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**TRANSFORMATION IN COMMON-POOL RESOURCES MANAGEMENT IN CENTRAL ASIA**

# Social Construction of Pastureland: Changing Rules and Resource-Use Rights in China and Kyrgyzstan

Lu Yu<sup>1,2,3</sup> and Ulan Kasymov<sup>4,5</sup>

<sup>1</sup> School of Public Affairs, Zhejiang University, Hangzhou, CN

<sup>2</sup> German Development Institute-Deutsches Institut für Entwicklungspolitik (DIE), Bonn, DE

<sup>3</sup> The Berlin Workshop in Institutional Analysis of Social-Ecological Systems (WINS), Humboldt-Universität zu Berlin, DE

<sup>4</sup> Resource Economics Group, Humboldt-Universität zu Berlin, DE

<sup>5</sup> Ecosystem Services, Technische Universität Dresden, DE

Corresponding author: Ulan Kasymov ([ulan.kasymov@tu-dresden.de](mailto:ulan.kasymov@tu-dresden.de))

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A fundamental problem in governing natural resources is how to design institutions, particularly property rights regimes, that support sustainable use and management of common property resources. Privatization of natural resources was a widespread solution to the “tragedy of the commons” during the 1980s and 1990s. But many such efforts failed to achieve sustainable use of resources, and policymakers are now experimenting with new types of policy interventions. We examine recent changes in pastoral institutions and their outcomes regarding resource-use rights and the sustainability of resource use in China and Kyrgyzstan. Interpreting changing property rights as a process of social construction, we examine altered rules and rights relations and the ensuing changes in legal correlates between various actors in selected choice settings. The article contributes to the literature regarding the impacts of such reforms on property rights and their development in pastoral contexts.

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**Keywords:** Institutional change; property rights; grassland management; China; Kyrgyzstan

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## 1. Introduction

Ever since publication of Hardin’s “tragedy of the commons” (Hardin 1968), there has been extensive scientific and political debate over the role of institutions in managing natural resources, the major concern being the relationship between institutions and environmental protection due to increasing demand for natural resources and environmental services (Dietz, Ostrom, and Stern 2003). An initial line of reasoning suggested that weakly defined or poorly enforced property rights could explain the overexploitation of common resources. This led to development of the property rights “solution” of privatisation, which was implemented as a key policy. But consequent problems due to privatization arising in many countries, including China and Kyrgyzstan, shifted the focus of research towards micro-level analysis of institutional change and the nature of property rights.

Bromley offers a valuable perspective on this problem. Using the example of land, he argues that property rights are the result of a social construction process in which social meaning and a social role are assigned to a physical object, framing “[...] how humans occupy it, how they use it, and how they secure it for their own gain” (Bromley, 1996: 22). Most importantly, the social construction of land is shaped by its economic significance as a resource, the purposes of having control over it, and actors’ social obligations, making it a dynamic process reflecting the socio-economic contexts in which this process takes place. However, Bromley’s social-construction perspective is largely based on experience from Western European countries and the United States. Can this concept be helpful for analysing changing institutional arrangements in Asian transformational contexts?

Here, we address this question by examining the experiences of China and Kyrgyzstan, as illustrative case studies, reflecting on how institutional design has affected resource-use rights and sustainable use of

grassland there. Both countries have been experiencing rapid transition in natural resource management, driven by environmental problems – including land degradation and desertification – market integration, and changing forms of governance (Bichsel et al. 2010; Yang and Li 2015). We aim to understand the reasons for and impacts of institutional change in these transformation contexts, focusing on grassland property rights.

To examine the effects of institutional change, extensive empirical data was collected in the two countries during 2010–2013. Case studies were selected to focus on (i) grassland-related institutional change; (ii) interaction between actors in specific choice settings, where key resource users make choices driving their interactions and contestation related to pasture use and management; and (iii) the impacts of new institutions on resource use and societal and environmental sustainability. In China, case studies from two pastoral and two agro-pastoral counties in Northern China were conducted, with 330 local households and 47 diverse stakeholders interviewed. In Kyrgyzstan, 80 qualitative expert interviews were conducted in two agro-pastoral communities. In addition to field findings, we incorporate knowledge from the existing literature. In the following, we identify some similarities but also country-specific differences in their approaches to designing institutions. Our study is intended to contribute towards the ongoing discourse on natural-resource management under transition (Gatzweiler and Hagedorn 2001; Otto et al. 2016).

## 2. Institutional Innovations

Traditionally, Chinese and Kyrgyz nomads grazed their livestock on grassland according to their changing floral composition, varying with the seasons and altitudes and distinguished by differing vegetation phases of plants and livestock grazing stages. Herders practiced seasonal migration, rotating grazing plots and taking into account differences between grass regrowth in different areas. For a variety of reasons, the governments of both countries have sought to regulate or change traditional pastoral use patterns by designing new formal institutions.

In both countries, new institutions were expected to solve observed problematic outcomes resulting from old institutional arrangements. With early land-reform efforts – beginning in the 1980s in China and 1991 in Kyrgyzstan – policymakers introduced institutions that contracted individual use rights over pastureland. Later, policymakers responded to environmental concerns by designing new formal institutions. Since early 2000s, China implemented a grazing ban to protect resources and, since 2009, the Kyrgyz government has followed the path of decentralization and transferred pasture management responsibilities to the communal level.

### 2.1. Early pasture reforms

During China's post-reform period (since 1980) and the early post-Soviet period in Kyrgyzstan (since 1991), the most influential institutional change was that pastureland use rights were leased to private, state and collective users. Although policy details and implementation differed between the two countries, both policy interventions were influenced by the global trend towards agricultural-land privatization.

In China, radical change came after the demise of the commune system, in which commune-based tenure persisted until de-collectivisation began under the Household Responsibility System reform in the 1980s. Echoing the global and domestic trend towards agricultural land privatization, pastureland use rights were allocated to households or groups of households (Li and Huntsinger 2011), which was presumed necessary as an added incentive for sustainable rangeland management. Grassland use rights were leased to households under long-term contracts (varying from 30 to 50 years across regions), while the land stayed in the ownership of the state or collectives. By the end of 2003, about 70% of usable rangeland in the country had been leased through long-term contracts to households or groups of households (Cao et al. 2011).

Unlike in farming areas, where the land de-collectivisation reform had a great deal of success in terms of improving land productivity and enhancing household incomes (Lin 1992), the impacts of the reform on pastoral communities were far more complex, as individual land tenure was entirely new for herding households, which had traditionally used grassland as a common-property resource (Williams 2002). The reform did not achieve its goal of decreasing pastureland degradation, while also having negative impacts on local livelihoods and pastoral society (Banks 2001; Taylor 2006; Williams 1996, 2002). In many cases, it led to a “tragedy of privatization” – deterioration of the pastoral system and grasslands – as it undermined previous cooperative relationships within communities, transforming them into competitive relationships and contributing to land degradation (Li and Huntsinger 2011).

In Kyrgyzstan, the government also followed the global trend by implementing post-Soviet pasture-management reforms. During this time, policy interventions in pasture management struggled to deal

with the challenges of post-Soviet transformation, to arrest *de facto* open access use, and give structure to social interactions by implanting new formal institutions. Policymakers assumed that mismanagement was a result of poorly defined property rights and that securing individual property rights over land could improve resource use. Consequently, an important change here was that pastures could be leased out to private or collective users (Dörre 2012). Possible lease duration was defined as a maximum of 25 years in 1991, increasing to up to 50 years in 2002 (Lerman and Sedik 2009).

An important result of this reform was an observed massive reduction in pastoral mobility, which led to overgrazing of pastures, decreasing livestock productivity and increasing conflicts between pasture users over access to the resource. It is assumed that the reform failed to recognize the importance of institutions for coordinating pastoral migration and did not take into account the environmental, economic and social dynamics related to mobile herding (Undeland 2005; Jacquesson 2010; Kasymov et al. 2016).

## **2.2. Recent grassland reforms**

Responding to increasing pasture-related problems, during the 2000s both countries designed new institutions for exploring and testing new solutions. In China, a top-down compulsory ban policy with strict regulation on livestock grazing was implemented in its major pastoral provinces; in Kyrgyzstan, a decentralisation reform was implemented, promoting a community-based management system.

### **2.2.1. A grazing ban in pastoral China**

Since 2000, environmental problems have triggered the latest pastoral reforms in China. A series of environmental events sparked wide concerns among the public and policymakers (Liu and de Jong 2017; Wu et al. 2015) and, in the early 2000s, about 90% of Chinese grassland was reported to be degraded, with a constantly increasing rate of 200 km<sup>2</sup>/yr (State Council 2002). Such accelerating grassland degradation has been widely perceived as a threat to the sustainability of Chinese grassland use and poverty-alleviation initiatives in arid China, where grassland had been the main livelihood resource for local households (Wang et al. 2010; Banks 2001). Meanwhile, the economic significance of traditionally extensive pastoralism has been declining in the context of China's ongoing urbanization, modernization and marketization (Ho 2016; Ho and Azadi 2010). As a result, public environmental awareness shifted the Chinese government's policy priority away from economic development to grassland protection (Wang, Han, and Dong 2005).

Within the scope of the latest reforms, a series of ecological policies have been implemented, including one under the motto "retire livestock, restore rangeland". One of the key policy components has been a grazing ban, a drastic ecological conservation measure to regulate the nation's most-extensive land areas. Other rationales were behind the ban as well, including "[...] to ascertain control over a vast frontier endowed with mineral reserves and inhabited by ethnic minorities" (Ho 2016). The ban was first implemented in key pastoral provinces in 2003, including Ningxia, Inner Mongolia, Gansu, Yunnan, Sichuan, Xingjiang and Qinghai, and was later expanded to Heilongjiang, Jilin, Liaoning, Hebei and Shanxi regions in 2012.

Under the ban, livestock grazing is strictly prohibited on severely degraded grassland, while grazing rotation and stocking-rate control is to be implemented on less-degraded grassland, and intensive livestock husbandry is encouraged (Dong et al. 2007). Technically, use rights remain with individual households. However, the ban has created a very complex situation and property regime by contracting grassland use rights to individual households while strictly restraining grassland use (Ho 2016; Yu and Farrell 2016). In effect, the right to use grassland is now detached from the right to graze – the most important function of grassland for local households.

By 2015, 162 million ha of grassland was under the ban, accounting for 41% of total grassland in the country, and total government investment in fence construction, pasture plantation or household subsidies had reached 23.6 billion yuan (3.4 billion US dollars; Ministry of Agriculture 2015). Implementation of the ban has varied from one region to another, as detailed regulations, policy implementation, monitoring and state subsidies are determined by local authorities.

### **2.2.2. Community-based management in Kyrgyzstan**

Since 2009, environmental concerns in Kyrgyzstan regarding pasture degradation and decreasing pasture and livestock productivity have played a key role in designing and implementing recent pasture-management reforms. In January 2009, the Kyrgyz parliament adopted the new law "On Pasture" with the objective of promoting sustainable pasture use by introducing radical changes to the country's pasture-management system. The law (1) transferred a substantial part of responsibility for pasture management

to the local level, placing it on municipalities and newly formed Pasture User Unions (PUUs) and Pasture Committees (PCs); (2) abolished the area-based long-term pasture lease system and introduces an annual livestock-based pasture fee (“pasture ticket”); and (3) introduced a planning and monitoring system for pasture use and management. By 2011, PUUs and PCs had been created in 454 municipalities in Kyrgyzstan.

One of the first tasks for each newly established PC is collection of pasture fees and allocation of pasture tickets to pasture users. Collected fees are supposed to finance the committee’s overhead costs and be invested in pasture infrastructure and improvements. The pasture fee is defined annually by the PC for each type of livestock as well as for each type of pasture. It cannot be lower than the basic tax for using a pasture, needs to be approved by the respective municipality, and is calculated according to the annual budget of the PC. Pasture tickets are allocated according to annual pasture use and a management plan, developed and implemented under the coordination of the responsible PC. The capacity and condition of pastures (productivity and level of degradation) and livestock-population size need to be monitored and assessed annually by PCs, as the basis for negotiating allocation of pasture for each year’s pasture-use plan.

Collection of pasture fees has not, however, been successful due to difficulties in livestock monitoring. For example, as observed in our fieldwork, PCs in the studied communities only managed to collect less than half of their pasture fees in 2012. Implementation and enforcement of the new pasture legislation by PCs and municipalities has triggered a repositioning of actors, redistribution of access to pasture resources and reshaping of use rights among pasture users.

### 3. Conceptual Clarification and Elaboration

It has been generally assumed that when property rights – to use an asset, make use of returns from it, and change its form, substance or location – are not well defined or are restricted by a group or state, this may lead to decreasing economic incentives for owners and lower asset value (Libecap 1999). In this vein, Demsetz explains the rise of private property rights as a natural response for reducing externalities and transaction costs, increasing gains from trade and facilitating resource conservation (Demsetz 1967). Bromley, however, disagrees, arguing that rights are indeed a product of action by a “a meaningful authority system”, such as states or equally top-level rule-givers (a village council; Bromley 1992: 4). From this perspective, Bromley offers an important contribution to the development of property rights theory by highlighting the role of the state and proposing that reasons for resource degradation are generally factors outside of the commons, rather than “perverse property rights” and “selfish behaviour” within the commons (Bromley 2008: 539).

In his view, institutions are sets of rules, and property rights are a special class of institutions. He conceptualizes property rights as a social contract: “[...] a claim to a benefit stream that some higher body – usually the state – will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream” (Bromley 1992: 2). Here, the state plays an important role in protecting one actor’s rights from others and shaping the relationships among them. Bromley refers to Hohfeld, who, over 100 years ago, argued that property does not consist of things but, rather, of fundamental legal relations between people (Hohfeld 1917). Hohfeld proposed the idea that one who has a right is opposed by another who has “no-right” and that these oppositions form a set of legal relations that can describe any system of property rights, categorising these relationships into four legal opposites and four legal correlatives:

- The right of Alpha to possess property excludes Beta, who has no-right but a duty to respect Alpha’s right, which is enforced by the state.
- A privilege is permission for Alpha to act without being liable for damages to Beta and without being subject to state power to prevent such action.
- A power is defined as Alpha’s ability to change legal entitlements held and to enforce those changes.
- An immunity allows Alpha to secure her own entitlements and prevent them from being changed by Beta, who has no power to do this.

Furthermore, Hohfeld differentiated between static and dynamic correlates (**Table 1**). Static correlates are a snapshot of relations between parties at a particular time point, whereas dynamic correlates may cover a longer time period and refer to the capacity to enlist the coercive power of the state to force others into a new legal situation against their will.

**Table 1:** Property rights correlates.

	<b>Alpha</b>	<b>Beta</b>
<b>Static correlates</b>	Right	Duty
	Privilege	No-right
<b>Dynamic correlates</b>	Power	Liability
	Immunity	No power

Source: Hohfeld (1917), further elaborated in Bromley (1991).

Bromley further unpacks components of property rights by detailing various kinds of rights, differentiating between property, liability and inalienability rules (Bromley 1978, 1991):

- Rule I (property rule): Alpha may not interfere with Beta's consent, as Beta is protected by a property rule.
- Rule II (liability rule): Alpha may interfere with Beta but must compensate Beta, who is protected by a liability rule.
- Rule III (property rule): Alpha may interfere with Beta and can only be stopped if Beta buys off Alpha, who is protected by a property rule.
- Rule IV (liability rule): Beta may stop Alpha from interfering but must compensate Alpha, who is protected by a liability rule.
- Rule V (inalienability rule): Alpha may not interfere with Beta under any circumstances, and no compensation is required, as Beta is protected by an inalienability rule.

Conventional property rights theory was largely based on the notion of private property as related to physical objects (i.e., Rule I, property rule situations), while little concern was given to other situations, including in our case overgrazing and consequent land degradation. Bromley (1978: 47) highlights the importance of clarifying various kinds of rights, as they can define "[...] the nature of the bargaining process between two or more parties in environmental disputes [...]" to achieve an "optimal" outcome. He moves away from an idealized world, where transaction costs are zero and have no income effects, with the same ideal outcome being reached no matter who is liable (Coase 1960). Some users may complain about state interference, says Bromley, as costs they were formerly able to ignore must now be internalised. Thus, he extends the concept of property rights from a mere ability to withhold a benefit stream to also having the right to disregard a cost stream, or, following Bromley (2006), we might call it a new benefit stream (in the form of cost savings). This right to disregard a cost stream is often not clearly defined in conventional property regimes, which can lead to conflicts among rights owners and between rights owners and non-owners, thus, requiring a detailed analysis of legal relations among actors. The key question from the perspective of society and policy is whether Alpha's interests deserve protection from Beta's interference and whose rights deserve protection by the state. A policy may be changed and move from the presumptive right of one actor to any of the other four rule options. Here, policy advisors must consider the value of goods and services gained and forgone in each option; who gains or loses from each option; and the administrative feasibility and enforceability of each option.

In the following sections, we analyse the above-specified use rights as an important part of wider institutional changes in the regions studied and their impacts on different groups of actors. We emphasise this as a process of social construction, highlighting the ways in which shifting government interests and respective policies on grassland have shaped the design of new formal institutions, changing legal correlates among actors. Pasture users have responded by developing adaptive strategies within wider socio-economic and ecologic constraints, which may or may not match the original policy aims of promoting sustainable grassland use and management.

For our institutional analysis, we have reduced the complexity of interactions among actors in the pastoral context and, for analytical purposes, focused on illustrative choice settings in our study regions, where specific individual and collective choices and decisions by actors can result in potential conflicts or compromises. In China, we focus on interactions over livestock grazing between pastoralists and outsiders, whose benefits stream may be indirectly affected by grassland degradation. In Kyrgyzstan, we investigate how herders and livestock owners in a pastoral community negotiate the conditions of their cooperation. In both kinds of choice setting, interactions have been radically shaped by institutional change that, in our view, significantly impacts rules, resource use rights and the sustainability of pasture use.

#### 4. Altered Rules and Rights in China

In China, we focus on a choice setting where pastoralists and outsiders compete and compromise over economic and environmental benefits and cost for the following reasons. Ever after the grazing ban was introduced, individual households have continued to have the right to withhold benefit streams generated from grassland, because the right to use it is formally contracted to households. All other households in a community have the duty to respect this right and, thus, individual households are protected. The ban has, however, changed the property-right relations between pastoralists and outsiders, who have no direct interactions but are related to each other through an interdependency circle (Hagedorn 2008). Their interdependence has been increasing in recent years as pastoralists' overuse their grassland, degrading the grassland ecosystem and reducing outsiders' chances of enjoying a good environment. Here, the core choice setting involves competition over grassland use between pastoralists grazing livestock and outsiders who do not want to be disturbed by negative environmental impacts from grassland degradation.

We focus on pastoralists (Alpha) and outsiders (Beta), analysing changes in legal relations between them before and after the ban, where neither has the power "[...] to force another individual into a new legal situation against his or her will" (Bromley, 2006: 205). We concentrate on how the state, by enforcing the grazing ban, has influenced legal relations and whether actors have been able to create new legal relationships. We only examine the static correlates between actors in order to address the following question: Whose claim to both benefit and cost streams is in line with societal interests?

As the right to use land had been leased to pastoral households before implementation of the ban, the legal correlates between Alpha and Beta in terms of benefiting from income streams are the same as in a conventional private property relationship<sup>1</sup> (Rule I: Property Rule): a right vs duty relation. Alpha has the right to withhold the benefit stream which arises from using grassland via grazing, and Beta has the duty to act in line with Alpha's interest, meaning not to behave contrary to it. In terms of the cost stream resulting from negative environmental impacts, Alpha is free to act without being disturbed by Beta because of any potential negative impacts Alpha's behaviour might impose on Beta, meaning a Privilege (Alpha) vs No-right (Beta) relation. Both actors are bound by Rule IV (Liability Rule), where Alpha is protected.

At this stage, the ecological impacts of grassland use are not yet a concern to the state; therefore, Alpha is free to graze animals on the grassland (often excessively), though it may interfere with others through land-degradation effects. This behaviour (i.e., overgrazing) may continue unless Beta buys Alpha off, paying them to not graze the land, which was not the case before the ban, putting Beta in the position of having to bear the ensuing external costs. The state, meanwhile, had "no interest" in the ecological impacts of Alpha's herding behaviour, although it might entail cost streams – or, to use a conventional term from environmental economics, externalities – as at the time the ecological importance of grassland was underestimated by Chinese officials, compared with its political and economic significance (Williams 2002). **Table 2** summarises the situation before the ban was introduced.

**Table 2:** Rules of entitlement between pastoralists (Alpha) and outsiders (Beta) before the grazing ban in China.

	Pastoralists (Alpha)	Outsiders (Beta)
<b>Static correlates</b>		
<b>In terms of benefit streams</b>	Alpha is protected. Alpha has right to access, withdraw, manage grassland and possess property	Beta has a duty to respect Alpha's rights and cannot interfere in the use of grassland by Alpha
<b>In terms of cost streams</b>	Alpha is protected. Alpha is permitted by the state to manage grassland (including grazing livestock on it) as a privilege, without being liable for potential negative environmental impacts that might influence Beta	Beta has no right to prevent Alpha's grazing activities and can only stop this if Beta buys Alpha off

Source: Authors.

<sup>1</sup> It is worth noting here that, due to the diverse situations of pastoral communities in China, in many communities, grassland is still managed collectively (Ho 2016; Yu and Farrell 2013). However, as we want to focus more on the change in entitlements before and after the ban, we simplify the situation here as a conventional private-property relationship situation.

However, when grassland degradation became overwhelming, and when alarming environmental events, such as sandstorms, repeatedly occurred and were blamed on grassland degradation, the value of grassland changed. It was no longer seen as some remote area that only pastoralists live in and care about. The public and policymakers started to realize that the negative impacts of grassland degradation might go well beyond the boundaries of grassland tracts and threaten the socio-ecological situation of wider areas (Huang et al. 2013). In the past, outsiders had perceived grassland as a natural resource – owned and used by pastoralists living within herding boundaries – of no direct value to them, either economically or ecologically. However, their perception of grassland's value changed, as the cost stream (i.e., costs of land degradation) generated by grazing became seen as a burden for outsiders to carry. When public pressure arose, in line with the perception among policymakers that overgrazing was the main reason for grassland degradation, the ecological quality of grassland became highly valued by the state, which shifted the governmental policy priority from economic development to ecological protection (Wu et al. 2015). This resulted in implementation of the grazing ban.

Under the new regulations, technically, Alpha maintains the right to use grassland, which cannot be interfered with by Beta. However, due to the grazing ban, the right to use grassland is now detached from the right to graze livestock on it. Therefore, the use right is no longer the same as in the past (Yu and Farrell 2016). Alpha's right to graze, meaning the right to the cost stream, is now prohibited, and Beta's right to avoid the cost stream is protected. In limited cases (Situation A in **Table 3**), for example in the studied villages of Xilinhot, local pastoralists have the right to choose either to give up grazing rights and receive subsidies from the government or to keep grazing rights without subsidies. Here, the rules of entitlement between Alpha and Beta fall into the category of Rule IV (Liability Rule), and Alpha is protected by a Liability Right. Beta may stop Alpha's grazing activity by compensating Alpha in the form of a subsidy. It is important to note here that Beta does not pay Alpha directly but through a third party (i.e., the state).

In most cases (Situation B in **Table 3**), local pastoralists (Alpha) were forced to comply with the grazing ban and, thus, outsiders (Beta) have the privilege of not being influenced by negative environmental impacts caused by livestock grazing conducted by Alpha, who has no right in this situation to act against Beta's interest. Beta has a privilege protected by Rule V (Inalienability Rule), meaning there is no price that would permit Alpha to interfere with Beta through livestock grazing, or, if this is the case, Alpha must be prepared to compensate Beta. The compensation process would be determined and conducted by a neutral third party, in this case local government in the form of sanctions.

Obviously, concerns about grassland degradation had been articulated before the ban was introduced. But it was only at the point when alarming environmental events happened that the threat to the public's interests became recognized as a matter of concern. The grazing ban was a response to these concerns that incorporated the government's interest in saving pastureland's ecological significance and value. As a result,

**Table 3:** Change in rules of entitlement between pastoralists (Alpha) and outsiders (Beta) after the grazing ban in China.

Situation	Rules of entitlement	Legal relation
<b>In terms of benefit stream</b>	No change: Grassland long-term contracts as Rule I (Property Rule)	No change: Alpha (Right) vs Beta (Duty)
<b>In terms of cost stream</b>	In situation A	
	No change: Voluntary contracts between government and households as Rule IV (Liability Rule)	No change: Alpha (Privilege) vs Beta (No right) Alpha is still free to use grassland and can only be stopped if Beta buys off Alpha (compensation).
	In situation B	
	Change: Grazing ban as Rule V (Inalienability Rule)	Change: Alpha (No right) vs Beta (Privilege) Alpha has no right to graze livestock on grassland, although officially Alpha keeps the right to use it. Beta has the privilege of not being disturbed by the potential negative environmental impacts caused by Alpha's livestock grazing activities.

Source: Authors.

pastoralists have no right to graze livestock on grassland, while outsiders enjoy the privilege of being free from the environmental negative impacts of grassland use.

## 5. Altered Rules and Rights in Kyrgyzstan

Since the early 1990s in Kyrgyzstan, traditional pasture-use practices have been adapted to new realities and many different cooperative arrangements have been developed. Today, many small and medium-sized livestock owners pool their livestock together in order to collectively use common pastures. Herders will have one set of costs if they move only their own livestock, but their benefits can increase greatly if they also provide herding services to other livestock owners as clients. Thus, providing herding services has become a popular business. This informal arrangement is known as *Mal Koshuu*.

For our analysis of the Kyrgyz case, we describe and analyse an illustrative choice setting where community herders (Alpha) and livestock owners (Beta) negotiate the conditions of their cooperation and take individual and collective decisions regarding pasture use. We first consider alternative strategies that are available to cooperating actors, followed by a description of typical interaction outcomes prior to the change in formal institutions in 2009 as well as analysis of the ways the new rules have shaped actors' legal correlates. In this choice setting, a livestock owner and a community herder cooperate regarding herding of livestock and use of pastures. There are two alternative strategies and equilibrium outcomes when they decide to cooperate: (i) the community herder moves with the collected livestock to distant spring, summer and autumn pastures or (ii) the community herder stays on spring and autumn pastures close to the village and market, without moving to distant summer pastures.<sup>2</sup>

We assume that the main goal of the pasture users is to achieve a distributional advantage, which depends on the specific outcome equilibrium that is attained and implications for both parties. Livestock owners gain a distributional advantage if community herders move to spring, summer and autumn pastures. In this case, livestock is likely to gain more weight, as more feed will be available, and will consequently have a higher value. In contrast, the strategy of staying on spring and autumn pastures close to the village and market, without moving to summer pastures and rotating pasture use, has a distributional advantage for the herder, who can sell livestock products at the local market and have lower transportation costs. However, it also has potential negative impacts for the pastoral system, as it leads to overgrazing, degradation and decreasing pasture productivity. This was observed in the studied communities in Kyrgyzstan: winter pastures and most accessible spring and autumn pastures are overgrazed, due to intensive use of the land throughout the whole year without rotation, while the most distant summer pastures are left underused.

In our view, this problematic outcome is generated through a particular constellation of pasture-use rights under the old formal institutions, as summarised in **Table 4**. The static perspective provides a snapshot

**Table 4:** Legal correlates between livestock owners and community herders under old working rules in Kyrgyzstan.

	Herder (Alpha)	Livestock owner (Beta)
<b>Static correlates</b>	Herder has right to use accessible pastures without moving to remote summer pastures and rotating them	Livestock owner has duty to pay for herding services but cannot interfere in selection of pastures
	Herder has privilege to use accessible pastures without migration and rotation	No rights against herder's privilege
<b>Dynamic correlates</b>	Herder has power to force livestock owner to cooperate on conditions which bring the former a higher distributional advantage – use of accessible pastures	Livestock owner has no power to change the status quo
	Herder enjoys immunity	Livestock owner has no power to force livestock owner to move to remote summer pastures, bringing the latter greater distributional advantage

Source: Authors.

<sup>2</sup> For a more detailed description of the bargaining situation among pasture users in Kyrgyzstan, see Kasymov and Thiel (2019) and Kasymov and Zikos (2017).

of relations between pasture users during the period between 1991 and 2009. Policymakers at that time assumed that mismanagement resulted from poorly defined property rights and that securing individual property rights over land could improve resource use. Therefore, pasture users were encouraged to obtain pasture-use leasing contracts. To promote individual pasture-use rights, the formal rules simply copied legislation already applied to arable land without considering the effectiveness of tendering pastureland plots, the environmental need for pasture rotation and overall mobility due to climatic and terrain conditions.

Therefore, when herders formally acquired pasture use rights, they had a right to use accessible pastures without moving to remote summer pastures and enjoyed a privilege by staying on pastures close to markets and villages, though this may cause overgrazing. Livestock owners, in contrast, had a duty to pay for herding services with no ability to interfere in the selection of pastures and had no right against the herders' privilege.

From the dynamic perspective, we see that livestock owners have no capacity to enlist the coercive power of the state to force herders to seasonally rotate pastures. Under the old legislation, the State Institute for Land Use (Giprozem) was responsible for monitoring and planning pasture use and providing services to municipalities on a paid basis. The rule was rarely implemented, and no monitoring, pasture-use or management plans were developed or enforced. Herders enjoyed immunity for their actions, which often led to overgrazing and degradation of pastures.

After 2009, the new pasture law affected pasture users' rights to use the resource as well as their rights to appreciate returns from its use. The legal correlates between herders and livestock owners were affected by enforcement of decentralised formal institutions, such as pasture-use planning and pasture fees, by Pasture User Committees (PCs). In the past, and still to an extent today, pasture users relied mainly on informal arrangements, such as *mal koshuu*, presented above. However, organisations at the community level – such as municipal administrations and PCs – have been intervening through enforcement of formal rules and, consequently, changing negotiating conditions for involved actors. For example, they have been responsible for officially approving general terms for herding, including setting maximum prices that can be asked for herding services and stipulating when pasturing in fields and near-village pastures must come to an end and livestock need to be moved to spring and summer pastures.

By enforcing these new formal rules, the intervention of municipalities and PCs has altered the legal correlates between actors, resulting in changes to the equilibrium reached in the previous setting. **Table 5** presents the changes that have taken place to Rules I and II. As pasture-use rights are now allocated to pasture users by PCs annually, actors face the risk of not being able to prolong their pasture contracts. As a result, correlates in Rule I change. In other words, the new rule allows livestock owners to interfere in herders' choice of pastures and push them to migrate to remote, but more productive, pastures (movement from spring to summer and autumn pastures). In this way, the legal correlates have changed. Now the development and implementation of pasture-use and management plans are forcing herders to negotiate and, under a typical pasture-use plan, move to spring, summer and autumn pastures. This has led to a change in liability Rule II and changed the legal correlates between actors, making herders now liable for not migrating to summer pastures according to pasture-use plans, including seasonal rotation of pastures. If they do not follow this rule, herders could face punishment fines.

## 6. Implications for Sustainability

In the current political and scientific literature, there is an ongoing discussion regarding the extent to which policy interventions in both study regions examined here have actually contributed towards achieving the main policy objective: more sustainable pasture use. In this section, we discuss our empirical findings in relation to the contemporary literature and generalise their implications for institutional change.

In China, government reports have repeatedly claimed there was continuous ecological improvement from 2007 to 2014, owing to the implemented policy measures, with the ban being considered the essential one (Ministry of Agriculture 2014, 2015). However, in spite of some short-term positive effects, challenging empirical evidence has accumulated illustrating the long-term negative impacts of the ban on pastureland ecosystems (e.g., loss of biodiversity) (Ho, 2016; Zhen et al., 2008) and local social conditions (Yu and Farrell 2013; Zhang et al. 2007; Li and Li 2016).

Our empirical work has found that the long-term social impacts of the ban seem to be problematic. The grazing ban forces herders to give up their grazing rights over grassland, shifting instead to stall-feeding. However, the limited subsidy granted is insufficient to support successful change from extensive livestock grazing to intensive husbandry at the local level, leading to widespread illegal grazing (night grazing) among herders as well as conflicts between local governments and herders. Potential problems with increasing inequality and adaptive capacity to climate change as well as adverse effects on pastoral culture and rural

**Table 5:** Property and liability rules that have been changed between the old and new institutions for livestock herding in Kyrgyzstan.

	<b>Under old formal institutions</b>	<b>Under new formal institutions</b>
<b>Property rules</b>	Leasing contracts up to 10 years via auction	Annual agreements between PCs and herders.
Rule I: Beta (Livestock owner) may not interfere without Alpha's consent. Alpha (Herder) is protected by a property rule	Livestock owners may not interfere in selection of pastures and decisions regarding seasonal migration. Herders who sign formal contacts are protected by the property rule.	Change in property rule allows livestock owners to interfere in choice of pastures and push herders to migrate to remote, but more productive, pastures.
<b>Liability rules</b>	The State Institute for Land Use was responsible for monitoring at national level and providing services to municipalities on a paid basis. The rule was rarely implemented and not monitored; pasture-use and management plans were neither developed nor enforced.	PC develops pasture-use and management plans based on monitoring of pasture use from previous years. PCs are responsible for their enforcement.
Rule II: Beta (Livestock owner) may interfere with Alpha (Herder) but must compensate Alpha. Alpha is protected by a liability rule	Livestock owners may interfere with herders, but must compensate them. Herders are protected by a liability rule.	Change in liability rule makes herders liable for not migrating to spring, summer and autumn pastures.
		Livestock owners interfere in choice of pastures and push herders to migrate to remote, but more productive, pastures (spring, summer and autumn pastures) without compensation.

Source: Authors.

development have also been identified as partly due to this policy intervention. Some scholars have been positive in their evaluations, pointing to increasing household incomes due to the subsidy, better off-farm employment and the shift to intensive husbandry. Yet, a systematic review found that 60% of the reviewed literature finds decreasing herder incomes after the ban (Li and Gongbuzeren, 2016). Furthermore, over-exploitation of natural resources by outsiders, such as the exploitation of scorpions in Inner Mongolia, is increasing (Li, Li, and Gongbuzeren 2016).

Based on our empirical findings and theoretical analysis, we argue that the design of the ban may have seemed essential in the beginning phase but does not seem to fit the current context. According to Bromley, if an action is characterised by “irreversibilities” and may affect a future stream of values from “preservation of a unique environmental resource” (i.e., grassland), then the inalienability rule may be preferred (Bromley 1978), as in the case of the grazing ban. This may have served as valid theoretical justification for implementation of the ban, considering the alarming land degradation and environmental events in the late 1990s and early 2000s. At that particular point in time, grassland was unprecedentedly highly valued for its ecological importance and, thus, outsiders demanded the right not to be burdened with the cost stream from land degradation. Here, the right of local pastoralists to use the land was sacrificed in order to meet a political priority of the Chinese government. After more than 15 years of implementing the ban, with empirical evidence of its negative impacts at hand, now it is fair to question whether this justification still stands.

Meanwhile, in Kyrgyzstan, the reforms carried out there are also undergoing critical assessment (Crewett 2015; Dörre 2015; Ridder, Isakov, and Kasymov 2017; Kasymov and Thiel 2019). While Crewett (2015) investigates how policy implementers at the local level (“street-level bureaucrats”) have simplified information rules for the donor-initiated natural-resource governance reforms at the expense of more resource users being involved in a more participatory manner, Dörre compares the “promises” of Kyrgyzstan’s pasture-related

legislation and the “realities” of its implementation. In his opinion, “the recent innovation in pasture law has not comprehensively resulted in the desired outcomes on the ground” (2015: 1). Furthermore, Ridder et al. (2017) evaluate the costs and instrumental benefits of different land-use strategies with regard to pasture degradation, concluding that allowing pastures to rest will lead to higher net benefits and would be a more beneficial choice for herders economically. However, awareness about the relationship between overgrazing and pasture or livestock productivity has not been translated into action among pasture users. Kasymov and Thiel (2019) argue that the enforcement of new formal institutions in pasture use and management affects actors’ relative bargaining power and distributional advantages. Thus, it has a redistributive character in supporting less powerful actors and contributing to the selection of more socially optimal strategies adopted by pasture users.

Our analysis of interactions between herders and livestock owners supports these assessments. The constellation of correlates between actors under the old formal institutions helps to explain the original problematic outcome: overgrazing of accessible pastures. Our results appear to indicate that intervention by municipalities and PCs has contributed towards changing property and liability rules in this choice setting, thus changing the equilibrium of interactions therein and, consequently, altering the pastoral working rules involved. There is no doubt, however, that the latest reform in pasture management in Kyrgyzstan is still a work in progress, and a longer-term perspective as well as more research will be required to evaluate the environmental and social impacts of the new working rules.

## 7. Conclusions

In this article, we have reflected on the experiences of China and Kyrgyzstan, which have been experimenting with altering institutional arrangements to bring coherence and sustainability to problematic grazing regimes. In both cases, privatisation reforms were implemented with the intent of achieving success similar to that already achieved in farming areas, without careful consideration of the physical specificities and cultural differences of pastoral areas. The ongoing institutional changes, centered on a grazing ban in China and community-based management in Kyrgyzstan, can be seen as an effort of the state to grope for solutions to deal with inherited institutional flaws.

For the Chinese case, we have identified choice setting where competition and compromise occur between pastoralists and outsiders, who are not directly connected but are bound together by potential ecological impacts. Although concern over grassland degradation existed well before the ban, the state did not prioritise regulating the cost stream of negative ecological impacts until the turn of the millennium, when it faced alarming environmental events and great public concern. Ever since then, the right of outsiders not to be affected by negative ecological impacts has been of interest to the state; thus, a ban was initiated, changing the legal correlates between pastoralists and outsiders. We question whether, after more than 15 years of the ban’s implementation, the Inalienability Rule still fits the current situation. Faced with long-term negative impacts of the ban, we argue that it is time to re-evaluate this policy and reconsider how the state can intervene and shape the correlates between pastoralists and outsiders.

In the case of Kyrgyzstan, we have focused on a choice setting where community herders and livestock owners negotiate terms and conditions regarding who should obtain greater benefit from cooperation. A problematic outcome of the previous institutional arrangements was observed empirically in the communities studied: winter pastures and the most accessible spring and autumn pastures are overgrazed, as herders used them throughout the year without rotation. We have attempted to provide an answer to a key question from the societal point of view: Do the herders’ interests deserve protection from livestock owners’ interference? We have argued here that the enforcement of new formal rules has affected property and liability rules and changed the legal correlates between herders and livestock owners. We interpret this change as not protective for the herders’ interest but is more supportive for pastoral mobility and sustainable pasture use.

An important finding of our analysis is that the interest of concern has changed in both cases, leading to a resulting flow of benefit streams (and cost streams as well) from one actor to the other. In the Chinese case, with increasing awareness of the ecological impacts of the pastoral system, the interests of outsiders have become a concern of the state. Implementation of an inalienability rule (i.e. the grazing ban) guarantees those interests, to the disadvantage of pastoralists. In Kyrgyzstan, we have observed that the interests of individual livestock owners to force community herders to make more costly migration decisions is now protected by the current institutional arrangement. In both cases, the legal correlates between opposed actors have been changing, and those whose interests have become a concern of the state are likely to benefit from the new institutional arrangements.

Two more points are noteworthy. First, the different stakeholders and their legal correlates need to be more fully considered. Changing property regimes not only alters the rights of resource owners but also the legal correlates between owners and other stakeholders, which are often ignored. Second, as our knowledge of socio-ecological systems improves, we may find that certain types of rules that may once have fit well now no longer do so (Bromley 1991, 1978), especially in transformation countries where socio-economic conditions are changing rapidly. This requires careful examination of new and existing rules and their resulting legal correlates for updating to contemporary contexts.

The empirical approach used here has proved helpful in dealing with the methodological difficulties encountered when evaluating institutional change and its dynamics across time and space. Identifying relevant legal correlates between involved actors and evaluating the changes to those correlates triggered by the new institutional arrangements has allowed us to evaluate the effects of new institutions. Our analysis suggests that this approach can also be applied in the transformation contexts of other regions where radical policy interventions change over time, altering various rules and actor rights. The approach also enables assessment of the stakeholders involved in illustrative choice settings in terms of who wins and loses due to reform policies. In both case-study regions, a question remains open regarding long-term impacts of the new institutions and how a new equilibrium can be achieved that can support more sustainable use of pastures. For future studies, this question needs to be specifically addressed.

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## Competing Interests

The authors have no competing interests to declare.

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