian tuimu huancao renwu de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 18 March 2003.

²³⁴ 'Notice Regarding Doing A good Job in the *tuimu huancao* Work in 2004' (*guanyu zuohao 2004 nian tuimu huancao gongzuo de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 5 April 2004; 'Suggestions regarding Another Step toward Strengthening the Implementation and Management of the *tuimu huancao* Program' (*guanyu jinyibu jiaqiang tuimu huancao gongcheng shishi guanli de yijian*). Ministry of Agriculture, 11 April 2005; 'Notice on Several Opinions Regarding Another Step toward Perfecting Several Policy Measures on *tuimu huancao*' (*guanyu jinyibu wanshan tuimu huancao zhengce cuoshi ruogan yijian de tongzhi*). the Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, the State Grain Administration, April 20, 2005; 'Notice Regarding Doing A good Job in the *tuimu huancao* Work in 2005' (*guanyu zuohao 2005 nian tuimu huancao gongzuo de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 30 April 2005.

individual household is included in a fenced zone under the project in order to figure out how much it should be compensated.

As discussed in Chapter 2, in many cases rangeland use rights being contracted out means to issue each individual household a Rangeland Contractual Management Certificate (*caochang chengbao jingyingquan zheng*) that provides details about how much grazing land is allocated to the household, while the grazing land is still used collectively, which at least helps the government know how much grazing land a household has. The first central government document on *tuimu huancao* suggests that the target area for the project on the Tibetan Plateau should be the eastern Tibetan Plateau where some great rivers originate. However, Getse County in western TAR was selected as one of the first three target counties in the TAR for the project, though it is not a source area. Asked if it was because the Rangeland Household Responsibility System had been well implemented in Getse, this official admitted that this was indeed the case.

Asked why these counties (Nagchu, Driru and Getse) of the TAR were chosen as the first three target counties when the program was launched in 2004, and if it was because of more severe rangeland degradation in these three counties than in other counties, an official from the regional DAAH who was involved in the project responded that the primary reason was good implementation of the policy of rangeland use rights privatization in these three counties. He explained, “They (the central government) explicitly told us that without the grassland being contracted out, the state will not invest in rangeland protection and construction.” Thus, since 2005 in order to receive *tuimu huancao* from the central government, the TAR government has intensified and accelerated the implementation of the policy of rangeland use rights

privatization.²³⁵ “The more grassland contracted out, the more investment in *tuimu huancao*,” he said. In other words, the selection of the first three counties for *tuimu huancao* in the TAR had nothing to do with the rangeland condition in these counties.

In Nagchu the prefectural BAAH put forward the principle of “no contract, no fencing” (*bu chengbao, bu weilan*), meaning without the rangeland use rights being contracted out to individual households, *tuimu huancao* will not be implemented.²³⁶ Officials there cited Sok County where the program has not been implemented because the policy of rangeland use rights privatization has not been implemented as an example of the latter being the primary precondition for the program. Two years after the program was launched a central government document stated that the implementation of the policy of rangeland use rights privatization had been promoted as one of the achievements of the program.²³⁷ Therefore, the most important precondition for the implementation of *tuimu huancao* is the rangeland use rights privatization policy rather than rangeland degradation. This means that, between two counties, one with severe rangeland degradation but without the implementation of the policy of rangeland use rights privatization while the other without severe rangeland degradation but with the implementation of the policy of rangeland use rights privatization, the latter will be first priority rather than the former.

Furthermore, *tuimu huancao* is intended to intensify existing policy directions that aim to transform traditional pastoralism. The first central government document on the project

²³⁵ Request regarding Increasing Investment in *tuimu huancao* in the TAR (*guanyu jiada dui xizang zizhiqu tuimu huancao de qingshi*). Department of Agriculture and Animal Husbandry of the TAR, 2005.

²³⁶ Material on the *tuimu huancao* Program in Nagchu Prefecture (*naqu diqu tianran caoyuan tuimu huancao gongcheng jiaoliu cailiao*), Nagchu Prefectural Bureau of Agriculture and Animal Husbandry, 26 March 2009.

²³⁷ ‘Notice Regarding Doing A good Job in the *tuimu huancao* Work in 2005’ (*guanyu zuohao 2005 nian tuimu huancao gongzuo de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 30 April 2005.

advocates the application of carrying capacity in rangeland management and raising livestock in pens and with feed along with the implementation of *tuimu huancao*.²³⁸ To fulfill this criterion, in its proposal the TAR government said it had been making the effort to transform the traditional production system. For example, it had been trying to breed livestock in pastoral areas but fatten them in agricultural areas, to slaughter livestock in the warm season.²³⁹

The primary goal of the policy of rangeland use rights privatization is to transform the traditional communal rangeland land use system to a system of private use rights (Humphrey and Sneath, 1999; Williams, 2002). The application of carrying capacity in rangeland management and raising livestock in pens and with feed has the goal of transforming the traditional production practice of raising livestock on extensive grazing land. The facts that the policy of rangeland use rights privatization is the primary precondition for the implementation of *tuimu huancao* and that transformation of traditional pastoralism is emphasized along with the implementation of the program show that *tuimu huancao* is not merely a rangeland improvement program, but part of China's overall goals of transforming traditional pastoralism into a modern intensive production system.

3. Local Governments: Driven by Economic and Political Incentives

Five institutions at the central government level are involved in formulating, coordinating and implementing *tuimu huancao*, namely the Office for the State Council Leading Group for Western China Development (OWCD), the National Development and Reform Commission

²³⁸ The new *tuimu huancao* policy adjusted in August 2011 has stressed the construction of livestock shelters and pens, and feed bases (*rengong sicao di*) in order to modernize traditional pastoralism. Each household is expected to build a livestock shelter of 80 m² with a subsidy of 3000 *yuan* from the central government. The subsidy for construction of feed bases will be 160 *yuan* per *mu* from the central government. 'Suggestions regarding Perfecting the *tuimu huancao* Policy' (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

²³⁹ 'Request regarding Increasing Investment in *tuimu huancao* in the TAR' (*guanyu jiada dui xizang zizhiqu tuimu huancao de qingshi*). Department of Agriculture and Animal Husbandry of the TAR, 2005.

(NDRC), Ministry of Agriculture, Ministry of Finance and the State Grain Administration (SGA). The Office for the State Council Leading Group for Western China Development is a subsidiary of NDRC responsible for coordinating the overall economic and social development of China's western region. Officially *tuimu huancao* was launched as a strategy under the Open up the West program.²⁴⁰ NDRC is China's macroeconomic management agency under the State Council. Its functions include, among others, to examine and approve major construction projects. Its role in *tuimu huancao* is to review and authorize targets each year. Ministry of Agriculture is the functional ministry in charge of actual project implementation at the central government level. Central government funding is channeled from the Ministry of Finance down to the county finance bureau through provincial and prefectural finance bureaus. The SGA is a functional bureau administered by the NDRC and involved in *tuimu huancao* because pastoralists are to be compensated for the fenced pastures with grain.²⁴¹ *Tuimu huancao* is coordinated by these institutions at various levels with the agriculture agency being the actual implementer of the program as shown in Table 20.

Table 20 Government institutions involved in coordinating and implementing tuimu huancao

Central governmental level	Regional level	Prefecture level	County level	Township level
the Office for the State Council Leading Group for Western China Development (under NDRC)	the Office for Western China Development (under RDRC)	/	/	the township government
the National Development and Reform Commission (NDRC)	the Regional Development and Reform Commission (RDRC)	the Prefectural Development and Reform Commission	/	
Ministry of Agriculture	the Regional DAAH	the Prefectural Bureau of Agriculture and Animal Husbandry (including the grassland station)	the County Bureau of Agriculture and Animal Husbandry (county government)	

²⁴⁰ For in-depth discussions of the West China Development program, see Goodman, 2004.

²⁴¹ In the case of TAR pastoralists are compensated in cash as discussed in Section 5.

Ministry of Finance	the Regional Department of Finance	the Prefectural Bureau of Finance	the County Bureau of Finance (county government)
the State Grain Administration (under NDRC)	/	/	/

The five central government institutions jointly delegate enormous authority (targets, tasks, funding, grain and responsibility) to the institutions at the provincial level, which hold overall responsibility for project implementation within the province, and require them to further delegate targets, tasks and responsibility to the prefecture, county and township respectively.²⁴² In the words of the head of Grassland Office of Department of Animal Husbandry under the Ministry of Agriculture:

The central government only requires that compensation should be paid to households, fencing materials should be purchased through open bidding and the implementation of the project should be monitored.

This means at the operational level, the Ministry of Agriculture, the actual project implementer at the central government level, sets the target of the amount of area to be fenced off and seeded each year at the provincial level and the Ministry of Finance allocates the funding to the provincial department of finance. In theory, the central government budget covers the cost of seed, including transportation costs (usually to the township headquarter), and compensation of pastoralists for pastures fenced off, and 70% of the cost of fencing, which includes fencing material and fencing installation, while the province and pastoralists the remainder 30%, but in practice in the TAR pastoralists' labor input in fencing installation counts as the 30% of the cost

²⁴² Grain as compensation, but in the TAR, compensation was paid in cash.

of fencing. Thus, the central government budget covers the cost of fencing material, including transportation costs (usually to the township headquarter).²⁴³ In addition, it supports a project operating fee of 1% of the total project funding from the central government. Thus, *tuimu huancao* does not cost the four institutions at the regional level a penny financially. At the same time, they delegate targets, tasks and responsibility to the prefecture, county and township respectively.

Therefore, the institutions at the regional level want to implement the project most as it is a great opportunity to capture central government funding given they do not have to provide matching funds while the actual project implementation on the ground is conducted by lower levels of institutions. This can be seen in a statement by the head of Grassland Office of Department of Animal Husbandry under Ministry of Agriculture:

In 2003 when the program was initiated Tibet was not a target region because it has been enjoying special preferential policies and funding from the central government for socioeconomic development and ecological construction. But since 2004 Tibet has been included in the program because the local government of Tibet and its pastoralists requested the program.

Thus, both the central government and the regional government see the program as a source of funding. Fencing and seed are purchased through open bidding. The money is transferred directly from the prefectural or county finance bureau, depending on who (the county government or the prefectural BAAH) makes the purchase, to the fencing and seed suppliers without going to the three levels of Agriculture and Animal Husbandry agency (regional, prefectural and county), but the project operating budget of 1% of the total project funding from the central government is allocated to the regional department of DAAH through the regional

²⁴³ The village committee is responsible for transporting the material (fencing and seed) from the township headquarter to the fencing sites and covering the transportation costs (from the village public funds). In several cases the fencing and seed suppliers transport the fencing and seed to the fencing sites.

department of finance.²⁴⁴ It is a good sum of money over the years. For example, during the period of 2004 and 2009, the total central government investment in the project in the TAR was 1.929 billion *yuan* and 1% of it was 19.29 million *yuan*.²⁴⁵ The regional DAAH manages the budget and decides how it should be distributed to the two lower levels of BAAH (prefectural and county). This provides a financial incentive for it as the actual project implementer at the regional level to implement the project.

The importance of the regional level's financial incentives can be seen in arguments over the seeding component of the program, which totally failed in the previous rounds of the project. Because of this, officials from the county BAAH of four counties in Nagchu Prefecture suggested to officials from the regional department of and the prefectural BAAH that it should be excluded in the new round of the program (that of 2009), but the regional officials told them that they would have to keep implementing the seeding component as long as they have the *jinmu* component. These county officials further suggested that instead they purchase barley seed with the funding for the seeding component and grow barley in livestock pens or let pastoralists grow grass in their courtyards, but they were told that they should keep seeding with *Elymus sibiricus* Linn and *Elymus nutans* Griseb in *jinmu* zones (see Chapter 5) by the regional officials even though they are well aware of the infeasibility of it. "Seeding of grass is just totally a waste of money and labor," said one of the deputy heads of the county BAAH in the western site. In

²⁴⁴ It is not uncommon for a supplier to illegally offer payments to officials and bidders in proportion to the amount of material (fencing and seed) they purchase if the latter purchases the material from it, which is called *hui kou* (literally kickbacks) in Chinese.

²⁴⁵ 'Implementation of the *tuimu huancao* Project has gone smoothly' (*xizang tuimu huancao gongcheng shishi shunlu*) TAR Government, 18 August 2011. <http://www.xizang.gov.cn/getCommonContent.do?contentId=382413>; Under the new *tuimu huancao* policy adjusted in August 2011, the project operating fee has been increased to 2% of the total project funding from the central government. 'Suggestions regarding Perfecting the *tuimu huancao* Policy' (*guanyu wanshan tuimu huancao zhengce de yijian*). National Development and Reform Commission, Ministry of Agriculture, Ministry of Finance, 22 August 2011.

the end in this new round of the program, the budget for the seeding component for the four counties is 8.4 million *yuan*.²⁴⁶ This example illustrates that regional officials do not want to lose the opportunity to keep receiving project funding from the central government due to failure of some aspects of the program because in this case if they report the seeding component of the program does not work, it is probable that it would not only affect the funding for seeding but also for the *jinmu* component of the program since “severely degraded” pastures, which are what is enclosed in *jinmu* zones, need seeding to accelerate its restoration according to the program policy. It also shows that recommendations by lower-level officials are often ignored by higher-level officials when they conflict with their own interests.

The regional level’s financial incentives were further shown in a document jointly issued by the regional DAAH and the regional Development and Reform Commission (DRC) to the prefectural BAAHs and the prefectural Development and Reform Commissions, calling for project implementation plans for the project for fiscal year 2005. It reads:²⁴⁷

This year, tuimu huancao will be implemented on a large scale in the region for the first time. Success or failure of the implementation of the project will have an impact on state investment in the region hereafter. Prefectures and municipalities should install the fencing on a large scale and make sure that the fencing is not fragmented and that they are good for show.

First, this shows that for the regional officials, implementation of the project for fiscal year 2005 is more about securing future state investment than the project per se. In other words, the project for fiscal year 2005 would have to be implemented “successfully” for the sake of future project

²⁴⁶ ‘Notice regarding Investment Planning for the Fourth Round of the *tuimu huancao* Program in 2009 from the Central Government Budgets for Expansion of Domestic Consumption’ (*guanyu xiada tianran caoyuan tuimu huancao gongcheng 2009 nian disipi kuoda neixu zhongyang yusuan nei touzi jihua de tongzhi*). Development and Reform Commission of the TAR, Department of Agriculture and Animal Husbandry of the TAR, 30 September, 2009.

²⁴⁷ Notice regarding Preparing and Proposing Implementation Plan for the *tuimu huancao* Program in 2005 (*guanyu zuzhi bianbao 2005 nian tuimu huancao xiangmu shishi fang’an de tongzhi*). 30 May 2005.

funding from the state. Second, with this purpose of ensuring future project funding, they are more concerned with whether the fencing looks impressive rather than whether it is useful. Similarly, as discussed in Chapter 6 regional officials told the township and county officials they will have to “successfully” implement the destocking policy under the CES program, otherwise the central government may abolish the policy not only in the demonstration counties, but more significantly the policy cannot be replicated and implemented in other parts of the TAR and the result would be a huge loss of funding from the central government. This is the case even though pastoralists are very concerned about how implementation of the policy will affect their livelihoods, and township and county (prefectural to a less extent) officials find it very difficult to put the policy into place.

In China’s fiscal hierarchy, project funding for each level of government has to be channeled through the level immediately above it. In its political hierarchy job performance evaluations and promotion of lower-level officials depend on the satisfaction of higher-level officials (Lieberthal, 1997), who act in the best interests of their own task fulfillment. This fiscal and political system makes each level of government and lower-level officials more accountable to the higher-level government and officials than to the public and to the state (*rgyal khab*). It provides an incentive for each level of government and lower-level officials to implement the project as they want the higher-level government and officials to be satisfied and to ensure future project funding from the higher level government. Evaluation of officials’ performance is based primarily on their ability to capture project funding, which is called *pao xiangmu* (seeking projects) in Chinese idiom. In this case of *tuimu huancao*, the best interests of the four institutions at the regional level are to receive central government funding. The three lower levels (prefectural, county and township) of institutions work towards this goal accordingly. For

example, asked whether all the projects evaluated thus far passed the evaluation, the official in charge of the project at the prefectural BAAH said very proudly:

Yes, they all passed the evaluation. There was nothing to complain of fencing installation. Our prefecture did the best job in the region in terms of implementing tuimu huancao. If we did not do a good job, it would not only affect future projects for the prefecture, but also for the whole region. The higher-level government requires that we make sure the fencing is well installed.

This illustrates that as discussed later in Chapter 5, for officials, implementing the project means fencing installation as an end and that the purpose of good installation of fencing is to demand more projects from the state rather than to protect and restore the “degraded” rangeland through banning grazing by fencing, which is the fundamental goal of the program. Asked whether she thinks thus far the program is cost effective in terms of the efficacy of the investment in addressing the problems of the rangeland ecological environment, one of the deputy heads of the township government in the central site responded, “Actually, the so-called investment is made by the state...” She meant that given the investment was not from the township government, she was not really concerned with the efficacy of the project. This attitude is typical of many local officials at various levels in which they do not really care much about project outcomes as long as the funding is not from their own institution and they think that it is unwise not to capture and spend state funding. Similarly, one of the deputy heads of the county BAAH in the western research site said:

The state requires the jinmu zones to be closed off for ten years. However, personally I think it would be better to just close off for two to three years, but I did not say so in written reports as after all it is state investment and the regional government wants to have the project from the state.

The township government does not receive implementation funding for the project and after the fencing is installed it is the township government that engages with the pastoralists and settles any disputes derived from implementation of the program. Thus, it is relatively less enthusiastic

about implementing the program but it still implements the program as a routine task from the county government and for the free fencing and compensation for the pastoralists. Therefore, the primary incentive for three levels of local government to implement *tuimu huancao* is funding (regional down to county) (Fischer, 2005; Bauer, 2005) and job performance (township up to prefecture) (Lieberthal, 1997).

In term of bureaucratic ranking, the township government and the county BAAH stand at the same level, i.e., township level. However, the county BAAH has the final say in the decisions about where the fencing should be installed. They can make trips to the sites though in most cases they delegate township leaders to suggest target villages, as discussed in Chapter 5. This also holds true for the other three levels of government, i.e. the county government versus the prefectural BAAH (county level), the prefectural government versus the regional DAAH (prefectural level), and the regional government versus the ministry of agriculture (ministerial level) in terms of which has more authority over project implementation. This is because *tuimu huancao* is implemented through the functional unit (from the Ministry of Agriculture down to the county BAAH) which decides where the project should be implemented, and as a result the territorial government (from the regional down to the township government) has no option but to please the former in order to capture the project funding. This means that Lieberthal's (1997) argument that in post reform China, the territorial government (horizontal/*kuai*) has become more powerful than the functional unit (vertical/*tiao*) and forms a situation in which "*tiao* serves *kuai*" does not apply to the implementation of *tuimu huancao*. Apparently in the implementation of *tuimu huancao* it is that "*kuai* obeys *tiao*" rather than vice versa because what counts is, as people usually say in China, whoever has the money is the boss. In Lieberthal's case of the

implementation of environmental policies the Environmental Protection Agency²⁴⁸ (and various levels of it down to county) does not control funding as the Ministry of Agriculture (and various level of it down to county) does in the implementation of *tuimu huancao*. In fact, rather than help to increase local revenue the implementation of environmental policies affects the operation of some polluting enterprises, which makes local territorial officials have no incentives to implement the policies as Lieberthal and others observe (Muldavin, 2000; Van Rooj, 2006; Ma and Ortolano, 2000).

Officials at lower-level governments (township, county) from the local area know more about the local situations, but in the political system their alternative ideas are not heard (Shapiro, 2001). Some of them just want to fulfill their tasks and make the higher-level officials and government happy as discussed previously. Those locals with pastoral family background are often those with rich knowledge of the local area, but without formal education and in lower-status positions in the bureaucratic hierarchy, they do not have the capacity to have their rich knowledge adopted in policy implementation. For example, what was observed about the program by officials at the township government and county BAAH from the local area was similar to pastoralists' observations. Unlike other officials who express consensus (*tongyi koujing*²⁴⁹) about the program by saying pastoralists welcomed the program and the program brought good results, these officials tend to admit that the program neither worked well nor was beneficial to pastoralists other than bringing them free fencing and compensation. Like pastoralists (as discussed in Chapter 5), these officials think that it would have been better to set up smaller zones, which can be better managed, as experiments in order to see if it is effective or useful and at the same time not to affect current grazing. However, with Chinese being the

²⁴⁸ Now Ministry of Environmental Protection

²⁴⁹ Literally “unify calibration”

working language at three levels of government (regional down to county) and given that the use of the Tibetan language in township government administration is also being replaced with Chinese, without formal education and Chinese language skills these officials' job is often to make field trips to the villages and communicate with pastoralists, while Chinese and formally educated Tibetan officials who know little about pastoralism write project reports and applications. Consequently they have no means of making their voices heard. For example, a middle-aged township government official in the eastern site, who is from a village within the township, complained that he just has no way of understanding what is being discussed in the annual congress of the county government as it is conducted in Chinese and Tibetan is used only at the opening ceremony symbolically; thus he cannot fully and actively participate in the conference. In fact, these officials complain in private that even if there were a way of expressing their ideas, higher-level officials seldom make the effort to listen to them and pastoralists. According to these officials, this is one of the biggest problems nowadays in government administration. This in fact reflects the unequal power relation within the local bureaucratic hierarchy in an authoritarian system because generally speaking, without democratic constituencies to be accountable to, what officials do is just to please the higher-level officials who have power over their promotion, rewards and punishments, rather than pay attention to what lower-level officials and ordinary citizens are concerned with. This has become the norm over time.

4. Local Governments: Manipulating the Tools of State and Science, and the Carrot and Stick Approach

In order to capture the project funding from the higher-level government the local government at three levels (county up to regional) report to the higher-levels of government that both pastoralists and the lower-levels of government welcome the program. At the same time, in

order to fulfill the tasks set by the higher-level government it would tell the lower-levels of government and the pastoralists that it is a policy from the state and implementation of it is mandatory. However, in fact, county (and township) officials impose the project on pastoralist through a classic carrot and stick, top-down approach. The following case demonstrates how this approach works.

In Research Village 2 in the western site, a county government work team consisting of a governor and officials from the county BAAH and the township government told the village leadership about *tuimu huancao* and asked them whether they had rangeland to be fenced off for the purposes of the program and told them they could ask for the project. The village leadership asked for the *xiumu* component of the project because they could use the fence as a seasonal pasture as they were told by the work team that a *xiumu* zone just needs closing off for several months. The following year the village leadership requested an even larger area of *xiumu* zone and told the township government that they had nowhere to set up a *jinmu* zone. However, the county BAAH responded through the township government that if the village agreed to have the *jinmu* component of the project instead, they would receive a decent compensation and other development projects in the future. Thus, the village leadership decided to have a small area of *jinmu* zone. In the end, the village was given fencing for a *jinmu* zone but not for a *xiumu* zone as they requested. In order to mitigate the negative effects of the *jinmu* zone on livestock grazing and movement and more evenly distribute the impacts among the natural villages, the village leadership decided to set up two *jinmu* zones in fall 2008. However, officials from the county BAAH ordered the village to remove the eastern zone and combine it with the western zone by saying a *jinmu* zone has to be one large zone rather than two separated fences, partly because the originally suggested fencing site by the village was where the western zone is. They threatened

the village leadership that if they did not remove the fencing and combine them, the two fences would not be counted as *j inmu* zones for the project and they would remove them, and more seriously, the village would not be given other development projects in the future and if the case affected the whole township's or county's work, they should be responsible for it.²⁵⁰ Under such circumstances the village had to remove the eastern zone and combined it with the western one in spring 2009. Now the village head said, "If not for the sake of compensation and future development projects, the fenced zones²⁵¹ are just useless."

This case shows a classic carrot and stick approach to project implementation in the TAR. This approach typically consists of three steps. First, officials would adopt a seemingly bottom-up approach to present a state project to pastoralists. If the pastoralists accept the project without hesitation, officials do not need to use the second step. For example, in this case, if the village had said they wanted a *j inmu* zone at the beginning, the story would have stopped there. The officials could boast about their "bottom-up" approach. Second, if the pastoralists decline the project (for example, in this case the village leadership explicitly told the work team that they did not want to have the *j inmu* component), the officials would turn to the carrot component of the approach by doing what is called "thought work" or *zuo sixiang gongzuo*²⁵² (Anagnost, 1997; Ku, 2003), including educating them about the benefits of the project, including compensation and relating the current project to future development projects (i.e. offering more development projects if they accept the current project). At this point, the pastoralists can hardly turn down the project. In this case, the village had to agree to have the *j inmu* component. Third, if the second

²⁵⁰ Here the primary motivation of the county officials for the insistence on the *j inmu* zone was political pressures, i.e. fulfillment of their tasks and evaluation by higher levels of government. They were not confident that higher levels of government would not find out if they allowed the pastoralists to have a *x iumu* zone and told the higher levels of government that actually there was a *j inmu* zone.

²⁵¹ They village still had to leave space for a truck road between the fencing; thus actually there are two zones.

²⁵² Literally "to do thought work" or "to do ideological work"

approach still cannot convince the pastoralists to accept the project or implement the project the way that they want them to (in this case, one large zone instead of two separated zones), officials would resort to the third step, the stick component of the approach by threatening that they would cut off future government support, or that the pastoralists are against the wishes of the state as it is a mandatory project from the state, and thus will be held responsible for any negative consequences. In the end, pastoralists have no option but obey the officials. In doing so, they behave quite rationally in terms of their limited political, economic, and symbolic resources and opportunities as discussed in the next section, as there is little room for pastoralists' wishes to be considered and respected. This approach was also applied in the implementation of the policy of rangeland use right privatization and the destocking policy under the CES program as discussed in Chapter 6.

At the same time, officials sell the project to pastoralists with the rhetoric of science. In China the political system requires people to remain consistent with the Party line (*tongyi sixiang*²⁵³) in politics. Over time this also discourages people to think critically in other arenas beyond the political arena and challenging the authority of science is out of the question (Forsyth, 2003; Williams, 2000). They accept government discourses labeled as science uncritically. For example, asked what they think of the widely held perception among many pastoralists that there is no such thing as overgrazing, many officials respond that the pastoralists are wrong by referring to carrying capacity and pointing out that there are far more livestock than the rangeland can hold. They take carrying capacity as a given and its calculations as scientific. Thus, officials take rangeland degradation as fact and suggested solutions as science and they persuade pastoralists to implement the program in the way they want by deploying the rhetoric of science.

²⁵³ Literally “unify thoughts”

As a result, pastoralists found it difficult to refute what the officials told them about the program because they feel they have to believe what science says, though their own knowledge and observations suggest otherwise. This discourages pastoralists to challenge the program's assumptions, which they feel they have to accept without doubt. 69-year-old Gyaltse in the central research site came to settle where he is now when he was 19 years old. Talking about the fenced sandy pasture he neither observes the vegetation cover of it is improving nor thinks it will as officials claim.

Yonten: "What was the condition of the sandy pasture now fenced off for *tuimu huancao* when you came to settle here 50 years ago? Did you observe the pasture get sandier over time before it was fenced off?"

Gyaltse: "It looks like it has remained as it was before, though I do not often go there. I went to look several times after it was fenced off, but it seemed the condition remains the same."

Yonten: "Did you observe the vegetation cover has been improving since it was fenced off three years ago?"

Gyaltse: "I did not observe any changes."

Yonten: "I see. Then, from your experience do you think the vegetation cover will improve if grazing is effectively banned for ten years?"

Gyaltse: "The state says the vegetation cover will improve according to scientific research, but I do not think vegetation will grow where there is no vegetation before. If I said so, it would be like saying I do not believe what science says, but I do not think the vegetation cover will improve. For example, the vegetation cover of pastures in Changtang where there is not livestock grazing always remains the same from generation to generation."

Puntar, head of my host family in the western research site, and I had a casual conversation about the condition of rangeland in his area. What Puntar said shows how township and county officials sold the program to the pastoralists under the banner of science and how pastoralists look at science and the state. The conversation went as follows.

Yonten: “Is the amount of bare ground where there is no vegetation increasing over time?”

Puntar: “I have not noticed that it is either increasing or decreasing. What was bare ground in the past is still bare ground. The condition of what is now inside *tuimu huancao* zone used to be like this (very low vegetation cover and density). But in some places there are turfs damaged by wind.”

Yonten: “But by banning grazing, the government seems to say livestock grazing is a problem, right?”

Puntar: “We realize saying livestock grazing causes rangeland degradation does not reveal the truth.”

Yonten: “Then, did people not tell the government so?”

Puntar: “No. it seems people tend not to say we do not want what the state is giving to us. But livestock grazing is not the problem. We were just told (by the village heads) that township and county officials said that according to scientific research the grazing land has a capacity of certain number of livestock and that the number of livestock we raise should not exceed that capacity.”

Yonten: “But no scientific research into carrying capacity has even been done in your area, right?”

Puntar: “No, but they (village heads) just told us that they were told so by the state through township and county officials,”

Yonten: “Then why do people believe what the state says?”

Puntar: “We believe that the state never cheats or tells a lie. And we believe that science can do research into everything and knows everything, and what science says must be true.

Yonten: I see, but the state may not know everything.”

Puntar: “When people say according to scientific research, we believe it must have been done somewhere before. If we said they (officials) did not conduct a scientific research and we would not believe what they say, we would be criticized. They might even accuse us of being against the state and we would run into trouble.”

This conversation conveys two messages. First, pastoralists believe in science and the state and what they say. For example, earlier Puntar argued, “We realize saying livestock grazing causes rangeland degradation does not reveal the truth.” while later he said, “We believe that the state never cheats or tells a lie. And we believe that science can do research into everything and knows everything, and what science says must be true.” It appears that Puntar contradicted himself by these two statements. But in fact he did not. Instead, his message was that from his own experience he does not believe overgrazing, but he has to believe it as the state and science educate him about it because he believes in them. Second, at the same time, pastoralists neither want to lose the opportunities to receive benefits from the state, nor to offend the local officials, which is especially the case when the political climate becomes tense, in which pastoralists are careful not to express their discontent with government policies, and refrain from openly criticizing them.

5. *Pastoralists' Resistance to and Taking Advantage of tuimu huancao*

Under such circumstances, pastoralists express their discontent through acts of everyday resistance (Scott, 1985; Peluso, 1992; Neumann, 1998). When asked whether individual families

were consulted when the decision about the fencing site was made, a pastoralist in the west said discontentedly:

No, not at all! We were told by the township officials and village leadership that the fencing not only must be installed but also the quality of it must be good. We have to do as we are told. We will eat the fencing if we are told to do so!

As discussed in Section 1, in meadow pasture-dominated central and eastern Nagchu, pastoralists' conception of the purpose of fencing is to reserve forage for the period of late winter and early spring, and snowstorms. Thus, only fencing alpine marsh meadow pastures can bring about this result, but officials in the central site asked the pastoralists to fence alpine meadow pastures for the *xiumu* component of the project, which does not make sense to the pastoralists. As discussed later in Chapter 5, pastoralists prefer a smaller fenced zone while officials prefer a larger one. All these led to struggles over decisions about fencing and everyday resistance to the program.

In the central research village, in 2007 when the fencing arrived at the township headquarter, township officials had village heads be responsible for organizing pastoralists to transport and install the fencing. The village heads decided to allocate the fencing evenly to each Zuk, which then decided to fence alpine marsh meadow pastures either at the Zuk or natural village level. When officials from the county BAAH learned about it, they ordered the pastoralists to fence alpine meadow pastures for the *xiumu* component of the program and sandy pastures for the *jinmu* component of the program instead by saying the fencing should be installed according to the purpose of the program determined by the state. Hence the *xiumu* component of the program is nicknamed as “alpine meadow fencing” (*skam*²⁵⁴ *ra* or *skam skor*) and the *jinmu* component of the program as “sand fencing” (*bye ra* or *bye skor*) by the local pastoralists. These local names imply that for the local pastoralists *tuimu huancao* is just

²⁵⁴ In the local dialect alpine meadow pastures are also called *skam*.

enclosure of different types of pastures rather than a program designed to restore “degraded” rangeland and improve its health. Consequently, when they heard that they could not fence alpine marsh meadow pastures pastoralists were not as enthusiastic about the program as they were at the beginning. When asked how pastoralists responded to the program, one of the township governors answered:

In the beginning of the program, pastoralists were unwilling to fence their pastures as they were concerned about livestock grazing after the fencing was set up. Consequently, when asked to come to fence the pastures, they did not come. The township government had to order them to install the fencing.

In fact, the county BAAH had to pay the pastoralists to install the fencing in the first round of the program because “the pastoralists were unhappy about fencing off large degraded pastures though at the beginning they were very pleased to hear that they would receive free fencing.” as one of the heads of the county BAAH said.

This same official said now the pastoralists’ attitude towards the program has changed as their environmental awareness has been promoted through the program. However, this does not reveal the truth because today the pastoralists want to have the project for two reasons. First, they will receive the compensation. Second, at the same time, they have seen that grazing in the fenced zones does not need banning as they worried as discussed in Chapter 5. In fact township officials acknowledge this. Pastoralists make efforts to resist certain aspects of the project, but more obviously, they view it as an opportunity to take the material for their own use, making the most of it. Thus, pastoralists are not passive victims of power, but also creative agents. In the central site, one of the Zuk cunningly included some alpine marsh meadows in their *jinmu* zone. The township government, the county BAAH and the prefecture grassland station successively issued written orders that asked the Zuk to exclude the alpine marsh meadows from the zone, but the Zuk just ignored it. In the end, the issue just disappeared without the government following it

up. Today pastoralists from other Zuk thought admiringly that this Zuk had taken good advantage of the program. Talking about the evaluation of the project, the former Party boss of the township in the central research site told me:

If the pastoralists used 100 rolls,²⁵⁵ at best, of the 120 rolls provided by the government to fence what the government wanted them to fence, that would be good enough as it was impossible for the government evaluation team to walk along the fence to check if all the fencing was installed where they should be. They would secretly use the remainder of the fencing to enclose alpine marsh meadow pastures. It would be a kind of embezzlement if it were money.

In the central site when asked if they still wanted to have the project given they were not allowed to fence alpine marsh meadow pastures as they desired, most of the pastoralists said they still wanted to have the *xiumu* component of the project for the purpose of using the fencing as boundaries as discussed in Section 1 while they wanted the *jinmu* component for the sake of compensation.

Pastoralists' positive attitudes toward the program derive from two sources. First, they think that it would be great if their sandy pastures with little vegetation could be improved through the seeding component of the program. Thus they would have more forage for their livestock, though seeding of grass does not work in western and central Nagchu, which will gradually make pastoralists less interested in the program as discussed later in Chapter 5. This is especially true in the western and eastern research sites where there are more sandy pastures. In the western site, the program is nicknamed as "grass cultivation for pastoralists" (*'brog don rtsa 'gso*) by the local pastoralists, meaning the program is implemented to the benefit of pastoralists. "If the seeding of grass works, the project would be beneficial to us. I am hopeful about it as the state says it would work, though I am not speaking from experience as this is the very first time pastures have ever been seeded in our area," said an old pastoralist in the western

²⁵⁵ One roll of fencing is 200 meters

research site. In the eastern site, it is nicknamed as “transformation of sandy pastures to alpine meadows” (*sa nag spang ’gyur*) by the locals, meaning the program is implemented to improve the pasture condition. Asked whether the program is useful to them, an old pastoralist and his son from the eastern research site responded:

It is a good project as we will have vegetation where there is none now and the sandy pasture would become alpine meadow pastures through seeding of grass, which I have seen works. As you know, we pastoralists depend on livestock, which in turn depend on vegetation. So if we have more forage through this project it will be beneficial both to people and livestock. It would be good if we have more grass seed and people work hard to grow grass.

In the western and eastern research sites the seeding component of the program is the key to pastoralists’ positive response to the project rather than natural improvement in vegetation conditions through banning grazing as the program aims for, which they do not think will happen as I will discuss in Chapter 5.

Second, in the central site, even though they perceive the vegetation conditions of the fenced pasture would not improve through the program, the compensation for the fenced land is good enough for them to accept it. Asked if he still wanted to have the project if there was no compensation for the fenced sandy pasture, a pastoralist from the central research site responded:

We would rather not have the project if we receive no compensation as we would end up having nothing to benefit from the project. If it is not fenced off, we can still let the livestock move around there in the summer though not much vegetation there and the condition of the pasture will not improve through fencing it off. As we pastoralists earn very little money, if there is compensation it is okay for us to fence off that sandy land for the sake of money.

Here the compensation for 3 years (2006-2008) has already been paid in cash for the first round of the program (i.e. that of fiscal year 2006) according to the central government policy.²⁵⁶

The five central government institutions authorize the four regional institutions to decide when the compensation should be paid and the latter pays after the evaluation (see Chapter 5) at

²⁵⁶ Compensation payments started from the fiscal year of the project (i.e. 2006) though the actual fencing installation did not occur until the following year (i.e. 2007).

the regional (provincial) level. How much a household should be compensated is based on how much land is enclosed in the fenced zone. In the research village all the surveyed families were happy with the compensation because in the case of the *j inmu* zone, there is not much vegetation to graze in the first place and in the case of the *x iumu* zone grazing in fact is not banned well, as discussed later in Chapter 5.²⁵⁷ Thus the program does not greatly affect daily grazing. Furthermore, as the pastoralists earn little cash income,²⁵⁸ it is just good to earn some extra cash through the program.²⁵⁹ In the western site, along with free fencing and seeding of grass, compensation is what the pastoralists see they can benefit from the program. In fact, given seeding of grass does not work, and vegetation cover does not improve with the grazing ban (see below), officials from the county BAAH and the township government have realized that compensation is the primary reason why the pastoralists want to have the program. A township official said, “Personally, I see that the pastoralists want to have the project not because they think more vegetation will grow through the project, but because they want to have the compensation. Of course, if more vegetation grew, that would be great.” In Research Village 1 where one of the two zones is just closed off but not seeded at all, the pastoralists have begun to complain about not being paid the compensation yet by saying without compensation the program is useless and they want to open the zones.²⁶⁰ Therefore, compensation is what the pastoralists hope for immediately from the program.

By contrast, pastoralists in the eastern site do not really care much about compensation for three reasons. First, as discussed later in Chapter 5, compared to the western and central sites,

²⁵⁷ They received an annual mean compensation of 739 *yuan* per household, ranging from 357 *yuan* to 1462 *yuan*.

²⁵⁸ The mean annual per capita income was 1733 *yuan* in the village in 2008 (Township Government Statistics).

²⁵⁹ In extreme cases where a fenced zone belongs to an individual family, the family receives all the compensation for the zone. For example, in this research township, several families receive an annual compensation payment of more than 20,000 *yuan*.

²⁶⁰ As of June 2010, one the deputy heads of the county BAAH said that the money had already arrived at the county and they were ready to pay the compensation to the pastoralists.

seeding of grass works there, which is the primary reason why the pastoralists accept *tuimu huacao*, and they really have high hopes for yielding more forage through it. Second, as introduced in Chapter 1, in recent years they generate a decent cash income from harvesting and selling caterpillar fungus. Third, it appeared that officials from the county BAAH and the township government did not talk much about compensation when they sold the program to the pastoralists as their counterparts in the western and central sites did. Thus the pastoralists do not have high expectations for it. In fact many did not hear about compensation.

Conclusion

As part of the suite of environmental projects associated with the Open up the West campaign, *tuimu huacao* promises both to be for the good of pastoralists, improving their livelihoods and production, as well as to save rangeland ecosystems for the good of China's economic development as a whole. Operationally, even though widespread rangeland degradation -- 90% of the country's rangeland -- was presumed when the program was designed, the first places for program implementation were determined by degree of implementation of the Rangeland Household Responsibility System, China's basic policy on rangeland management, rather than by degree of rangeland degradation. Therefore, in reality *tuimu huacao* has less to do with rangeland degradation than it does with the intensification of existing policy directions that aim to transform traditional pastoralism, which is neither desirable nor feasible as discussed in Chapter 2 (Humphrey and Sneath, 1999; Fratkin and Mearns, 2003). This explains why *tuimu huacao* is defined as "a basic rangeland construction project" because "basic" implies eventually *tuimu huacao* should apply to all rangeland across the country regardless of their conditions. Most importantly, the whole concept of "rangeland construction" is a legacy of Mao's war against nature from the 1950s (Shapiro, 2001) because national policy makers and

scientists believe the seemingly degraded rangeland can be improved through man-made measures such as *tuimu huancao* (see Leach and Mearns, 1996; Bassett.T & Koli Bi Zuéli; 2003).

In practice, the primary incentive for the regional officials to implement the project is funding from the central government.²⁶¹ They make every effort to capture revenue from the program. In China's political and bureaucratic hierarchy officials' job performance is evaluated by officials who are one level higher and in its fiscal hierarchy, project funding for each level of government is allocated by the level immediately above it. This makes officials at each level more accountable to higher-level officials than to the state (*rgyal khab*), other lower officials and the public. Accordingly, officials from the prefectural down to the township level implement the project in order to capture funding from the higher level government and fulfill their tasks from higher-level officials. Although the program is implemented in the name of rangeland improvement, the condition of rangeland is not the first thing officials at each level consider, as their top priority is to cope with the political economic pressures. Lower-level officials' alternative input and pastoralists' wishes are ignored when they do not conform to the higher-level officials' overall goal of capturing project funding and accomplishing tasks. In fact, the Ministry of Agriculture as the program implementer at the central government level also has similar economic and political incentives. Large scale programs such as *tuimu huancao* promote its sectoral interests (i.e. more state investment in and more attention to its sector). This is illustrated from how the program was decided to be implemented under the Ministry of Agriculture by the central government. When the *tuigeng huanlin huancao* program (the Sloping Land Conversion Program) or "return crop lands to forests and grassland" (Yeh, 2005) was launched in 1999 it was managed and coordinated by the Ministry of Forestry, but the Ministry

²⁶¹ A full discussion of why local officials want to capture funding from the central government in the first place is beyond the scope of this dissertation.

of Agriculture complained that the Ministry of Forestry did not attach importance to the “grassland” part of the program as its main job is not related to grassland. Therefore, the Office for the State Council Leading Group for Western China Development launched *tuimu huancao* under the Ministry of Agriculture and made the name be consistent with *tuigeng huanlin*.²⁶² Therefore, economic and political incentives play an important role in the implementation of *tuimu huancao* at all levels of government.

Furthermore, the concepts of remaining consistent with the Party line (*tongyi sixiang*) in politics and expressing consensus (*tongyi koujing*) in government work discourage local officials and pastoralists from thinking critically and expressing alternative voices (Shapiro, 2001). Belief in science, i.e. science as neutral rather than as a social practice shaped by political forces (Forsyth, 2003; Williams 2000) discourages them from being skeptical of the assumptions of the program made by national policy makers, which are legitimized by the rhetoric of science. All these make it difficult for the received wisdom underpinning *tuimu huancao* to be challenged, alternative input about the actual state of rangeland condition in Tibet to be revealed, and alternative policies to be considered and adopted.

Under such circumstances, the program is being implemented on a large scale in the TAR and imposed on pastoralists through an unequal power relation between officials who implement the program and pastoralists who receive the program (Li, 2007). Pastoralists’ responses to the program are not limited to resistance (Mitchell, 1990; Moore, 1998; Li, 2005). More evidently, they act rationally to take advantage of the program and make the most of it. Moreover, the specific ways in which pastoralists both resist and desire further intervention (Agrawal, 2005; Li 2005, 2007) is a result of specific local environmental and socioeconomic factors (Li, 2005).

²⁶² Interviews with a professor at Beijing Forestry University, the head of the Grassland Office of Department of Agriculture under Ministry of Agriculture and a professor at China Agriculture University

What pastoralists see they can potentially gain from the project is more forage through the seeding component (eastern and western Nagchu), compensation (west and central Nagchu) and free fencing (across the region).

Chapter 5

“Retire Livestock, Restore Rangeland”: China’s Strategy for Restoring and Improving Rangeland: Implementation and Results

As you see, with little vegetation, a large part of this fenced sandy land is bed med [useless] in terms of forage available for livestock grazing. It has been like this since my childhood. I recall at that time when we were out herding, my friends and I would often sneak out here to catch lizards and play with them as there are none in meadows. Three years ago, when they looked for land to be fenced off county and township officials picked up this land because obviously it looks “degraded” compared to meadows. Look, this is where we seeded, nothing has come up. This is exactly what the old saying goes, ‘there is no point of opening the windows before daybreak’ because the condition of this sandy land is original, so it is useless to ban grazing or to seed grass to try to improve it. These are just old ldunbu [forbs] and tsherma [shrubs]. They might look higher as they are not touched by livestock. But they will dry up and then be blown away by wind in winter. Can you see lots of yak dung over there? They must have been left over by yak caravans from somewhere when they passed through. So as I told you earlier, this fence is way too large to patrol even if the state wants us to ban grazing in it. Of course, now nobody really cares much about it...

This is part of what a village head in his fifties in the central village told me about how *tuimu huancao* was implemented in his village. In Chapter 4, I examined national policy makers’ rationales for launching *tuimu huancao*, local officials’ incentives to implement the program, and pastoralists’ responses to the program. Here, I turn to a discussion of how the program is being implemented and with what results. Specifically, I will discuss how fencing sites and sizes were decided, whether grazing was banned effectively, whether the condition of vegetation has improved, whether seeding of grass worked, and lastly how the implementation was evaluated.

1. What Criteria Determine “Degraded” Rangeland for tuimu huancao?

According to the *tuimu huancao* policy, it is the most degraded rangeland that is supposed to be fenced off. However, two problems arise. First, other criteria are often used in actual implementation to decide which land gets fenced off. These criteria include rangeland use rights privatization, rangeland areas and types, pastoralists’ working and living conditions. Second, as discussed in Chapter 1, it is not uncommon for officials and scientists to misinterpret

environmental realities for various reasons elsewhere in the world, for example in Africa (Fairhead and Leach, 1995, 1996; Leach and Robin, 1996; Davis, 2007) and in Thailand (Forsyth, 1996). This has turned out to be the case in the implementation of *tuimu huancao* in Nagchu in so far as what is called “degraded” land is often not in fact a recent phenomenon, but rather a long-term condition that does not, in the pastoralists’ views, result from human use. Therefore, a very important question when “degradation” began, whether it is a recent phenomenon or a persistent condition in living memory has long been ignored.

As discussed in Chapter 4, counties with good implementation of the policy of rangeland use rights privatization were selected first as target counties for the project by the regional DAAH and prefectural BAAH. The program was launched in 2006 both in the western and central research counties.²⁶³ Over time, with less remaining rangeland to be fenced in these counties, other counties that have just begun implementing the policy of rangeland use rights, but where it has not yet been implemented in all townships and administrative villages, are also implementing *tuimu huancao*. This has happened as county and regional officials have reported in their project applications that the policy of rangeland use rights privatization has already been put in place in the county. For example, in the eastern research county, rangeland use rights privatization was launched in 2007, with actual fencing installation in 2009. However, some administrative villages, including Research Village 2, had as of 2011 not yet implemented the policy of rangeland use rights yet.

The area of rangeland was also used as an important criterion for deciding where *tuimu huancao* should be implemented first. Asked why the county was selected as a target county for the program, one of the deputy heads of the county BAAH in the central research site responded,

²⁶³ Usually actual fencing installation did not happen until one year (or two years) later due to a delay in receiving the fencing.

“The higher-level government picked our county for the project because of its large area of grassland and severe degradation of grassland. That is to say the project was given by the higher-level government; we did not ask for it.” Operationally, as it is hard to define “severe degradation of grassland”, the area of grassland often becomes the quantifiable criterion to be used to decide where the project should be implemented first. After it decided the target townships, the county BAAH asked the township government to suggest potential target administrative villages and the amount of area to be fenced off. Then, in most cases, the village committee suggested specific fencing sites in the village, a few of which were checked against its criteria (i.e. visual assessment of vegetation cover²⁶⁴) by the county BAAH along with staff from the prefectural grassland station in some cases, which allocated the fencing to the township government according to the area that the township government suggested and the availability of fencing. Therefore, officials from the county BAAH did not have any baseline data on vegetation conditions of the pastures before they were fenced off and in most cases what they did was simply distribute the fencing to the township.²⁶⁵

The cases from the three research sites show that fencing site selection on the ground at various levels (from target counties down to specific sites) has nothing to do with rangeland “degradation.” They also demonstrate that the implementation of *tuimu huancao* resembles a phenomenon in China in which government projects are more strictly implemented near towns or main roads because there they are clearly visible to higher-level officials passing through, and thus are more likely to win local officials recognition and rewards.

²⁶⁴ For example, in the western site land primarily covered by sand cannot be fenced off; in the central site, alpine marsh meadow pastures should not be enclosed in the fenced zone according to the rules established by the prefectural Grassland Station and the local county BAAHs.

²⁶⁵ In some cases officials from the county BAAH and staff from the prefectural grassland station trained some pastoralists to install fencing and grow grass.

In the eastern research county, officials from the county government and the county BAAH decided to implement the program first in its northern townships, where there are more sandy pastures (*sa nag*) and the natural conditions are tougher (higher altitude, more vulnerable to snowstorms). They hoped to increase forage production through the seeding component of the project and reserve alpine marsh meadows for snowstorms through the *xiumu* component of the project. This means that they understood and used *tuimu huancao* as a preferential policy rather than a program to reverse and restore “degraded” rangeland. That is, the county BAAH were concerned primarily with the fencing available through *tuimu huancao* as a useful material that they could use to help pastoralists in the north where natural conditions are tougher and living conditions are harsher.

Reserving alpine marsh meadows is not allowed in central Nagchu under *tuimu huancao* because local officials see alpine marsh meadows as the best pastures in the region. Thus, they should not be a target of the program intended to fence off “degraded” rangeland in order to restore and improve them. However, it appears this is not a problem in remote villages in this county, where project evaluation teams from the higher levels of government will seldom come to check the fencing.²⁶⁶ In addition, in this county a *jinmu* zone needs closing off for only five years, though it says ten years in documents of the county BAAH, compared to ten years in central and western Nagchu. Within the research township, the township officials decided to fence off sandy pastures in the south and alpine marsh meadows in the north.²⁶⁷ They pinpointed specific fencing sites for villages (for example Research Village 2) that are located near the township headquarter while the village committee decides specific fencing sites in other villages,

²⁶⁶ But this does not mean local officials can totally ignore the program primarily for two reasons. First, they still need the program to capture state funding (i.e. economic pressure). Second, they are not confident that the higher levels of government will not be aware of it if they are doing nothing on the ground (i.e. political pressure).

²⁶⁷ Within the township, there are more sandy pastures in the south while more alpine meadow pastures in the north.

for example Research Village 1. Officials from the county BAAH came to see the suggested sites near the township headquarter, but in most cases they did not check the suggested sites given the vast tracts of land and difficult road conditions.

Because the central research village is located just between the prefectural town and the county town along a main road, officials from the county BAAH and staff from the prefectural grassland station came to check the fencing sites suggested by the township and village committee before the pastures were fenced off to make sure they were selected according to their criteria: fencing off sandy pastures for the *j inmu* component and alpine meadows for the *x iumu* component, and no alpine marsh meadows would be enclosed. This means local officials determine rangeland “degradation” according to rangeland types, which is problematic because it implies some rangeland types can degrade while others cannot, i.e., sandy and alpine meadow pastures can degrade while alpine marsh meadow pastures cannot.

In the western research county, as discussed in Chapter 4, a fencing project of 40 million *yuan* was implemented as boundary fencing in 2005 after the policy of rangeland use rights privatization was introduced. The pastoralists contributed half of the total investment. In 2007 the county BAAH proposed to the regional department of agriculture and animal that the government reimburse the pastoralists for what they spent on the fencing using the funding from the third round of the program (that of 2007) and that the existing boundary fencing count as fencing for the *x iumu* component of the project. The latter approved the proposal and paid the pastoralists eight million *yuan*. Therefore, in this case, the *x iumu* zones have nothing to do with the rangeland condition as the fencing was installed as boundaries before the project was implemented. In the case of Research Village 1, the existing fencing was inter-household boundary fencing as the rangeland was managed by individual households during the 4-year

individual rangeland tenure as discussed in Chapter 2. But it appeared the county officials did not care about it as there is little chance of the higher levels of government coming to the village to check the fencing. Furthermore, here spring pastures are fenced off as the *xiumu* component as they are not grazed in other seasons anyway and what is enclosed for the *jinmu* component is largely what pastoralists call “useless” land (*bed med*), which is land with little vegetation not used as primary grazing land as discussed below. “Pastoralists are not complaining about the *jinmu* zones as what is enclosed largely is useless land in the first place” as a township official put it. Therefore, all these fences have nothing to do with rangeland degradation, which is the very first assumption of *tuimu huancao*.

In terms of site selection for the *jinmu* zone, if possible, the village committee would select what pastoralists call “useless” land so that the effects of a long-term grazing ban on livelihood will not be that significant. Asked what the government told them about the criteria for selecting the fencing site and why that particular fencing site was picked for the program and who made the decision (the county BAAH, the township government or the village committee), one of the village heads in Research Village 2 in the west responded:

The government told us that we need a place where there is little vegetation or it is sandy. It was the village committee that decided the site rather than the county or township. We suggested this site because the vegetation is poor there and it is far away from we usually are, so the negative effects [of banning grazing] would be small.

Then asked whether the pasture fenced off now for the program had been degraded before it was fenced off and what the condition was when he was young, he continued:

The condition of that rangeland was like that originally and has not changed. I mean it has been like that since I can remember, rather than it being a result of livestock damage or pika damage. So I do not think the vegetation cover will improve through banning grazing.

Asked which component (*xiumu* or *jinmu*) people prefer, one of the interviewees in the central site responded:

Of course, we prefer the skam ra [xiumu] as it is completely useless to fence off sandy land without vegetation. People are saying what a waste of a good government project it is to install the fencing on the sand. However, we receive compensation for the bye ra [jinmu]. That is how we benefit from fencing off the sandy land. The government had us fence off useless land where there is nothing for livestock to graze and then gives us compensation. We are really grateful for it.

Here, like many pastoralists in the central village, this pastoralist welcomed compensation from *tuimu huancao* though they thought it was a waste of state funding and useless to enclose sandy pastures with little vegetation. Asked if he thinks the compensation for the *jinmu* zone is enough to compensate for the loss of grazing land, one of the interviewees in the central site responded, “It is more than enough as we pastoralists have little money and there is not much vegetation to graze in the *bye ra* even before it was fenced off.” In many cases, that what is enclosed in *jinmu* zones is mostly not primary grazing land in the first place tells that they are not degraded pastures caused by livestock grazing in recent years.

Furthermore, practically all the pastoralists and township officials from the local area interviewed in this research assert that the condition of the “useless” land and of the seemingly degraded rangeland remains as it was in their living memory.²⁶⁸ “It has been like this since my childhood” is a common response among pastoralists when asked what the condition was when they were young.²⁶⁹ This means that what appears to be degraded rangeland for officials might already have existed for hundreds of years, but officials interpret it as a result of recent degradation caused by livestock grazing for the purpose of implementing *tuimu huancao*. They do not necessarily do this intentionally, as they really take rangeland degradation as fact and never doubt it is a recent phenomenon or ask when the “degradation” started. Asked what he

²⁶⁸ In the west several old pastoralists told me a legend that thousands of years ago what is now sandy land between the two lakes that is fenced off for the program used to be the bottom of one lake, and when the lake shrunk and has become today’s two lakes, the bottom of the lake has appeared, which is the sandy land today.

²⁶⁹ Only a few pastoralists observe that the pastures are slightly damaged (in fact possibly expanded) by voles in the form of digging holes on the rangeland in the eastern site, and may be covered with more sand brought by wind in the central site as discussed in Chapter 3.

thinks of the impact of livestock grazing on rangeland, one of the deputy heads of the county BAAH in the western site responded:

Today we have a total livestock of 1.98 million heads for the whole county, but the actual carrying capacity calculated by regional experts this year for the county as a whole is just 775, 000 heads. Also, the carrying capacity decreases from the south to the north, where there is vast land but the vegetation cover is very poor with few alpine meadows, ranging from 17 mu a sheep to 40 mu a sheep. In my opinion, there does exist overgrazing because as we see present herds far exceed the carrying capacity. For example, Dropdroptang²⁷⁰ in village 1, where you have been to, where there appears to be plenty of vegetation from afar, but when you get close the vegetation is very scattered. This is clearly a result of overgrazing. If the herd size is not reduced, this pasture cannot support that many livestock.

From this, we can see that local officials think of carrying capacity as scientific and use it to define overgrazing and rangeland degradation. They believe that if carrying capacity is exceeded, the result must be overgrazing, which in turn leads to degradation. Furthermore, in this case, this official used the original condition of this particular pasture as disused see below as evidence of a result of overgrazing.

However, this particular pasture named Dropdroptang is considered as one of the most fertile pastures by the local pastoralists, and moreover, they have not observed any change in its condition over time. All the members of the two focus groups with elders recalled that Dropdroptang was grazed by abundant wild asses when they were young. This is what one of them, an 80-year-old pastoralist, has to say about the pasture:

If grazing and digging by livestock damaged pastures, making them sandy (sa nag), then there should not have been vegetation left on Drodoptang because when we were young there were hundreds of wild asses grazing and wandering around on Dropdroptang and they should have been more destructive to the pasture given their numbers, but the vegetation on Dropdroptang has remained as it was in the past. The wild asses have gone further north when more and more vehicles move around and some of them were hunted by Chinese mineral workers and local officials after the Chinese came.

2. “Our Fence Is Too Large To Be Named”: Unmanageable Fenced Zones

²⁷⁰ The name of a pasture in Research Village 1 in the west

The five central government institutions involved in the formulation of *tuimu huancao* requested that project areas should be concentrated and linked (*jizhong lianpian*) rather than scattered and fragmented in order to use the project funding effectively and achieve greater results.²⁷¹ Operationally, this means for officials from the regional down to township levels that the larger a fenced zone is, the better. Three logics encourage officials to simply prefer a larger area over any evaluation of whether the rangeland to be enclosed is “degraded” in the first place. First, when two sets of fencing are combined, a larger area can be fenced. Officials want to use the fencing more effectively in terms of the area being fenced. This is the most commonly cited reason for why a larger zone is highly desirable. “A set of fencing of 3000 meters can fence an area of 845 *mu* of rangeland, but if two sets are combined, the enclosed area will be more than 1700 *mu*. Thus more land can be fenced with the same amount of fencing if several sets of fencing are used together,” said one of the heads of the county BAAH in the central research site. “People from the prefecture grassland station and the county BAAH told us that the fenced zone should be as large as possible because more grassland will be protected and restored,” said one of the governors of the township in the central research site. Thus, for officials the amount of “degraded” rangeland that the program can reverse and restore is positively correlated with the size of the fenced zone, rather than with an effective ban on grazing, providing the program’s assumptions are right.

Second, a large fenced zone can impress an evaluation team from the higher level government. Talking about how fencing sites were selected, one of the officials at the township government in the western research site told me:

²⁷¹ ‘Notice regarding Assigning Tasks of Implementing the *tuimu huancao* Program in 2003’ (*guanyu xiada 2003 nian tuimu huancao renwu de tongzhi*). Office for the State Council Leading Group for Western China Development, the National Development and Reform Commission, Ministry of Finance, Ministry of Agriculture, State Grain Administration, 18 March 2003.

The pastoralists requested that they fence several small zones where there is little vegetation because if a large grazing land were fenced off for ten years they would have difficulty grazing their livestock. But this request was rejected by officials from the county BAAH, who said that as a government project, a fenced zone should not be fragmented and that we need to have a large fenced zone no matter whether it is useful or not to show for our work when evaluation teams from the higher level of government come.

Third, obviously with a larger fenced zone officials at three levels (county, prefectural and regional) can demand more funding from the higher level government. The largest fenced zone is more than 30 km in diameter. In some places, the local pastoralists find it difficult to name the place where the fencing is installed because the enclosed area spans several valleys and hills. “Our *skam ra* is too large to be named as we have a name for each of the valleys and hills that are inside the *skam ra*. So we do not know by which valley or hill we should refer the *skam ra* to” said a pastoralist in the central village when asked the name of the fenced area. It is ironic that the government often emphasizes the Tragedy of the Commons (Hardin 1967; Buck, 1985; Feeny et al., 1998) in rangeland management, advocating privatizing the use rights of traditionally commonly-used rangelands, but when it comes to fencing in *tuimu huancao* it forces pastoralists to fence off a large commonly-managed zone.²⁷² Ironically if not for the purpose of *tuimu huancao*, for pastoralists it is better to have a large zone because for the same amount of fenced area the possibility of restricting livestock mobility by a large single zone is smaller than by several fragmented zones.

However, when a large area is fenced off pastoralists find it difficult to graze their livestock if primary grazing land is effectively closed off in the fenced zone. For example, in spring 2009 pastoralists in Research Village 2 in the east had to fence off the whole fall pasture (August-September) for the program for a period of five years. As a result, since the fall of 2009

²⁷² Interestingly, some officials said that grazing in a large zone can be banned more effectively as households or villages can monitor each other, which sounds reasonable in theory, but in reality it turns out to be infeasible.

they have had to come back to the winter settlement directly from the summer pasture or keep staying at the summer camp. In fall 2009 after a snowstorm some families had to put some livestock inside the fenced zone because of a lack of forage. As a result, they were made to stand in front of everyone at the township headquarter and at a village meeting as punishment by township officials and village heads. One of the pastoralists there said:

Today we have to keep staying on the summer pasture until the 5th of September due to the new fence, which we cannot open for five years.²⁷³ Ideally, we should have just fenced off the seeded area [10% of the entire fenced area]. But now with the whole mountainous pasture being fenced off no matter whether it has been seeded or not, livestock cannot graze on the non-seeded pasture where there is vegetation.

This also shows that, as discussed in Chapter 4, pastoralists view protection of areas with seeded grass as the only possible purpose of fencing off sandy pastures. In the case of Research Village 1 in the eastern research site, what is partly enclosed in the fenced zone used to be the grazing land during mid winter for about three weeks for sheep and *yarma*²⁷⁴ and during snowstorms. Pastoralists hope that their sandy pastures will produce more forage through the seeding component of the project, and thus are willing to abandon grazing inside the fence and think it is worth banning grazing there as long as the seeding of grass works. During the first winter, i.e. that of 2009-2010, after the pasture was fenced off, they did not encounter a big grazing problem as sufficient forage was available in other pastures thanks to plentiful rain in the summer of 2009, but they cannot guarantee they will not have to graze the livestock inside the fence under severe weather in the future. Some pastoralists in the central site report that as vegetation greens up earlier in sandy pastures, where what is partly enclosed in the *jinmu* zone is the grazing land in the spring, it affects the physical condition of livestock if the zone is closed off effectively. For

²⁷³ Pastoralists in the east who believe in the Bon tradition tend to use an international calendar instead of a traditional Tibetan calendar.

²⁷⁴ Year two milking yaks

example, the livestock cannot gain weight as they did in the past, leading to poorer livestock condition.

3. *Location Matters in Grazing Bans*

In addition to affecting grazing and making protecting the seeded area within the zone more difficult, a large zone makes a ban on grazing -- the fundamental purpose of installing the fencing under the program -- more difficult. Very large zones become unmanageable. The responsibility for supervising grazing bans is delegated down to the township government through the administrative hierarchy. The township government needs to be accountable to the county government. In practice, the location of a fenced zone matters in township officials' supervision of grazing bans. The above case in which some pastoralists in the second village of the eastern research site were caught grazing in the fenced zone, part of which used to be their fall pasture, illustrates this. The village is very close to the township headquarters (4 km from the village head's house) and the fenced zone is just along the main road leading out of the township to the county town. Consequently, township officials can easily notice livestock grazing inside the fence without a deliberate inspection of it. Furthermore, work teams from higher levels of government will see the fenced zone, and thus township officials must pay special attention to it to ensure everything is in order and pressure the village heads to be responsible for making sure grazing bans are put in place effectively.

However, this does not apply to all fenced zones. As discussed later in Section 6, *tui mu huancao* is implemented as fencing installation in practice, and management of the fenced zones, including banning grazing effectively, is not a major concern for various levels of government. Furthermore, as discussed in Chapter 4, the township government does not receive funding for the implementation of the program. As a result, officials at the township government are neither

pressured nor have an economic incentive to make sure grazing is banned well in the fenced zones in locations other than near the township headquarter or main roads where the fenced zones can be seen. Practically, a lack of transportation facilities and the cost of field trips given vast tracts of land and difficult road conditions restrict township officials' field trips to the villages to check whether the fenced zones are closed off effectively. This is especially true with fenced pastures in remote and isolated villages. Township officials in the three research sites said that they have never made an inspection and evaluation tour of the fenced zones once fencing was installed. They just pay attention to the fenced zones on their way for other business trips to the villages. In fact, it appears that the best-case scenario for local officials (especially at the township and county level) is to capture the funding from the higher-level government but not to have to ban grazing if there is no pressure from the higher-level government.²⁷⁵ As one of the deputy heads of the county BAAH in the west put it explicitly, "Actually we have the *jinmu* component for the sake of compensation, and at the same time we let the pastoralists to use the fenced zones during severe weather. Without compensation, we would not ban grazing for ten years."

Under such circumstances, an effective ban on grazing depends on the village committee and the pastoralists. For example, the township government in the western site requested two villages to monitor each other's ban on grazing. In some cases there is a written contract between the village committee and individual households concerning individual families' responsibility for protecting the fenced zones, including refraining from grazing livestock inside the fenced zones during the grazing ban. In other cases, regulations governing the management of the fenced pastures are included in the Village Rules and Regulations (*yul srol dmangs khrims*)

²⁷⁵ Township officials do this as a task from the county officials though they do not receive funding from the project.

approved by the township government. In practice, as discussed in Section 1, where what pastoralists call “useless” land is fenced off, grazing is banned well simply because they are not primary grazing land in the first place. “Never been there since fencing installation” is a common response among pastoralists in such a case. Where primary grazing land is fenced off, however, it is really difficult for pastoralists not to let the livestock graze in the fenced zones simply because they have nowhere else to graze the livestock. In such a situation, whether or not grazing can be banned effectively depends upon the village leadership.²⁷⁶ However, like the township officials, without being pressured many village leaders do not feel obligated to have fellow pastoralists refrain from grazing the livestock in the fenced zones and find it difficult to do so in practice. This can be seen in the case of the central research site, where the village committee openly allowed pastoralists to graze their livestock in one of the *jinmu* zones for two months in spring 2010 after the pastoralists requested so to do. Moreover, where a large area is fenced off, even if they try to prevent their own livestock from grazing in the fenced zones, pastoralists find it difficult to prevent livestock from neighboring villages or townships from grazing in the fenced zones or people from sabotaging the fencing, or passersby from opening or breaking the fencing gates and leaving them open or damaged. For example, a pastoralist in the central site stated:

Our skam ra is very large with more than 100 rolls of fencing and extends over valleys and hills as far as the neighboring village, which occasionally sabotages it. Actually it is too large to be managed well. Without managing it well, there is no point of installing the fencing, which will fall apart gradually. We have four natural villages in this Zuk. If the skam ra had been fenced at the natural village level with each of the natural villages having its own skam ra, it would have been easier for us to manage it.

²⁷⁶ In the central research village, of the five Zuk, only one zuk pays a family to stay in the *jinmu* zone and drive livestock away when they approach the fence.

Furthermore, even if grazing by livestock is effectively banned, grazing by wildlife remains an issue in some places, in which Tibetans antelopes²⁷⁷ and gazelle²⁷⁸ stay and graze inside the fences. For example, in the second eastern village, the pastoralists had driven all the gazelle out of the zone when they installed the fencing, but later the gazelle just came back. In the western research site, local pastoralists try to enforce an effective ban on grazing by livestock in the fenced zones, which are supposed to be closed off for ten years. However, Tibetan antelopes often sneak into and graze in the fenced zones. Thus, they complain that it seems as if the enclosed pastures are reserved for the antelopes. What is worse, constant trampling by antelopes tends to damage the existing vegetation in the fenced zones as the antelopes have difficulty getting out once they get into a fenced zone. “Instead of improving the rangeland condition, the project seems to damage the rangeland as Tibetan antelopes inside the fence not only damage the seeded area but also the existing vegetation when they do not know how to get out and have to stay in the fence for months,” said one of the pastoralists there. Antelope tracks can be seen along the fences like motorbike tracks and there was plentiful antelope dung inside the fences.²⁷⁹ Before the pastures were fenced off, the antelopes would wander freely across the vast steppe rather than stay at one place for a long time, not causing trampling damage to the vegetation. Now with the fenced pastures, it seems as if the antelopes have been put into a large stall, where the frequency of trampling on the vegetation has increased as the mobility of the antelopes inside is restricted. As Tibetan antelopes are listed as first-class endangered species in China, the pastoralists do not dare to drive the antelopes out the fenced zones, even if they were able to do so. Neither officials from the township government and nor from the county BAAH

²⁷⁷ *Pantholops hodgsonii* (*gtsod* in Tibetan; *chiru* in Indian English)

²⁷⁸ *Procapra picticaudata* (*dgo ba* in Tibetan)

²⁷⁹ Every time when I passed the fences during my stay in the village I saw antelopes and gazelle grazing inside the fences. Once on our way home the eldest son of my host family and I saw a body of an antelope being eaten by vultures inside one of the *jinmu* zones.

have any idea what to do with the problem of grazing by antelopes in the fenced zones. All these have significantly contributed to the failure of *tuimu huancao* in terms of effective bans on grazing.

Under such circumstances, both pastoralists and officials from the local area and with pastoral family backgrounds, who are often at the lower level government (township), think a smaller fenced zone at a natural village or a household level would be much easier to manage, and banning grazing and protecting the seeded area more effective. If the fenced pasture were smaller, pastoralists in some cases would not lose a big portion of their grazing land during the grazing ban and would not have to try to graze in the fenced zone, contributing to an effective grazing ban. Where seeding works, the seeded part of a smaller fenced zone could be better protected from livestock grazing and trampling as it is more difficult not to let livestock sneak into a larger fenced zone in the first place. They think that individual families could be contracted to manage a small seeded zone near the settlement or around their houses. They also think a smaller fence can be used as an experimental site before the program is implemented on a large scale in order not to waste money. Talking about how much the state invested in the project in his village and his idea of an alternative way to implement the project, Jekzi, the head of my host family in the eastern research site said:

To reduce the financial burden on the state of providing fencing and seeds and to really achieve the goal of sa nag spang 'gyur without encountering many problems during the grazing ban, it would have been better to just fence off a small sandy pasture with one-third of the fencing provided by the state and encourage people to collect native seeds to grow grass in the fenced zone, while fencing off meadow pastures with the remainder of the fencing to reserve forage. This way, we could have made the most of the fencing in such a way that the normal grazing activity was not disrupted as the seeded sandy pasture is not very large and the fenced meadow pastures can be grazed seasonally. Then when the seeded pasture is ready to graze several years later, we could move themfencing to enclose the next sandy pasture, which can be seeded with seeds collected from the previous seeded pasture. Now a huge sandy pasture with only about 1% of it being seeded is fenced off. This is such a waste of the fencing and the grazing land. This not only affects grazing, but also makes the

goal of improving vegetation cover difficult, if not impossible, as it is really difficult for us not to let the livestock graze in it for several years.

This also shows, as discussed in Chapter 4, that pastoralists think the only way to improve vegetation cover is through seeding of grass. 50-year-old Monyo is the governor of another township north of my research township in the central site. His family lives in the research village. Asked what he thinks of *tuimu huancao*, he said:

The biggest problem with tuimu huancao is that the fenced zones are too large, making it difficult to ban grazing effectively. Ideally the largest zone should not be more than three sets of fencing. When a fenced zone extends over a large area in Changtang, it would be several days before people learn the enclosed pasture is being grazed by livestock from nearby villages or of passersby. In this project fencing is the means of banning grazing, but if it is not useful for banning grazing, then it is just a waste.

However, as discussed in Chapter 4, the political economic pressures upon the policy translation process make it difficult, if not impossible, for these alternative voices to be heard.

4. “Great Leap Forward” in Improvement in Vegetation Conditions

Given that grazing is not banned effectively in many cases and that it has not been long since the fence installation, it is reasonable to expect no significant change in vegetation conditions providing the program’s assumptions (i.e. the condition of “degraded” rangeland will “recover” naturally through grazing bans for some time) hold true. However, improvement in vegetation conditions is impressive in local officials’ reports. The Ministry of Agriculture provides technical criteria for measuring the efficacy of the program in restoring “degraded” rangeland and lifting the ban on grazing.²⁸⁰ Accordingly, local officials at three levels (county up to regional) report how effective the program is by providing specific figures for improvement in vegetation cover and height. For example, across the prefecture the county BAAH request the

²⁸⁰ These include for *xiumu* above-ground dry matter accumulation and mean daily plant growth rate, and for *jinmu* primary productivity of the previous year, vegetation cover and carrying capacity. ‘Technical codes of grazing bans’ (*jinmu he xiumu jishu guicheng*). Ministry of Agriculture. no date.

township government to write a short report (called *xiaoyi zhengming*²⁸¹ in Chinese) based on the former's field assessment of vegetation conditions to prove the project is effective. In the eastern site, all five townships reporting the results of the program of fiscal year 2007 used the exact same wording except the figures for vegetation conditions. The research township reported in Aug 2009 that since the fence installation the mean forage yield in the sandy pastures had increased by 9.2 kg per *mu* (from 27 kg to 36.2 kg), the mean vegetation height of the fenced sandy pastures by 6 cm (from 2 cm to 8cm) and the mean vegetation cover by 21.3% (from 38.2% from 59.5%) based on county officials' vegetation condition assessment in July 2009.²⁸² However, these figures are problematic not only because it is impossible for the vegetation conditions to improve dramatically in such a short period of time (less than two months) given the actual fencing installation did not occur until May 2009, but also because officials from the county BAAH did not have any baseline data before the sandy pastures were fenced off to compare with, as in most cases it even did not check the fencing sites (see Section 1).

In another case, five different townships in Nagchu County also produced the exact same reports aside from figures for vegetation condition and timing of the assessment. The reports said officials from the county BAAH assessed above ground biomass, vegetation height, vegetation cover and ratio of high quality forage in the five townships during the five months of January to May after the fencing was installed in the previous summer and fall.²⁸³ Each township was

²⁸¹ Literally proof of efficacy

²⁸² 'Proof of Efficacy' (*xiaoyi zhengming*). Kangche Township Government, 12 August 2009; 'Monitoring Report on Efficacy of the *tui mu huancao* Program in Drachen County in 2007 (*baqingxian 2007nian tianran caoyuan tui mu huancao gongcheng jianshe xiaoyi jiance baogao*). Drachin County Bureau of Agriculture and Animal Husbandry, 18 August 2009.

²⁸³ 'Proof of Efficacy' (*xiaoyi zhengming*). Nagchu Township Government, 18 January 2009; Lhoma township Government, 20 February 2009; Nameche Township Government, 30 March 2009; Daksar Township Government 19 April 2009; Kormang Township Government, 31 May 2009.

assessed within a month: the first in January, the second in February, the third in March, and so on. The reports conclude:

Since grazing was banned on degraded rangeland through the implementation of tuimu huancao, rangeland ecosystems have been effectively improving, and rangeland productivity has been gradually restored. This will provide a basis for sustainable pastoral development in the township.

However, it is really difficult to assess the vegetation condition in the winter, especially in the case of sandy pastures because forbs as the main vegetation in sandy pastures should be senesced and blown away by wind by then, as pastoralists observe.²⁸⁴ In fact, it turns out that officials at the county BAAH first drafted the report and then asked township officials to come up with the figures or otherwise simply made up figures and filled in the name of the township.²⁸⁵ Therefore, local (township up to regional) government reports of improvement in vegetation conditions through *tuimu huancao* are unreliable and subjective at best if they are not fabricated. This reminds people of false grain production figures reported by local leaders to their political superiors for political reasons during the Great Leap Forward movement in the late 1950s in China (Shapiro, 2001). Today, local officials at various levels (township up to regional) report in a similar way, to show what a good job they did and claim more projects from the state, primarily for economic reasons.²⁸⁶

²⁸⁴ I consulted with a Tibetan ecologist, who teaches at a local college and conducted field research in Nagchu on rangeland. He does not think it is possible to assess above ground biomass and vegetation cover in the region in winter. Furthermore, he believes that the data would be much more reliable if the assessment is conducted for several years.

²⁸⁵ If the primary project implementer (in this case the county BAAH) shows a positive report from the territorial government (in this case the township government), it will increase the credibility of the results (interviews with county BAAH officials).

²⁸⁶ Overstated reports of improvement in rangeland conditions thanks to *tuimu huancao* also appeared in national documents. For example, the national Report on Environmental Conditions for 2003 states, "Vegetation cover in the project areas has increased by 10-15% and forage production by 6.7 kg/ha, effectively reducing soil erosion." The vegetation cover is unlikely to improve so significantly within one year of *tuimu huancao* implementation.

As of October 2010 when the last field trip was conducted for this research, it had been one to three years since the fences were established in the five administrative villages in the three sites (See Table 21).

Table 21 Tuimu huancao fencing installation in the five research villages

	west-1	west-2	central	east-1	east-2
<i>jinmu</i> (<i>sa nag</i>)	May 2008	/	/	/	/
<i>jinmu</i> with seeding (<i>sa nag</i>)	June 2009	fall 2008, spring 2009 ²⁸⁷	June 2007	May 2009	May 2009
<i>xiumu</i> (<i>spang</i>)	/	/	June 2007	/	/

Thus far, the local pastoralists in the three sites did not observe any noticeable improvement in vegetation cover and moreover in the case of sandy pastures they do not think it will because what appears to be degraded rangeland with very sparse vegetation is the original condition of the rangeland in their living memory (see Section 1) or partly damaged (in fact possibly expanded) by voles in the case of the eastern site as discussed in Chapter 3.²⁸⁸ In the case of alpine meadow pastures more existing vegetation will be left by the end of growing season if grazing is banned effectively, which is not generally the case.²⁸⁹ They think the only possible way to improve vegetation cover is by seeding of grass, though it did not work well (especially in the western and central sites) to date as discussed in the next section. Therefore, they think fencing off the pasture without seeding is worthless and in fact harmful to them. “If the zone is not to be seeded, then far from being useful, it is just bad as the land is blocked but the vegetation cover will not improve given it is the original condition of the pasture,” said an old

²⁸⁷ As discussed in Chapter 4, one of the two fences had to be removed and reinstalled in spring 2009.

²⁸⁸ The Ministry of Agriculture says a *jinmu* zone can be open to livestock when the vegetation cover exceeds 50% by the end of the growing season ‘Technical codes of grazing bans’ (*jinmu he xiumu jishu guicheng*). Ministry of Agriculture. no date.

²⁸⁹ This appears to be close to what the *xiumu* component is designed to achieve in terms of above-ground dry matter accumulation.

pastoralist in the western site when asked what he thinks of the *jinmu* zone without seeding of grass. To the same question the village head responded, “Currently, without compensation the fenced zones are useless. When we open the zones ten years later, we will just have the vegetation from the very last year, which will be the same as now, and nothing more than that.” Thus, for pastoralists if the existing vegetation is not grazed each year, it is just a waste of resources. Similarly, a pastoralist in the central site said:

We are educated by the government that according to scientific research the fenced sandy pasture will become more lush and an alpine meadow in ten years, but personally I think if the pasture were seeded with grass, it probably could be improved, otherwise, just closing off for ten years, actually even for one hundred years, will not improve the condition of the pasture because it has been so since I can remember.

In the eastern and central sites, the pastoralists perceive that when sandy pastures are closed off, changes in vegetation conditions that can be noticed over time are that existing forbs (*ldunbu*) and shrubs (*tsherma*) may grow higher in the summer, and the forbs will be blown away by wind in the winter when not grazed by livestock in the summer.

Pastoralists’ observations and knowledge suggest that if a pasture is fenced off and grazing is banned for some time, the existing vegetation will look higher and its density will look higher as a result of the vegetation not being grazed and trampled by livestock. Hence the fenced pasture will look greener and lusher when seen from a distance. Officials use this phenomenon to prove the grazing ban helps to improve vegetation cover, but this does not necessarily demonstrate real improvement in vegetation cover as pastoralists observe:

...on closer inspection where there is no vegetation it remains the same, and in the summer it looks like we have a larger area of vegetation but when the vegetation is dried up and some blown away by wind in the winter, the area is the same as before.

Pastoralists’ knowledge further tells us that true improvement in vegetation cover depends on vegetation species. Where there are vegetation species that produce seeds, which fall down to the

ground when the vegetation is not grazed by livestock, new vegetation may grow from the seeds, improving vegetation cover. It appears that there are few such vegetation species in the region.²⁹⁰ Officials never asked the pastoralists if they had such grass species in the area when they decided what to fence.

5. *Seeding of Grass: “One Cut of the Knife”²⁹¹ at the County Level*

Seeding was one of the few aspects of the program that officials from the township up to the regional DAAH admitted did not work well. In Beijing the head of the Grassland Office of the Department of Animal Husbandry under the Ministry of Agriculture said seeding of grass should be conducted only where it works. However, in practice as discussed in the Introduction, as the Ministry of Agriculture has decided that the area to be seeded should be 30% of the total area to be fenced at the county level, seeding of grass has become mandatory at the county level regardless of local conditions.²⁹² The prefectural and county BAAH decided what grass species to seed with based on the prefectural grassland station’s past experience of seeding in the prefecture and purchased seeds mainly from neighboring provinces (such as Qinghai, Gansu, etc.). *Elymus sibiricus* Linn and *Elymus nutans* Griseb are the two grass species that are seeded across the prefecture, often together. It appeared that when mechanical plowing and seeding was adopted by staff from the prefectural grassland station, seeding of these grasses worked to one degree or another in the past. However, when the sandy pastures were seeded manually with these grasses by pastoralists, they did not grow at all in the drier western Nagchu and not well in central Nagchu with moderate precipitation. They grew in the wetter area of eastern Nagchu to

²⁹⁰ Some pastoralists in the east observe the seeded grass species have such a function.

²⁹¹ *yi dao qie* in Chinese, meaning adopting a uniform policy without consideration for local conditions

²⁹² The *xiumu* area is included when figuring out the area to be seeded, though only the *jinmu* zone needs seeding, which appears to be problematic because only “severely degraded” rangeland enclosed in the *jinmu* zone needs seeding according to the *tuimu huancao* policy. Within the county each *jinmu* zone was not necessarily seeded 30% of it. For example, the seeded area in the five research administrative villages varied from only about 1% up to 90% of the *jinmu* zone.

some extent, but were damaged by voles and by livestock in some cases. Seeding methods adopted by the pastoralists did not vary greatly across the region.

In the case of the western research site, the pastoralists seeded the enclosed pastures in June 2009, which was the very first time that seeding of grass had been done in the two villages. After scattering the seed by hand over the ground, the pastoralists raked the soil over to cover the seed, or drove yaks in order to step the seed into the soil. Thus far nothing has grown.²⁹³ Nevertheless, the pastoralists have not abandoned hope for it. They observed grass began to appear from the seed that scattered in the village courtyard where they stored the seed before they used them. They wondered why the same thing did not happen in the seeded pastures.²⁹⁴ The method that they are enthusiastic about is mechanical plowing and seeding, which the village heads long for. Officials at the regional department of and the prefectural BAAH are careful with mechanical plowing as it will destroy the native vegetation, but interested in finding a way to irrigate the rangeland. Officials at the township government and the county BAAH and staff from the prefectural grassland station are well aware of the infeasibility of seeding of grass in western Nagchu, but they still have to conduct it as an important component of the grazing removal project, as discussed in Chapter 4.²⁹⁵ In fact township officials in this research site suggested that the pastoralists conduct a pilot seeding first because they know seeding of grass does not work well in the region. Thus the first village just used less than 1% of the seed provided to seed a small portion of the fenced pasture but the second village still used up all the seed and seeded about 90% of the fenced pasture. Although the local officials realized that

²⁹³ I went to see the seeded area of the first village twice. In September 2009, I saw some seeds still on the ground. In June 2010, I saw plentiful antelope dung on the ground.

²⁹⁴ This is probably thanks to the protection against cold and wind by the courtyard walls.

²⁹⁵ During my field site selection trip I learned that seeding of grass also failed in two other counties in western TAR, Nyima County in Nagchu and Getse County in Ngari Prefecture. In Nyima the head of county BAAH told me that they are careful with the seeding component of *tuimu huancao* as a seeding project completely failed in the past when the seeding was conducted manually.

natural conditions (such as precipitation) play an important role in seeding of grass in western Nagchu, they also attributed the failure of the seeding component of the project to seeding techniques and pastoralists' skills and indolence. As one of the deputy heads of the county BAAH put it:

We taught the pastoralists how to seed and told them to make sure the seed is three to four centimeters deep in the ground. But given the vast tracts of rangeland and their poor skills, later the pastoralists were getting lazy and just scattered the seed on the ground. Therefore, seeding techniques and skills are very important. Also, a lack of water is a problem.

In the central research village, the pastoralists seeded the fenced pastures twice, once in September 2007 right after the fencing was installed and then again in May 2008 after they found the previous seeding did not work. In some cases they first raked the soil over, and then scattered the seeds and spread manure on the ground, and lastly raked the soil back to cover the seeds. In other cases they just scattered the seeds on the ground. To date only in one of the seven seeded *jinmu* zones was grass observed to grow by the pastoralists who live nearby, though it was doubted by other pastoralists in the village. Some pastoralists reported that where grazing was not banned well, grasses were destroyed by livestock when they started to appear. Thus, they think it would be better to just enclose the seeded area in order to protect it rather than fence off the whole sandy pasture. Others say that when manure is used in seeding of grass, it helps grass grow. Given their pastures are dominated by lush alpine meadows and alpine marsh meadows, pastoralists in the central research site do not care as much as their counterparts in the western and eastern region about whether the seeding of grass works or not, though they also think it would be good to have more forage through the seeding component of the project if it were to work. When talking about seeding of grass, many refer to an experimental project on the way to the county town being jointly conducted by the prefectural grassland station and the Institute of Environment and Sustainable Development in Agriculture (IEDA) under the Chinese Academy

of Agricultural Sciences (CAAS) in Beijing, in which a fenced sandy pasture has been seeded and irrigated, and protected very well, and where as a result, the vegetation inside the fence is growing very well. From this they see the condition of rangeland can be improved through state interventions, which gives them some hope. The scientist at IEDA in charge of the project is well aware that it is impossible to replicate this project to other places given the high costs.

In the eastern research site, the pastoralists seeded the fenced sandy pastures in May 2009 right after they finished installing the fencing. They first scattered the seed over the ground, and then shoveled the soil over to cover the seed. By July 2010 the grass had grown to the height of approximately five centimeters in the first research village. The local pastoralists observe that burrows and holes made by voles in the ground and the soil dug out by voles when making the burrows and holes make the ground remain patchy with grass. The amount of seed they received from the county BAAH via the township government was only enough to cover about 1% of the fenced zone.²⁹⁶ Therefore, they really hope they will get more seed from the government. However, officials at the prefectural BAAH did not think more seed could be provided to an existing program because the state funding for each round of program is fixed and a new program will have its own seeding targets to be covered. They believed that the reason why the seed was inadequate was due to the pastoralists' seeding techniques and skills, not scattering the seed evenly over the soil. Like the pastoralists, in practice local officials at the township government and the county BAAH in eastern Nagchu see that the purpose of the *jinmu* component of the project is to improve the vegetation condition of sandy pastures through seeding of grass to produce more forage rather than through merely imposing a ban on grazing,

²⁹⁶ The township governor told me that they just evenly distributed the seed they received from the county BAAH among the program villages.

but they are concerned that voles and pika damage the newly-seeded pastures. Within the county, according to officials at the county BAAH, seeding of grass works better in the south, where it is wetter and lower in elevation, than in the north.

In sum, policymakers and government scientists assume that there exists pervasive rangeland degradation across the country. The area of “degraded” rangeland to be improved through seeding of grass is decided at the county level (county as a unit) without consideration for local conditions, i.e., 30% of the total area of the fenced zone for each project county across the region. The result is that it is a just waste of the seed where seeding of grass does not work while the seed is insufficient where grass grows from the seed to some extent. Together, this has resulted in a situation in which pastoralists across the prefecture have benefited little from the seeding component of the project. The prefectural BAAH reported that between 2004 and 2008, the total seeded area in the prefecture under the project was 4.32 million *mu*, which means the total central government funding for it was 43.2 million *yuan*.²⁹⁷ Therefore, the seeding component of the program is also cost-ineffective and just a waste of central government funding, which some local officials at the county BAAH have realized (see Chapter 4).

In fact this is not the first time that attempts at seeding of grass have failed in pastoral areas in China. Government projects to grow grass and irrigate rangeland in pastoral areas during the People’s Commune led to rangeland degradation instead of increasing rangeland productivity (Squires et al., 2009). As discussed in Chapter 4, in eastern and western Nagchu the pastoralists’ best hope of potential benefit they can gain from the project is to yield more forage through the seeding component of the project (after compensation and fencing in the case of western and

²⁹⁷ The state investment in seeding of grass was 10 *yuan/mu*. Material on the *tuimu huancao* Program in Nagchu Prefecture (*naqu diqu tianran caoyuan tuimu huancao gongcheng jiaoliu cailiao*). Nagchu prefectural Bureau of Agriculture and Animal Husbandry, 26 March 2009.

central Nagchu), but it is sensible to foresee that as time passes by this will disappoint them (especially in the west), the implications of which will be further reduced incentives to ban grazing in the fenced zones.

6. *A Forgotten Program after Fencing Installation and Evaluation*

Among the criteria that the document from the Ministry of Agriculture details for evaluating how well *tuimu huancao* is implemented, is task fulfillment, which accounts for 30 percent of the evaluation score of 100 points.²⁹⁸ This refers to an examination of whether the task of fencing off a certain amount of rangeland is fulfilled. The quality of project implementation, which refers to the quality of fencing materials and fencing installation, accounts for 30 percent of the evaluation score of 100 points while what is called post-implementation management that assesses vegetation cover conditions and mechanisms being set up for maintenance of fencing and grazing bans, and restrictions after a pasture is fenced off only accounts for eight percent of the total evaluation score of 100 points.²⁹⁹ Accordingly, in practice using these criteria as a guideline on the evaluation of the implementation of the program, government evaluation teams assess how well the fencing is installed, whether the enclosed zone is fenced according to the project implementation plan in terms of site and size, and whether a project sign with information about the fenced zone is set up.³⁰⁰ However, they are scarcely concerned with grazing bans and vegetation change in the fenced zone when they evaluate the implementation of a particular program. Talking about how the fenced zone met the evaluation

²⁹⁸ ‘Notice on Issuing Detailed Codes for Evaluating the *tuimu huancao* Program in the Western Region’ (*guanyu yinfa xibu diqu tianran caoyuan tuimu huancao gongcheng xiangmu yanshou xize de tongzhi*). Ministry of Agriculture, 7 October 2004.

²⁹⁹ No criteria are recommended for evaluating the seeding component of the project. The rest of the total evaluation score of 100 points goes to the payment of compensation (20%) and project management (12%).

³⁰⁰ For example, in the first round of the project in the central research village, one of the Zuk was not paid labor subsidies because they did not set up a project sign. Information on project signs is often inaccurate. The information includes the name of the place, the number of households and livestock involved in the fenced zone, the area of the fenced zone and the total investment, etc.

criteria and the problem of Tibetan antelopes grazing in the fence zone as discussed in Section 3, one of the village heads in the western research site said:

The government evaluation team of the county BAAH and the township government told us that the area of our fenced zone is more than 13, 000 mu, which is what it is in the implementation plan, so they told us that our project meets the evaluation criteria. The team is well aware of the problem of Tibetan antelopes grazing in the fenced zone but they neither said anything about it nor gave us any instructions on what to do with it.

As discussed in Section 3, after fencing installation and the program is evaluated, various levels of local government are not very much concerned to ban grazing effectively, nor have they the resources to do so. They rarely make any follow-up field visits to the fencing sites on purpose. as one of the village heads in the central research site said:

The evaluation team consisting of people from the county BAAH, the prefecture grassland station and the township government checked the quality of the fencing installation, and whether alpine meadow pastures are fenced off for skam ra and sandy pastures for bye ra. Since then, no government work teams have made a field visit to any of the fencing sites.

The above document suggests that the implementation of the program should be evaluated by three levels of government³⁰¹ (county, regional and state) and that after the county-level evaluation, at least 20% of the projects should be randomly sampled and evaluated by the regional government and after the regional-level evaluation, at least 10% of the projects should be randomly sampled and evaluated by the central government. This means that in practice the implementation of most of the projects is not evaluated by higher levels of government (regional up to central government). As it is impossible for the higher level government to assess every single project on the spot, the lower level government would report to the higher government that implementation of the project is satisfactory and make sure things are in order during the

³⁰¹ It appears that in Nagchu evaluation is also conducted at the prefecture level by the three institutions (the BAAH, the Development and Reform Commission and the Finance Bureau) and at the township level by the township government.

evaluation period in order to have their projects pass the evaluation and secure future project funding. “All the projects would pass our own evaluation.³⁰² Otherwise, how do we write reports to the higher level government and ask for their evaluation?” said an official from the prefectural development and planning commission. A former Party boss of the township government in the central research site stated:

When we learn an evaluation team is coming, we township officials would ask the village heads to arrange for people to drive livestock out of the fenced zones if there are any and make sure no livestock are grazing in them. The evaluation team would just assess the quality of fencing installation and estimate the area of a fenced zone. It is impossible for an evaluation team (even people from the state Ministry of Agriculture have come), to walk over the hills to thoroughly check every single part of the fencing. The evaluation team would just use telescopes to look around to make sure fencing is installed where the local pastoralists and officials told them the fencing has been set up.

Similarly, one of the township officials in the western research site reported, “The evaluation team of the county BAAH just went to evaluate the projects in three nearest villages and did not go to the other eight villages.” Asked what problems were found during the evaluation process, an official from the prefecture BAAH responded:

In the case of the program for fiscal year 2007, all the projects have passed the prefectural evaluation, but have not yet been evaluated by the regional government. Before their evaluation, the fencing may be damaged by yaks, or the fence posts in soft ground may get loose and come out of the ground after strong winds blow. In such case, we cannot say to the regional evaluation team that the fencing was in good condition when we evaluated, but have to get the fencing repaired.

All he is concerned with is the quality of fencing installation, but not vegetation change in fenced zones, which can be better assessed after some time passes, if grazing is banned effectively once fences are established.

³⁰² It is very common in the TAR for various levels of the local government to bribe members of an evaluation team to have a project pass the evaluation by giving money in red envelopes (*hongbao* in Chinese) or other gifts. This is openly done within the governmental organization using public funds.

Therefore, for various levels of local government (from regional government down to township), implementation of *tuimu huancao* is equal to fencing installation on the rangeland, ignoring the fundamental purpose of the project, which is to reverse and restore “degraded” rangeland and improve vegetation cover from the program’s perspective. Fencing should be the means of banning grazing in *tuimu huancao*, but the local governments just install it as an end in itself.

Conclusion

In terms of pervasive rangeland degradation across the region, which is the first assumption of *tuimu huancao*, national policy makers and scientists appear to be fighting against a straw man of their own construction (Fairhead and Leach, 1996). Local pastoralists’ memories and observations of rangeland condition contradict the primary assumption behind the policy. The important question of when the rangeland began to be “degraded” – that is whether current conditions have existed over a time span of a hundred or more years - has long been ignored by scientists and policymakers. The condition of what officials consider degraded rangeland has turned out to be original and persistent in pastoralists’ living memories. Furthermore, pastoralists’ knowledge and observations challenge the second assumption of the project, i.e. that rangeland “degradation” results from overgrazing and irrational management practices as discussed in detail in Chapter 3. The third assumption of the program, i.e. “degraded” rangeland can be restored through grazing bans, must be left for now as an open question given it has been only one to three years since the fence installation in the five villages (providing the program’s assumptions hold true and some fenced zones can be effectively closed off for ten years as the policy suggests). Fatal flaws in the program’s design also included a mandatory seeding component at the county level regardless of local conditions, and what is called “concentrated

and linked” (*jizhong lianpian*) fenced zones. The former resulted in a waste of funding where seeding of grass does not work, while funding is insufficient where it works, yielding little overall benefit, while the latter makes it difficult to manage the fenced zones.

As local (regional down to township) officials implement the program out of the political economic pressures rather than out of concerns about rangeland condition, in practice they install the fencing as an end in itself, rather than a tool for banning grazing as designed in the program. Consequently, even were the program’s assumptions to hold true, it is sensible to foresee that the program will not bring about much positive change (if any) that the national policy makers aim to see in terms of rangeland improvement given that in most cases the fenced zones are not closed off effectively. Therefore, when pervasive rangeland degradation is presumed and hence a large scale program is launched to battle it, it is infeasible in practice. There exists a rather large gap between what policy makers expect and what has happened on the ground, yet the government reconstructs it as a success and maintains it (see Li, 1999). Officials reported and evaluated *tuimu huancao* as a successful policy. The local government (county up to regional) needs to do so in order to make further claims on the central government for projects while the central government is hesitant to admit its policy has turned out to be based on erroneous assumptions or infeasible. This leaves *tuimu huancao* in Nagchu neither a good policy at the policy level nor good implementation at the implementation level.

As most fencing and seed suppliers are Chinese companies based outside the TAR, these companies are the biggest winners in *tuimu huancao* in terms of economic benefits. Therefore, the project money flows back to China, which resembles the cases for many development projects in the TAR, in which the central government investment goes back to China through

Chinese material supplier and migrant workers (Fischer, 2005).³⁰³ For example, the prefectural BAAH invited bids through a Chinese consulting firm based in Chengdu, Sichuan for the fencing material worth 51.421 million *yuan* for the project for fiscal year 2005 for four counties.³⁰⁴ Of the ten companies listed as having won a bid, eight companies are from outside the TAR with most them from Qinghai Province and one from as far as Shanxi Province.³⁰⁵ Overall, it is sensible to foresee that *tuimu huancao* will be cost-ineffective in terms of the efficacy of the investment in achieving its stated objectives and will be gradually forgotten once it is implemented.

³⁰³ Another channel through which the project funding goes back to China is project implementation monitoring, which includes, in theory, to check the quality of fencing material, site and installation. A Chinese company based in Chengdu, Sichuan has been contracted by the prefectural grassland station as it is “better” qualified to monitor project implementation progress, but it appears its real work is just to compile project monitoring reports.

³⁰⁴ ‘Request for Proposal for Fencing Material in 2005 for the *tuimu huancao* Program, and for the “Rangeland Construction and Sedentarization of Pastoralists” Program’ (2005 nian tianran caodi tuimu huancao gongcheng ji caochang jianshe yu youmumin dingju gongcheng wangweilan jianshe xiangmu huowu yanshou gongzuo baogao wangweilan zhaobiao weituoshu) Nagchu Prefectural Bureau of Agriculture and Animal Husbandry and Sichuan Jingzheng Construction Management Consulting Co., Ltd, 21 December 2005.

³⁰⁵ ‘Work Report on Fencing Material in 2005 for the *tuimu huancao* Program, and for the “Rangeland Construction and Sedentarization of Pastoralists” Program’ (*guanyu 2005nian tianran caodi tuimu huancao gongcheng ji caochang jianshe yu youmumin dingju gongcheng wangweilan jianshe xiangmu huowu yanshou gongzuo baogao*). Sichuan Jingzheng Construction Management Consulting Co., Ltd, 9 April 2006.

Chapter 6

From “Retire Livestock, Restore Rangeland” to the Compensation for Ecological Services

As a person who has grown up in a pastoral family and used to be a pastoralist, I truly understand how hard it would be for pastoralists if they are allowed to raise only a few livestock because other than livestock they have nothing to live on, as not even a single radish grows in the Changtang. As I told you earlier about the tuimu huancao program in my village, what looks like degraded grassland with little vegetation has been in that same state ever since I can remember. So this new policy may end up being good neither for the state because it is just wasting money, nor for the pastoralists. But as the saying goes, “Not being afraid of the official, but of his power.” As an official, like a parrot, I, along with my colleagues at the township, have to propagandize the policy among the pastoralists very accurately as higher levels of government want us to ...³⁰⁶

This is part of what a middle-aged township official from a pastoral family background in the western research site told me about his opinions on the newly launched destocking policy under the “rangeland ecological protection subsidy and reward mechanism” program. As I introduced in Chapter 1 and explain in further detail here, I refer to it as an example of a Compensation for Ecosystem Services (CES) program.

During my fieldwork in the western and central sites, I learned that the western and central counties are two of the first five experimental counties in the TAR for this policy. As the basic assumption made in this new policy is exactly the same as the second assumption of *tuimu huancao*, i.e. grazing by livestock causes rangeland degradation, and local pastoralists were concerned a lot about the implementation of the program because it might affect their livelihoods, I decided to include this policy in the research and add questions about it. This chapter examines why the Chinese Government launched the CES program, how the destocking policy under it is being implemented in Nagchu, and predicts possible results that the CES program may bring.

1. A Hybrid of Ecological and Economic Approaches and Solutions

³⁰⁶ *Tibetan: dpon la mi skrag dbang la skrag*

[T]uimu huancao is to restore vegetation after rangeland degradation whereas this compensation program is to buy vegetation from the pastoralists before rangeland degradation. So the former is a passive action whereas the latter is an active action. From passive to active action is significant progress.

A professor and policy advisor from Beijing Forestry University made the above statement when asked his opinions on the Compensation for Ecological Services (CES) program.

³⁰⁷ National policy advisors and policymakers consider the implementation of CES following *tuimu huancao* to represent significant progress on rangeland protection.

Aside from a rangeland protection initiative, policymakers mean the national CES program to be a subsidy and pro-pastoralist policy on pastoral development that will help promote pastoral production and increase the income of pastoralists, as articulated by officials at Ministry of Agriculture and Ministry of Finance:³⁰⁸

At present, our country faces a serious situation in rangeland ecological protection and income growth of pastoralists. First, there is serious rangeland degradation...Second... income growth of pastoralists through pastoralism is weak. Third...investment in rangeland ecological protection and pastoral production is inadequate. Subsidies in pastoral production are significantly less than that in agricultural production. Thus, [we] establish a rangeland ecological protection subsidy and reward mechanism [in order to] strengthen rangeland ecological protection, change the mode of pastoral development, and promote sustainable income growth of pastoralists.

They have emphasized this subsidy nature of the program by adding the word “subsidy” (*buzhu* in Chinese) before the word “reward” in the name of the pilot CES program in the TAR, “rangeland ecological protection reward mechanism.” Thus, the name of the national CES program is “rangeland ecological protection subsidy and reward mechanism.” Accordingly, two

³⁰⁷ Interview with a professor at Beijing Forestry University

³⁰⁸ ‘Responsible Personnel from Ministry of Finance, the Office of the CPC Central Leading Working Group on Rural Affairs, Ministry of Agriculture Answer journalists’ Questions about Establishment of Rangeland Ecological Protection Subsidy and Reward Mechanism’ (*caizhengbu he zhangyang nongban nongyebu fuzeren jiu jianli caoyuan shengtai baohu buzhu jiangli jizhi da jizhe wen*). Xinhua News Agency, 15 October 2010.

http://www.gov.cn/jrzq/2010-10/15/content_1723773.htm

As the eight target provinces (and regions) for the CES program are also China’s ethnic and border regions with underdeveloped economy, the program also aims to promote regional development, ecological security and political stability in these regions.

other components of the national CES program are policies of pastoral production subsidies and an increase in support for education and vocational trainings for pastoralists. The former will subsidize more productive breeds of livestock (cattle, sheep and goats), artificial pastures (six million ha at an annual rate of 10 *yuan* per *mu*) and two million pastoralists (at an annual rate of 500 *yuan* per household³⁰⁹), and the latter aims to promote off-range employment of pastoralists.

China's "rangeland ecological protection subsidy and reward mechanism" can be viewed as a Compensation for Ecosystem Services program (McAfee and Shapiro, 2010). Ecosystem services (ES) are ecosystem functions that bring benefits to mankind, for example, climate change mitigation, provision of clean and sufficient water supplies, and biodiversity conservation (Costanza, *et al.*, 1997). Commodification of ecosystem services under the name of Payments for Ecosystem Services (PES) is a neoliberal form of environmental management in that a market price is put on ecosystem services, and those who benefit from an ecosystem service pay those who provide it. Payers offer incentives to providers to manage ecosystems as they desire. Both payers and providers can be individuals, communities, enterprises or governments. Three competing discursive PES paradigms are advocated by PES proponents worldwide (McAfee and Shapiro, 2010), namely, conservation-efficiency PES, pro-market, pro-poor PES and compensation for ecosystem services (CES).

First, the conservation-efficiency PES paradigm advocated by resource and environmental economists, international development agencies, and government ministries suggests that PES should be market-oriented and have conservation prioritized without involvement of social or political objectives such as poverty reduction (Chomitz, 2006). It states that benefits for the poor brought by PES should be viewed as a by-product rather than a PES

³⁰⁹ Within the three years (presumably 2012, 2013, 2014) in which pastoralists will have to meet the target of livestock reduction, if their livestock numbers are higher than in the previous year, this subsidy will be suspended.

goal. This concept draws on neoliberalism's conceptual separation of nature and society. In this conceptualization of PES, most PES schemes in developing countries are seen as PES-like ones rather than truly PES, given that they are not truly market-based (Wunder, 2007).

Second, the pro-market, pro-poor PES paradigm supported by donor agencies and research centers such as the Ford Foundation, the United Nations Environmental Program (UNEP), and the Nature Conservancy, just to name a few, suggests that PES can also be pro-poor for two reasons.³¹⁰ One, given the rural poor are those who actually manage ecosystems on the ground, PES should aim to promote their management practices that positively contribute to ecosystem services (Landell-Mills and Porras, 2002). Second, the rural poor in developing countries have a comparative advantage in producing ecosystem services (UNEP, 2005). This view is consistent with the neoliberal notion that conservation in the global South is more efficient thanks to lower incomes and cheaper land. This paradigm accepts depoliticized notion of nature-society relations.

Third, in contrast to the aforementioned two paradigms, the compensation for ecosystem services (CES) paradigm advocated by proponents of sustainable rural development contends that conservation cannot be achieved without sustainable rural development. It stresses that rural communities engaging in traditional resource management activities deserve to be rewarded for the ecosystem services that benefit a wider society, and that the contributions of ecosystem services to local livelihoods should be included in valuation of the ecosystem services (Rosa *et al.*, 2003). This means that prices of ecosystem services are not determined by market forces as suggested by neoliberal discourse. The paradigm holds that governments should primarily be

³¹⁰ Supporters of the pro-market, pro-poor PES paradigm recognize the possibility of bypassing small-scale farmers among the poor because in practice it is less efficient to pay many small-scale farmers than a few large ones under a market-oriented approach (McAfee and Shapiro, 2010). This suggests that the poor need disaggregating in order to examine the impacts of this model on the poor.

responsible for the operation and regulation of CES (Rosa *et al.*, 2003). Challenging neoliberal discourse, the paradigm asserts that ecosystems are shaped by people and that conservation initiatives cannot be apolitical.

China's "rangeland ecological protection subsidy and reward mechanism" fits loosely into the compensation for ecosystem services (CES) paradigm for two reasons.³¹¹ First, as discussed earlier, the Chinese government has launched the program partially as a pastoral development effort with state subsidies. This means that the program is not merely a pure environmental protection initiative informed by neoliberalism's desocialized concept of nature as suggested in the conservation-efficiency PES paradigm. This means the program has social goals to achieve, which is to benefit pastoralists. Second, fixed payment rates, which are identical nationwide, are determined by national policymakers. Furthermore, in the case of the TAR, an upper limit of 4500 *yuan* payment per capita per year is set for individual households to avoid widening the gap between rich and poor. These mean that the program is regulated by the state through a command-and-control approach rather than being strictly market-oriented (Zheng and Qian, 2004) as proposed in the conservation-efficiency PES paradigm and in the pro-market, pro-poor PES paradigm. Instead, the program resembles those under the compensation for ecosystem services (CES) paradigm because of these two features (a hybrid of environmental protection and rural development, and state regulations). Hence, it is reasonable to view the program as a CES program.

2. *Local Governments: the Same Incentives as in and the Same Approaches to tuimu huancao*

³¹¹ It should be noted that as the program is also explicitly intended to promote regional development, ecological security and political stability in these ethnic and border regions, the Chinese Government implicitly admits that this conservation initiative is also political. Thus it challenges the depoliticization of nature-society relations.

The western and central research counties happened to be two of the five counties for the pilot CES program in the TAR. Two basic factors explain the selection of these two counties as experimental counties. First, these two counties were among the 16 counties (seven in Ngari, six in Nagchu, three in Shigatse) in northwestern TAR where the Committee for Population, Resources and Environment (CPRE) under the CPPCC national committee first proposed that a CES program should be initiated in the TAR for three considerations (harsh natural conditions, valuable but fragile ecosystems, underdeveloped economy). Second, implementation of the Rangeland Household Responsibility System is the principal precondition for the program as it is for *tui mu huancao* because each household's new livestock quota needs calculating based on the livestock quota allotted in the Rangeland Contractual Management Certificate (RCMC). Under the national CES program the compensation for grazing bans needs to be calculated and paid based on each household's allocated rangeland area in the RCMCs as is also the case under *tui mu huancao*. As discussed in Chapter 2, all households in these two counties have received their RCMCs.

As the program works by paying pastoralists who do not exceed their livestock quotas based on carrying capacities of their rangeland, the very first step is to calculate new carrying capacities. The Ministry of Agriculture suggests that carrying capacity should be calculated using a standard formula based on three key variables-forage production, utilization rate of forage and regrowth rate of forage. In the TAR it was the regional DAAH that determined a new carrying capacity at the county level. The regional DAAH along with the regional Finance Bureau, through which the central government funding is channeled, explicitly suggested that

political and economic factors rather than just ecological ones should be accommodated when the carrying capacity is determined by stating:³¹²

The region determines the carrying capacity according to current forage production and useable feed obtained from sources other than (range), plus considering pastoralists' needs for a normal life.

When asked how the new county carrying capacity was determined an official at the regional DAAH explained:

You know, the RHRS carrying capacity was flawed because at that time it was not associated with money. Frankly speaking, nobody really cared about it. But now under this CES program, as the carrying capacity determines the compensation, both local officials and pastoralists are very much concerned about it. We the regional DAAH very carefully decided each county's new carrying capacity based on its forage production depending on rangeland types, artificial pastures [seeding], and supplemental fodder. For those counties with a larger population, we also took population into account because if lots of livestock were reduced, these pastoralists would end up having nothing to eat. In other words, we decided on a higher carrying capacity for these counties. But the new carrying capacity was lower than the RHRS carrying capacity for two reasons. First, the RHRS carrying capacity was very rough and did not reflect the reality. Second, since the implementation of the RHRS, rangeland degradation has not been controlled yet.

This has clearly shown that in practice carrying capacity has more to do with political and economic factors than what it is claimed to be by the government in the rhetoric of science. It has also shown that the CES program helps to promote the implementation of the RHRS.

In the case of the western county, the new carrying capacity determined by the regional DAAH was 775,000 SEUs. As discussed in Chapter 3, the county's RHRS carrying capacity reported to the higher levels of government (prefectural and regional) was 1.47 million SEUs. Accordingly, the ratio of the new carrying capacity to the RHRS carrying capacity is 0.53

³¹² 'The TAR's implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011' (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011niandu shishi fang'an*). TAR Government, July 29, 2011.

(775,000/1.47*10⁶).³¹³ Hence, at the household level, each household's new livestock quota would be the value of the old household quota under the RHRS multiplied by this ratio, i.e., little more than half the old household quota. By the end of 2009, the county had a total of 1.63 million SEUs.³¹⁴ Therefore, if the new carrying capacity is put into place, the county would have to reduce over half of the livestock and many pastoralists would fall below the poverty line, which is 30 SEUs per capita.³¹⁵

Furthermore, under the destocking policy, newborn baby livestock (calves, lambs and kids) each count as half a livestock and all the others count as adults.³¹⁶ This places pastoralists in a worrying situation given they would have to dispose of the prime livestock in order not to exceed the new livestock quota.³¹⁷ This would leave them with young livestock, which do not provide immediate or adequate livelihood requirements because Tibetan pastoralists do not slaughter livestock or sell them to butchers at a younger age because of biological, cultural and economic reasons as discussed in Chapter 2.³¹⁸

Therefore, other than poor pastoralists with small or no herds who are more than happy to receive compensation from the government for their rangeland given that their livestock numbers

³¹³ The ratio for the central research county turned out to be 0.66.

³¹⁴ Bengun County Census Data (2009), Bengun County Census Bureau, 2010

³¹⁵ For example, in an extreme case, households in administrative village 5 could only raise 17 SEUs per capita.

³¹⁶ 'The TAR's Implementation plan for Establishing Rangeland Ecological Protection Subsidy and Reward Mechanism in 2011' (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011 niandu shishi fang'an*). TAR Government, 29 July 2011.

³¹⁷ It is sensible to predict that the market for younger livestock to be raised will be small given the destocking policy is being implemented in the whole region.

³¹⁸ For example, in the case of the Research Village 1 in the west, lambs and kids respectively accounted for approximately one quarter of the total number of sheep (27%) and goats (24%) in 2009.

are below the new livestock quota, the majority of pastoralists oppose the CES program.³¹⁹ When asked his opinions on the destocking policy, the village head of the Research Village 2 in the west hoped that the government will reconsider the new policy because he, like most other pastoralists, feels that it threatens their subsistence, and livelihood security and flexibility (see Chapter 2):

On the one hand, the government decides the poverty line is thirty sheep per people and encourages us to build a well-off society.³²⁰ But on the other hand, if this new policy is really enforced, many of us are going to fall below the poverty line, let alone build a prosperous society, which would be a dream for us. So we all would have to depend on the state, which would be a burden on it because it may not be able to support this many people. We are very grateful to the state for the comfortable life we are enjoying today, but if we pastoralists are just allowed to keep a handful of livestock, it would be the worst thing that could happen. Unlike farmers whose land would be still there even if they had bad weather at one point, we pastoralists cannot guarantee a fixed number of livestock will stay stable due to natural disaster, which are part of pastoralism. Then, we would lose our source of income. So we really hope the government will just let us maintain our current livestock numbers.³²¹ If it cannot, then we hope it will reexamine our carrying capacity³²² ...

Obviously households with large herds will have to reduce their herds the most dramatically, which they consider unfair as they believe that they have accumulated their herd capital through their hard work and careful management. Thus they more strongly resist the

³¹⁹ At the beginning of the TAR's pilot CES program, the regional government decided that all households whose livestock numbers were below the old livestock quota would receive payments. But later it realized that this would discourage households with few or without livestock to try to get out of poverty because they would receive payments from the government anyway. Thus it decided the recipients of payments were those households whose livestock numbers maintained between the old and new livestock quotas. It believed that this would encourage households with few or without livestock to increase their livestock numbers in order to receive the payments, thus giving them an incentive to try to get out of poverty. Therefore, households whose livestock numbers maintained between the old and new livestock quotas would receive 50 *yuan* per SEU for the difference between the new and old livestock quotas and an annual 1000 *yuan* fuel subsidy, which was meant to discourage pastoralists to collect livestock dung, pastoralists' source of fuel, to leave them as manure. Now under the national CES program all households whose livestock numbers are below the new quota will receive payments from the government.

³²⁰ The concept of a well-off society, literally modestly comfortable society (*xiaokang shehui* in Chinese or '*byor 'bring spyi tshogs* as translated in Tibetan, literally middle-wealth society) was first put forward by Chinese leader Deng Xiaoping in 1979 and later articulated by his successor Jiang Zeming in the 15th National Congress of the CPC in 1997 and the 16th National Congress of the CPC in 2002.

³²¹ Until the implementation of the CES program, there was not a policy on livestock control. Although a livestock quota was issued in the Rangeland Contractual Management Certificate (RCMC), no fine was imposed in practice even when the quota was exceeded, except in Research Village 2 in the west, which collected money from households whose livestock numbers were over their quotas in the RCMC at the beginning of the RHRS.

³²² carrying capacity: *shong tshad* in Tibetan

program because they feel they will not be able to maintain and keep improving their standard of living. Bogon is one of the wealthiest households in the central research village with a total of 758 SEUs at the time I interviewed him (April 2010).³²³ His new livestock quota under the destocking policy is 309 SEUs. This means he will have to cut more than half of his livestock. Hence, he deeply resents the program as many other rich households do:

In 1981 when the commune was abolished, each person received exactly the same number of livestock from the government. Today, why do we have more livestock? It is because we work hard to take good care of them- get up when the livestock get up and sleep when the livestock sleep. And besides, unlike some people who are ready to trade lots of their livestock for stuff such as vehicles, we are careful about selling or killing our livestock. I told the government work team that had come to ask our opinions on the new policy that this new policy sounds like a reward for being poor and a punishment for being rich, which is against Deng Xiaoping's idea "getting rich is glorious." I asked why government workers' salaries can keep increasing, while our salaries, which are our livestock, should be cut. The officials just told me, I misunderstood the new policy and would receive compensation for our livestock. But that money would be gone very quickly if we do not manage it well. Then we are just going to go hungry even if there is grass left, as we cannot eat grass. So if we just can raise a handful of livestock, then there is no point in being pastoralists. We had better just rely on the state for a livelihood.

Nonetheless, the program has been imposed on pastoralists via township officials through the carrot and stick approach after the regional government has made it mandatory for pastoralists to accept not only the destocking policy per se, but also the new carrying capacity. In the western county, pastoralists' largest hope is to have the carrying capacity measured if they have no option but to accept the new policy.³²⁴ Officials at three levels of government (township, county and prefecture) are sympathetic to pastoralists' requests to reassess the carrying capacity basically for three overlapping reasons. First, they are sympathetic to the plight of pastoralists as they understand that a dramatic reduction in livestock numbers would significantly affect the

³²³ He has 120 yaks, 130 sheep, 20 goats and two horses.

³²⁴ Similarly, in the central research site, the area of the reserved alpine marsh meadow used as a public spring pasture (see Chapter 2 and 3) was not included in the RHRS statistics. Pastoralists requested the government via township officials to have it included when the new carrying capacity was calculated. But their request was rejected.

livelihood of pastoralists due to their full dependence on livestock without any significant alternative sources of income. Second, lower level officials, particularly those township officials with pastoral family backgrounds have a much better understanding of the local situation. For example, a township official who grew up in a local pastoral community pointed out a simple yet an important reason, which appears not to be on other officials' mind, of why pastoralists appear to keep more livestock than they need: herd sizes do not equal the actual livestock numbers yielding immediate benefits for pastoralists. Third, given ultimately it is they who have to interact directly with pastoralists, lower level officials, particularly township and county officials find it easier to convince pastoralists to accept the new policy if the carrying capacity is increased. Therefore, they proposed the calculation of the new carrying capacity should be increased given the current stocking rate of the county or at least the carrying capacity should be measured.

In the end, the regional government merely agreed that the new carrying capacity can fluctuate 10% and demanded that the lower levels of governments (prefecture, county and township) should successfully implement the pilot program through educating pastoralists about the program (literally “doing thought work”) in lieu of reporting many problems to make sure the program can be replicated elsewhere in the region because it was afraid that the central government may abolish the program, causing a loss of billions of *yuan* to the region from the central government if it reports many problems during the pilot implementation phase.³²⁵ Thus, the lower levels of government have to follow the principle of “lower levels obeying higher

³²⁵ For example, the central government funding for 2011 in the TAR was over two billion *yuan*. ‘The TAR’s implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011’ (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011 niandu shishi fang’an*). TAR Government, 29 July 2011.

levels” (*xiaji fucong shangji*)³²⁶ and struggle for a best-case scenario-to secure funding from the central government while at the same time not having to reduce livestock numbers dramatically. This illustrates that the primary incentive for various levels of government for implementing the CES program is funding and job performance, as is the case for *tui mu huancao* (see Chapter 4), rather than the concern over “overstocking and overgrazing.” It also illustrates that in practice the determination of carrying capacity has more to do with political and economic rationales than what it is from a scientific perspective.

Two concrete tasks of lower levels of government (prefectural, county and township) are to inform and educate pastoralists about the policy and have each household sign an agreement on the implementation of the program with a fingerprint. “At the end of the day, township officials are the ones who have to fulfill these tasks on the ground” as the township governor of the western research township put it. Each level of government evaluates the implementation of the program by the lower level based on the latter’s fulfillment of these tasks. The village head of Research Village 1 in the west told me how township officials advised them to respond to higher levels of officials when I asked him what pastoralists think of the destocking policy:

Township officials advised us to say it is a beneficial policy and not to complain about it when county and prefectural officials come to ask what we think of the new policy, otherwise we might screw ourselves over given there are many other beneficial policies coming around [meaning they might not obtain other government development aid if they complain about this policy]. But to be honest, as we could raise only a few livestock under the new policy, our life would become very difficult...

Township officials need pastoralists to react positively to the policy because whether the latter is well educated about the policy (literally “had thought work done”) is part of higher-level officials’ evaluation of the implementation of the program by lower levels.

³²⁶ This is because in China’s hierarchical bureaucratic system lower-level officials have to be accountable to higher levels who appoint them (Edin, 2005).

More obviously, in the case of the central research village township officials imposed the policy on pastoralists through the stick component of the carrot and stick approach. The township government first sent down village heads to have the agreement signed by each household. However, the village heads failed to do so not only because the majority of households refused to sign the agreement but also because the village heads themselves were reluctant to sign it.³²⁷ Under such circumstances, the township government held a meeting in the village and forced each household to sign the agreement after the meeting. A pastoralist recalled the essentials of the township governor's remarks when he demanded that pastoralists sign the agreement:

At the time when the Cultural Revolution was launched, nobody asked you whether you would agree to have it or not because it was just a state policy. So is with this policy. And besides, the state tries to do good things, not bad things for its people and it has been taking good care of you. It has a series of development programs. If you do not accept this policy, then you may not get your share of other development programs in the future. You do not want to ruin things for yourselves, do you? We told the higher levels of government about your complaints. But we were told only the central government can make a decision. So you had better sign the agreement instead of complaining.

Thus, township officials have enforced the policy through the stick part of the carrot and stick approach and in the name of the central government albeit in fact it is the regional government that wants to implement the program most.

3. *Predicted Results of the Compensation for Ecological Services Program*

Lastly, although it remains to be seen how exactly the CES program will operate given it has just started, it is sensible to predict some aspects of its operation from the implementation of *tuimu huancao*.³²⁸ First of all, it may have little if any positive effect on rangeland for two

³²⁷ At one point, the township government asked village heads to sign the agreements on behalf of the pastoralists, but the village heads turned down the request by saying they cannot take responsibility for the signatures.

³²⁸ What remains to be seen includes what impacts destocking may have on rangeland conditions and pastoralists' livelihoods among others.

reasons. One, the condition of what the government considers degraded rangeland or unsuitable grazing land is a persistent condition in pastoralists' living memory rather than a recent phenomenon caused by livestock grazing. Thus, grazing removal may not improve the condition of the targeted rangeland. Two, even though banning grazing may help improve the condition, banning grazing effectively is highly doubtful. This will especially hold true for grazing ban areas without fencing. Unlike those under *tuimu huancao*, grazing ban areas under the CES program will not be closed by fencing. Instead, approximately twenty cement posts (20cm×20cm×150cm) will be installed for each grazing ban zone of 333 ha on average. Grazing bans are ineffective even with fencing under *tuimu huancao* due to a lack of meaningful pressure in the system because there is no incentive for officials and pastoralists to make sure grazing is banned effectively and hold them accountable. Thus, it is reasonable to predict that it will be very difficult to ban grazing without fencing.

Nonetheless, local officials, particularly those at the regional level, may report the program as a success so as to continue capturing funding from the central government while lower-level officials need to act accordingly under political economic pressures from higher levels even though they are aware of its infeasibility. Under mandatory implementation of the program, pastoralists will make use of the program to their maximum benefit. For example, knowing they will receive compensation while at the same time they can manage to graze in the grazing ban zones, some pastoralists in the central site desire to have some of their pastures be targeted as grazing ban zones. The program will appoint one pastoralist as a rangeland supervisor (*jianduyuan* in Chinese) among every five households with an annual subsidy of 5400 *yuan*,

whose duty will be to ensure effective grazing bans.³²⁹ Nevertheless, the pastoralists think that households can work together and share the subsidy, and reach consensus on how to use the grazing ban zones. Thus, it is reasonable to see that rangeland supervisors will not make much difference in terms of effective grazing bans.³³⁰ In short, where the implementation and content of the CES program overlap with those of *tuimu huancao*, how they might operate can be foreseen from the operation of *tuimu huancao*.

Conclusion

China's latest policy on rangeland and pastoralism, namely the rangeland ecological protection subsidy and reward mechanism, can be understood as a compensation for ecosystem services (CES) program among the three major PES models advocated and practiced worldwide in that it is a hybrid of environmental protection and pastoral development that is subsidized and regulated by the state, but not strictly based on market discipline and neoliberalism's conceptual separation of nature and society.

³²⁹ Within the three years in which pastoralists will have to meet the target of livestock reduction (presumably 2012, 2013 and 2014) if a supervisor's livestock numbers are higher than in the previous year, this subsidy of 5400 yuan will be suspended in addition to the suspension of the annual household subsidy of 500 yuan. 'The TAR's implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011' (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011 niandu shishi fang'an*). TAR Government, July 29, 2011.

³³⁰ The policy states that if pastoralists are caught grazing in grazing ban zones, their compensation will be canceled. 'The TAR's implementation plan for establishing rangeland ecological protection subsidy and reward mechanism in 2011' (*xizang zizhiqu jianli caoyuan shengtai baohu buzhu jiangli jizhi 2011 niandu shishi fang'an*). TAR Government, 29 July 2011. Given that there are not conflicts of interest among villages if one does not effectively ban grazing in its own grazing zones and that all the pastoralists are in the same boat in terms of wanting to receive compensation while not having to ban grazing, informing on those who game the system will probably be a rare occurrence.

Nonetheless, the rangeland protection component of the CES program cannot be celebrated as Chinese progress on rangeland management and pastoralism because it is merely the latest example of the equilibrium assumption made and deeply embedded in Chinese policy. Accordingly, it is a destocking policy intended to adjust stocking rate to carrying capacity as both a means and a goal of protecting rangeland ecosystems.

At the implementation level, the case of the implementation of the destocking policy under the CES program in Nagchu has clearly shown how political and economic forces maintain “received wisdom” environmental narratives underpinning *tuimu huancao* and the destocking policy under the CES program. The regional government has made the policy mandatory to be implemented through lower-level governments (prefecture down to township), which have imposed the policy on pastoralists through the carrot and stick approach under political economic pressures, even though pastoralists opposed the policy because they predict that it threatens their subsistence, and livelihood security and flexibility. To secure funding from the central government while at the same time not having to reduce livestock numbers has become a best-case scenario for the local government (township up to prefectural). This means that the primary incentive for various levels of government for implementing the destocking policy is to deal with political and economic pressures from the higher level rather than “overstocking and overgrazing” to be tackled through the destocking policy.

Therefore, although it remains to be seen how exactly the CES program will operate given that it has just started, where the implementation and content of the CES program overlap with those of *tuimu huancao*, they may resemble those of *tuimu huancao*: little positive impact on rangeland, being reported as a successful policy by various levels of local government led by the regional government, being taken to their advantage by pastoralists, and promotion of the

implementation of the RHRS. In the case of *tuimu huancao*, the way it has intensified the RHRS is primarily through fencing as physical boundaries whereas in the case of the CES program the way it has intensified the RHRS is through compensation. In this sense, the neoliberal element of the CES program works towards helping the government achieve the goal of transformation of traditional pastoralism. Lastly, in the context of CES theorists' argument that conservation must be linked to sustainable rural development, two questions arise in the Chinese case. First, it is worth questioning whether a destocking policy promotes or in fact hinders sustainable pastoral development. Second, even if pastoral development is promoted with the help of the two other components of the CES program, i.e. pastoral production subsidies and off-range employment promotion through an increase in support for education and vocational trainings, the flawed assumption that overgrazing is the primary driver of degradation makes it largely inappropriate to assume pastoral development under the CES program will certainly promote rangeland health.

Conclusion

1. Received Wisdom Used to Justify State Interventions into Pastoralism, But Contested by Pastoralists

The ultimate goal of state interventions into pastoralism in China has been to transform traditional pastoralism into a modern intensive production system. Rangeland use rights privatization is a basis for and an important step towards achieving this goal because it is ultimately intended to alter pastoralists' "irrational" and "backward" concepts and practices through transforming traditional range management systems. The fact that the most important precondition for the implementation of *tuimu huancao* and the destocking policy under the CES program is rangeland use rights privatization shows that they have less to do with rangeland degradation, restoration and protection than with intensification of existing policy directions. Hence, narratives of rangeland degradation underpinning *tuimu huancao* and the destocking policy under the CES program serve to justify state interventions into pastoralism that ultimately aim to transform traditional pastoralism. This parallels a pattern experienced by pastoralists the world over, in which "received wisdom" environmental degradation narratives that blame local or indigenous peoples' "irrational" management practices for environmental degradation are used to justify state interventions into their livelihoods and traditional production systems (Davis, 2007; Fairhead and Leach, 1995; Leach and Mearns, 1996).

Ecologically, these narratives of rangeland degradation are based on the equilibrium paradigm of rangeland dynamics, which emphasizes the importance of the biotic feedback of livestock density on rangeland health. Consequently, China's range management focuses on range condition assessment, carrying capacity and stocking rates. The center of the narratives is pervasive rangeland degradation caused by overgrazing across China's pastoral region. Thus, the solution is to reduce herd size and adjust it to carrying capacity to halt degradation.

Nonetheless, these narratives of rangeland degradation are contested by Tibetan pastoralists in Nagchu. In the case of Nagchu, Tibetan pastoralists' conceptualization and observations of rangeland and livestock interactions contradict the equilibrium assumption made in China's range management and the relevance of the concept of carrying capacity. Instead, range ecosystems in Nagchu as a whole can be best understood as a mix of equilibrium and disequilibrium dynamics because of the following characteristics. First, forage quantity is subject to seasonal variability and spatial heterogeneity owing to a greater variation in precipitation in the early part of growing season from the southeast to the northwest. Second, density-dependent interactions between forage and livestock may play a role in herd productivity from a historical perspective. Third, periodic unfavorable weather conditions such as snowstorms decimate livestock frequently enough in a density-independent manner that non-equilibrium dynamics may take hold. This demonstrates the complexity (temporal variability and spatial heterogeneity) of range ecosystem dynamics, as also pointed out in rangeland ecology research in other pastoral areas in the world. Furthermore, pastoralists in Nagchu conceptualize carrying capacity in terms of herd productivity rather than in terms of rangeland condition. This reflects the fact that grazing to date has not caused any degradation.

Moreover, local pastoralists' memories, observations and knowledge of range ecosystems not only contradict the underlying assumptions of *tuimu huancao* and the destocking policy under the CES program, but provide a much more accurate assessment of rangeland conditions in Nagchu. This is consistent with an insight provided by the literature on "received wisdom": indigenous knowledge and narratives about environmental change often more accurately reflect the actual local landscape conditions and ecosystem dynamics than do supposedly "scientific" degradation discourses (Leach and Mearns, 1996; Fairhead and Leach, 1995, 1996; Forsyth,

1996, 2003; Davis, 2007; Jarosz, 1996). In contrast to the official narrative of widespread rangeland degradation caused by overgrazing, pastoralists in Nagchu have merely observed localized rangeland damage evidently caused by off-road vehicles and livestock trampling, and possibly expanded by the burrowing of voles depending on rangeland types and topography. In addition, the conditions of what officials labels degraded rangeland have turned out to be original and persistent in pastoralists' living memory. In fact, the magnitude and causes of rangeland degradation in China and in the TAR are not only contradicted by pastoralists' observations, but also by the government's own narratives. A critical analysis of official narratives of rangeland degradation reveals contradictory, problematic and inconsistent figures and statements. For example, reports of rangeland degradation and the determination of carrying capacity in practice in the TAR are clearly shaped by political and economic interests. This challenges the credibility of these narratives in terms of the magnitude and extent of rangeland degradation.

Furthermore, all these three causative factors of rangeland degradation observed and reported by pastoralists are ultimately related to government policy implementation. First, rangeland damage caused by off-road vehicles reflects weak enforcement of rangeland protection laws and regulations. Second, rangeland use rights privatization and fencing increase the chance and frequency of prolonged and constant trampling. Third, pika and vole poisoning, which has proven counterproductive, may accelerate rangeland degradation and expand the extent of degraded areas even if pikas or voles may not be an original driver of degradation. These three points reflect a prominent insight in political ecology that environmental problems are driven by political-economic factors rather than being problems that can be understood merely through technical analysis (Robbins, 2004; Neumann, 2005).

In addition to narratives of rangeland degradation, conventional views embedded in Chinese policy also underlie *tuimu huancao* and the destocking policy under the CES program because these two programs are ultimately a continuation of efforts to transform traditional pastoralism. These include the Tragedy of the Commons and the Cattle Complex theory. The former is the theoretical foundation of China's basic policy on range management and pastoralism (rangeland use rights privatization), which has been promoted through the implementation of *tuimu huancao* and the PES program. This dissertation shows both of these models to be flawed and inappropriate to Tibetan pastoralism.

Rangeland use rights privatization based on the tragedy of the commons has turned out not to be a pastoralism-friendly policy because it ultimately neglects livestock, which, as a result, has become the source of all the negative socioeconomic and ecological consequences resulting from it. These include worsened social relations and traditional values and norms as well as unfair access to grazing land, and ecologically, rangeland degradation, which is ironic given the policy is presumed to protect rangeland resources. Rangeland use rights privatization ultimately reduces livestock productivity due to restricted mobility, and flexibility during natural hazards. Thus, as an economic approach and solution to ecological concerns, when it is applied to pastoralism, the tragedy of the commons model inevitably ignores the livestock component of pastoralism because it cannot accommodate it. Hence, it is not applicable to range management in pastoralism.

Pastoralists in Nagchu consider three overlapping rationales for raising more livestock that do not follow the logic of the Cattle Complex theory, which suggests that pastoralists have “irrational” cultural norms that drive them to own large herds as a symbol of wealth, status and prestige and to be excessively “conservative” in their reluctance to sell livestock.

First, due to biological, cultural and economic factors, not all livestock are available for production. Second, a larger herd size is desirable for pastoralists as a long-term strategy for livelihood security and flexibility. Third, pastoralists want a larger herd size as a means to improve their standard of living. These findings support an earlier critique of the Cattle Complex theory made through cases of African pastoralism that pastoralists' decisions about herd size are rational in pastoralists' own cultural, social and economic contexts; hence they must be understood in particular contexts in which pastoralists live (Mtetwa, 1978; McPeak, 2005; McCabe, 2004).

Therefore, this dissertation demonstrates that all these forms of "received wisdom" that underlie and underpin *tuimu huancao* and the destocking policy under the CES program are largely inappropriate to pastoralism. Yet, they are still deeply embedded in Chinese policy. This leaves a question of why they are persistent.

2. *Political and Economic Forces Leading to the Persistence of "Received Wisdom"*

The cases of the implementation of *tuimu huancao* and the destocking policy under the CES program show that the broadly defined political and economic forces maintain the persistence of narratives of rangeland degradation and prevent alternative input about the actual state of rangeland degradation in Tibet. Specifically, six overlapping factors play a role in the persistence of "received wisdom" on pastoralism in China.

First, upward accountability leads to the reconstruction of narratives of pervasive rangeland degradation out of economic and political motivations, but leaves little room for alternative views and understandings. In China's fiscal hierarchy, state funding for each level of government has to be channeled through the level immediately above it. In its political hierarchy lower-level officials are evaluated and promoted by higher-level officials. This hierarchical fiscal

and political system makes each level of government and lower-level officials more accountable to the higher-level government and officials than to the public and to the state (*rgyal khab*). In this accountability framework, the primary driving force of implementation of state policy for each level of government and lower-level officials is to deal with political and economic pressures from the higher level, rather than the problems per se to be addressed through the policy. The economic pressure for each level of government is to capture state funding from the higher level. Accordingly, the political pressure for lower-level governments and officials is to assist the higher level in achieving this goal of securing state funding because it is part of the evaluation of the former's performance by the latter. For example, the implementation of *tuimu huancao* in Nagchu focused on achieving a dual goal of passing the evaluation of present programs and securing future programs. Accordingly, local officials installed fencing as an end in and of itself rather than as a means of restoring and protecting rangeland as designed in *tuimu huancao*. Therefore, compared to the above-mentioned double goal, restoration and protection of rangeland was not a top priority for local officials. Similarly, in the implementation of the destocking policy under the CES program, a best-case scenario for the three lower-level governments (township, county and prefecture) was to secure state funding without a dramatic reduction in herd size. Thus, the problem of "overstocking and overgrazing" to be tackled through the destocking policy was not a primary concern for local officials. Furthermore, the functional ministry as the policymaker and implementer at the central government level has similar political and economic pressures to promote sectoral interests both politically and economically.

Therefore, in this context of political and economic pressures, being useful and helpful for capturing and securing state funding, narratives of rangeland degradation based on "received

wisdom” are constructed and reconstructed out of economic and political motivations even though lower-level governments and officials are aware of their fallacies. For example, the western and central research county BAAH still had to continue to seed in *jinmu* zones even though they were well aware of its infeasibility because the regional DAAH did not want to lose the chance of continuing receiving *tuimu huancao* programs from the central government. In addition, the county BAAH produced false reports of improvement in vegetation conditions after the implementation of *tuimu huancao* with the intention of demonstrating its “achievements” and claiming more state funding. Thus, narratives of “improvement” achieved through *tuimu huancao* by local governments further support and strengthen broader “received wisdom” narratives underpinning *tuimu huancao*. Overall, the disjuncture between local officials’ incentives to implement *tuimu huancao* and the purpose of *tuimu huancao* has contributed to the failure *tuimu huancao* in terms of rangeland restoration and protection. Yet, officials reported *tuimu huancao* as a successful policy to cope with the political economic pressures upon implementation.

Second, cultural politics and undemocratic top-down policymaking explain why policymakers do not appreciate pastoralism from the standpoint of pastoralists. In China, pastoralists are exclusively ethnic minorities (mostly Mongols, Tibetan and Kazakhs), who are culturally and politically marginalized in the context of Chinese farming culture as the dominant culture and unequal power relationships between them (the subordinated) and the Chinese (who dominate). Consequently, their sophisticated pastoral culture and wisdom are underrepresented and underappreciated in policymaking. In addition, the undemocratic nature of top-down policymaking and implementation leaves little space for alternative knowledge and wishes.

Third, policymakers view pastoralism as a purely technical issue that can be addressed by a “rule of experts” drawing upon economic and ecological theories, and modernization paradigms. They assume that pastoralists should receive technical advice but have nothing to offer. In addition, the rhetoric of science and belief in science as neutral rather than as a social practice shaped by political forces discourage officials and pastoralists from being skeptical of “received wisdom” and officials from listening to pastoralists’ alternative voices.

Fourth, the concepts of expressing consensus and remaining consistent with the Party line in politics discourage officials and pastoralists to think critically and contest “received wisdom,” particularly those labeled as science. Fifth, the Chinese government usually stresses factors that deflect blame away from it, for example, overgrazing versus reclamation. Lastly, it is very common in official writing in China to duplicate texts from previous writing without any references. This practice makes officials become accustomed to drawing on and accepting earlier reports uncritically over time. Therefore, all these factors contribute to the persistence of received wisdom on pastoralism in China. Therefore, this dissertation demonstrates that factors contributing to the persistence of “received wisdom” elsewhere in the world also play roles in the TAR. Specifically, politics, broadly defined, plays an important role in constructing and maintaining environmental knowledge. Furthermore, it shows that narratives of pervasive rangeland degradation may be more persistent in China in general and in Tibet in particular given the specific political factors arising from China’s governance system, and especially in Tibet given the nature of Tibetan politics in China. Does this mean Tibetan pastoralists are victims of state interventions based on conventional views inappropriate to pastoralism imposed by state power?

3. Pastoralism as An Integrated System with Livestock Being A Principal Component

This dissertation demonstrates that Tibetan pastoralists are neither victims of state power nor passive beneficiaries. Rather, they are active agents whose interests and subjectivities are neither completely outside of, nor completely determined by, state power. They act rationally to both resist and take advantage of state interventions, and also make further claims on the state. Whether pastoralists resist or desire a particular state intervention depends on whether it accommodates the livestock component of pastoralism. This is because livestock are particularly essential for pastoralists simply because they are their principal source of income and livelihood, although each component of pastoralism (people, livestock and rangeland) is equally important to the sustainable operation of the system. Any interventions unfriendly to livestock are inappropriate to pastoralism simply because they threaten pastoralists' livelihood. Hence, the feasibility of interventions primarily depends on whether interventions pay attention to livestock from the standpoint of pastoralists. For example, a hybrid policy combining household rangeland tenure with community-based use with user fees has proven feasible and successful in the context of rangeland use rights privatization. It works towards the government goals of commodification of rangeland use rights and control over stocking rate. Where it is practiced, pastoralists view and accept the hybrid policy as a pro-poor and fair policy. The reason why this hybrid policy is feasible and successful is that it guarantees a continuation of existing rangeland use practices, thus it does not affect livestock grazing, mobility and flexibility. This logic also applies to other state interventions.

The goal of transforming traditional pastoralism is also supposed to be achieved through sedentarization of pastoralists, enclosure of rangeland by barbed wire fencing, construction of livestock pens and shelters, and raising livestock in pens exclusively with fodder. Depending on whether or how they affect livestock, some such as construction of houses at the home base or

seasonal camps, livestock pens and shelters are desirable and feasible for pastoralists (after changes made in some cases) while others, such as concentrated settlement, are not. Still others (i.e. fencing) are partially desirable and feasible. Furthermore, some interventions (livestock shelters, fencing and construction of houses at the home base or seasonal camps) function as a technology of governmentality because they configure pastoralists' aspirations for better livestock care and improved living conditions in the context of not affecting livestock, for which pastoralists are willing to make and accept changes that are consistent with the ultimate goal of the government of transforming traditional pastoralism. In other words, governmentality functions here in that these interventions help the state transform pastoralists' aspirations consistent with the state goal, which appears to be freely desired by pastoralists, but in fact are unintentionally through broader structures of governance in the first place.

Sedentarization of pastoralists is rationalized in terms of achieving triple goals of transforming traditional pastoralism, enhancing natural hazard coping capacity, and providing infrastructural facilities and services. Nevertheless, pastoralists find it unattractive to live in concentrated settlement even though it is tempting in terms of better access to facilities and services simply because it is impossible for them to raise livestock in concentrated settlement. This is especially true in places characterized by vast but poor quality rangeland with sparse vegetation (such as western Nagchu), where livestock need particularly to move around to graze over large areas. By contrast, pastoralists welcome construction of houses at the home base or seasonal camps because it enables them to enjoy a more comfortable living without affecting livestock. In cases where an obvious difference in living conditions exists between the settlement and seasonal camps, the improved living conditions may indirectly affect transhumance as they make pastoralists tend to be unable to endure harder living. But pastoralists are willing to accept

such change because it still does not fundamentally affect livestock, thus working towards the government goal of settling down pastoralists.

The purpose of enclosure of rangeland by barbed wire fencing is to reserve pastures, to set physical boundaries between pastures, and to restore and protect “degraded” rangeland from the perspective of the government. However, enclosure of rangeland on a massive scale is not beneficial to pastoralists because fencing leads to unfair access to and disputes over rangeland, which are ultimately for and over livestock grazing, as well as restricted livestock mobility and restricted access to seasonal pastures in some cases. These can eventually cause the same negative socioeconomic and ecological subsequences as rangeland use rights privatization. Furthermore, fencing may make livestock migration difficult during snowstorms as they may have to navigate around fencing, which may increase livestock mortality. On the other hand, pastoralists in places dominated by alpine meadows (such as central and eastern Nagchu) desire to fence off alpine marsh meadows on a proper scale, depending on the local situation, to reserve forage, and pastoralists in places dominated by alpine steppe and desert steppe (such as western Nagchu) desire to install fencing as physical boundaries between distinct seasonal pastures. The former enables pastoralists to mitigate the effects of forage shortages on livestock during snowstorms and spring, and have calving and lambing pastures, and/or fattening pastures. The latter enables pastoralists to better reserve seasonal pastures. Both types of enclosure help to reduce mortality, and promote survival of newborns and productivity. Furthermore, in the context of the RHRS, pastoralists find themselves having to have fencing to protect their rangeland from being used by livestock of others, thus having more forage left for their own livestock. This, in turn, makes the RHRS functional and consolidates the RHRS.

Construction of livestock shelters is embraced by pastoralists because livestock shelters enable pastoralists to more effectively mitigate the effects of cold stress on livestock, thus helping to reduce mortality and increase productivity. Nonetheless, pastoralists who migrate seasonally find that their livestock are more vulnerable and less adaptable to severe weather conditions once they leave shelters at the home base. Accordingly, these pastoralists willingly reduce livestock migration and want the state to support livestock shelters at seasonal camps, thus working towards the government goals of transforming the traditional production system.

All these evidently demonstrate that Tibetan pastoralism can be well adapted to state interventions through a middle-way between traditional forms of pastoralism and development interventions, an optimistic view on the future of pastoralism held by most researchers because of the deeply embedded adaptive capacities of pastoralism (Humphrey and Sneath, 1999; Fratkin and Mearns, 2003; Bauer, 2008). Nonetheless, formation of such a middle-way approach will require officials to view pastoralism from the standpoint of pastoralists by integrating the cultural, political, ecological, economic, social and institutional dimensions of pastoralism and adopting a bottom-up approach. Therefore, it will not be easy for such a policy to come into being because it will be a political process and can be prevented by officials' powerful vested political and economic interests as shown in the implementation of *tuimu huancao* and the destocking policy under the CES program.

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Appendices

A. Changes in rangeland access over time

Period	Western Nagchu	Central Nagchu	Eastern Nagchu
Prior to 1959 (1940-60)	-part of Sepa Tribe -rangeland shared within the tribe	-part of Mema Tribe -rangeland shared within the tribe but grazing and camping beyond the tribe not an issue	-part of Kangche Tribe -rangeland shared within the tribe but grazing and camping beyond the tribe not an issue
After 1959 and prior to People's Commune	<i>1961-74</i> -a Zuk under Sepa Township -no change in rangeland access (as the tribe converted into a township and rangeland shared within the township)	<i>1961-69</i> -Naser Township (with five Zuk) -rangeland access shrank (as the tribe divided into several townships and rangeland shared merely within the township)	<i>1961-73</i> -a Zuk under Kangche Township -rangeland access shrank (as the tribe divided into several townships and rangeland shared merely within the township)
During the Common era	<i>1975-1984</i> - as a production brigade merged into Changma Commune -rangeland shared within the commune	<i>1970-1984</i> -Xiayang Commune (with five brigades) -no change in rangeland access (as the township converted into a commune and rangeland shared within the commune)	<i>1974-1984</i> -a production brigade under Kangche Commune -no change in (as the township converted into a commune and rangeland shared within the commune)
Post-People's Commune and reform era	<i>1985-2003</i> -an administrative village under Medang Township -rangeland access shrank (as rangeland shared merely within the administrative village)	<i>1985-2002</i> -Naser Township -rangeland access remained the same (as rangeland shared within the township though nominal boundaries drawn between the five zuk)	<i>1985-present</i> -an administrative village under Kangche Township - no official boundaries between administrative villages, but across administrative villages grazing and camping increasingly restricted
Post- reform era	<i>2004-08</i> -individual rangeland use (rangeland access based on the household level) implemented under the Household Responsibility System <i>2008-present</i> -communal rangeland use at the administrative village restored	<i>2002-07</i> -an administrative village with five Zuk under Zaren Town -rangeland access remained the same (as the township converted into an administrative village and rangeland shared within the administrative village) <i>2005</i> , the Household Responsibility System implemented, but communal rangeland use at the administrative village level maintained <i>2007-present</i> fencing of <i>tuimu huancao</i> program has made nominal boundaries between Zuk effective, leading to communal rangeland use merely at the Zuk level	<i>2009</i> , land around settlement houses allocated to individual families under the Household Responsibility System

B. Glossary of selected Tibetan terms

Tibetan (Wylie)	English Meaning
<i>a bra</i>	Pikas
<i>bed med</i>	Useless (land)
<i>'brog pa</i>	Pastoralists
<i>'brog don rtsa 'gso</i>	Literally, grass cultivation for pastoralists, a nickname for <i>tuimu huancao</i>
<i>'brog skyur rtsa gso</i>	Literally, retire livestock, restore rangeland, an official term for <i>tuimu huancao</i>
<i>bye ra</i> or <i>bye skor</i>	Liberally, sand fencing, a nickname for the <i>j inmu</i> component of <i>tuimu huancao</i>
<i>bye sa</i>	sandy land or sandy pastures
<i>bza' 'bri tho thug</i>	Literally, people and milking yak balance, meaning one yak could feed one person, which describes a higher livestock productivity in the pre-1940 period
Changtang (<i>byang tang</i>)	Literally, the northern plain, the name for a region of high altitude plains with sparse vegetation and giant lakes in northwestern Tibet.
<i>'jagma</i>	A forage species, <i>Trikeria hookeri</i>
<i>ldunbu</i>	Forbs
<i>mos</i>	Satisfied
<i>na</i>	Alpine marsh meadows, <i>Kobresia schoenoides</i>
<i>rdzi bo</i>	Herders
<i>rdzi chags</i>	Livestock trampling
<i>rgyal khab</i>	The state
<i>sa bcud yul bcud</i>	Literally, land nutrition, pastoralists' concept of the health of the environment
<i>sa nag</i>	Sandy land or sandy pastures
<i>sa nag spang 'gyur</i>	Literally, transformation of sandy pastures to alpine meadows, a nickname for <i>tuimu huancao</i>
<i>shong tshad</i>	Official term for carrying capacity
<i>skam</i> ³³¹ <i>ra</i> or <i>skam skor</i>	Liberally, alpine meadow fencing, the <i>x iumu</i> component of <i>tuimu huancao</i>
<i>spang</i>	Alpine meadows, <i>Kobresia pygmea</i>
<i>tsherma</i>	Shrubs
<i>tsi gi</i>	Mice
<i>trema ('bri ma)</i>	Year-one milking yaks
<i>yarma</i>	Year-two milking yaks
Yartsa Gunbu (<i>dbyar rtsa dgun 'bu</i>)	Caterpillar fungus or <i>Ophiocordyceps sinensis</i>
<i>yol la</i>	A portable livestock pen made of wool blankets set up on the ground to protect livestock from wind and cold at night
<i>yul srol dmangs khrims</i>	The village rules and regulations
<i>zog</i>	Livestock
Zuk (<i>tsug</i>)	An administrative unit between the natural village and the administrative village

³³¹ In the local idiom alpine meadow pastures are also called *skam*.

C. Glossary of selected Chinese terms

Chinese (pinyin)	English Meaning
<i>bubo</i>	Literally, reseeding of grass, the term for the seeding component of <i>tuimu huancao</i>
<i>caochang jianshe</i>	Literally, rangeland construction, a concept that can be traced back to the early years of the P.R. China that refers to rangeland improvement through man-made measures such as irrigation, seeding, fencing, etc.
<i>caoyuan shengtai baohu jiangli jizhi</i>	Literally, rangeland ecological protection subsidy and reward mechanism, a state program launched in pastoral China in 2011, the core of which is to adjust herd size to carrying capacity through a reward mechanism for the purpose of protecting rangeland
<i>caoyuan tuihua</i>	Literally, a movement backward in rangeland conditions, broadly meaning any negative changes in rangeland conditions
<i>caoxu pingheng</i>	Literally, forage and livestock balance, a concept in China's range management that advocates adjusting stocking rate to carrying capacity
<i>dingju youmu</i>	Literally, sedentarized pastoralists with mobile livestock, a policy initiated by the Mongolian communist leader Ulanfu in pastoral China in the early 1950s that advocated building home bases for pastoralists while maintaining transhumance.
<i>huikou</i>	Literally, kickbacks, the practice of suppliers illegally offering payments to officials in proportion to the amount of material the latter purchases if the latter purchases the material from formers
<i>hongbao</i>	Literally red envelopes, referring to the practice of bribing officials in order to persuade them to do something for the briber, who can be either an individual or a government; for example, in the context of the implementation of <i>tuimu huacao</i> , various levels of the local government may bribe members of an evaluation team to have a project pass the evaluation by giving money in red envelopes
<i>jianhua</i>	Alkalization
<i>jinmu</i>	Grazing bans
<i>jizhong lianpian</i>	Literally, concentrated and linked, a policy that suggests fencing under <i>tuimu huancao</i> should not be fragmented
<i>lunmu</i>	Rotational grazing
<i>mu</i>	1/15 hectares
<i>pao xiangmu</i>	Literally, run to seek projects, an expression that describes that a primary task for various level of government and official is to capture project funding
<i>shahua</i>	Desertification
<i>tuihua</i>	Degradation
<i>tuigeng huanlin huancao</i>	Literally, retire cultivated land, restore forests and rangeland, a state program launched in western China in 1999 to restore and protect the environment in the upper reaches of the Yangtze and Yellow Rivers
<i>tuimu huancao</i>	Literally, retire livestock, restore rangeland, a state program launched in pastoral China in 2003 that aims to restore degraded rangeland and protect rangeland through grazing bans (<i>jinmu</i>), grazing restrictions (<i>xiumu</i>), rotational grazing (<i>lunmu</i>), and seeding of grass (<i>bubo</i>)
<i>tongyi koujing</i>	Literally unify calibration, an expression that describes officials are supposed to express consensus about government policies
<i>tongyi sixiang</i>	Literally, unify thoughts, an expression that describes that people are supposed remain consistent with the Party line in politics
<i>xiaji fucong shangji</i>	Lower levels obey higher levels
<i>xiaoyi zhengming</i>	Proof of efficacy
<i>xingxiang gongcheng</i>	Literally, image projects, an expression that describes that officials use development projects to win recognition and rewards from the higher

	level officials; a similar expression is <i>zhengji gongcheng</i> , literally, credit projects or political achievement projects
<i>xisha xishou</i>	An expression that describes pastoralists' unwillingness to slaughter or sell livestock
<i>xiumu</i>	Grazing restrictions
<i>yomumin dingju</i>	Sedentarization nomadic pastoralists
<i>yuan</i>	the standard unit currency in China
<i>zuo sixiang gongzuo</i>	Literally do "thought work", a step in the carrot and stick approach, in which officials persuade the public to accept state policies by educating them about the benefits of the policies

D. Acronyms

BAAH	Bureau of Agriculture and Animal Husbandry
CAAS	Chinese Academy of Agricultural Sciences
CES	Compensation for Ecosystem Services
CPC	Communist Part of China
CPPCC	Chinese People's Political Consultative Conference
CPRE	the Committee for Population, Resources and Environment
CTRC	China Tibetology Research Center
CV	Coefficient of Variation
DAAH	Department of Agriculture and Animal Husbandry
DRC	Development and Reform Commission
GMSC	Grassland Monitoring and Supervision Center
NDRC	National Development and Reform Commission
NPMO	Nagchu Prefectural Meteorological Observatory
OWCD	Office for Western China Development
PES	Payments for Ecosystem Services
RCMC	Rangeland Contractual Management Certificate
REC	Report on Environmental Conditions
RHRS	Rangeland Household Responsibility System
SEU	Sheep Equivalent Unit
SGA	State Grain Administration
TAR	Tibet Autonomous Region
UNCCD	United Nations Convention to Combat Desertification

E. Spellings of place names

Name	Tibetan (Wylie)	Chinese (pinyin)
Amdo	<i>a mdo</i>	<i>an duo</i>
Bengun	<i>dpal mgon</i>	<i>ban ge</i>
Drachen	<i>sbra chen</i>	<i>ba qing</i>
Getse	<i>sger rtse</i>	<i>gai ze</i>
Golog	<i>mgo log</i>	<i>guo luo</i>
Kangche	<i>gangs che</i>	<i>gang qie</i>
Lhasa	<i>lha sa</i>	<i>la sa</i>
Machen	<i>rma chen</i>	<i>ma qin</i>
Maduk	<i>rma stod</i>	<i>ma duo</i>
Medang	<i>man thang</i>	<i>men dang</i>
Nagchu	<i>nag chu</i>	<i>na qu</i>
Ngari	<i>mnga' ris</i>	<i>a li</i>
Sogzong	<i>sog rdzong</i>	<i>suo xian</i>
Tarlag	<i>dar lag</i>	<i>da ri</i>
Yulshul	<i>yul shul</i>	<i>yu shu</i>
Zaduk	<i>rdza stod</i>	<i>za duo</i>
Zaren	<i>rtsa' ring</i>	<i>zha ren</i>