Exploring institutional complementarity and social thresholds of mobility in pastoral social-ecological systems in Mongolia

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Abstract

Biodiversity continues to decline worldwide, affecting dryland ecosystems that are of significant importance for global biodiversity conservation. Accelerated by climate change, undergoing transformations have been pushing the entire social-ecological system across ecological and social thresholds. Particularly, the decline of pastoral mobility in Mongolia is of great concern, as flexible responses to the dynamic environment are crucial for the sustainability of drylands' ecosystems. Responding to this concern, Mongolian policymakers design new pasture use and conservation policies. However, the policies might be ineffective in preventing systems from crossing the thresholds, unless policy implementation succeeds in systematically shaping the perceptions of a critical mass of herders and their strategic choices regarding pastoral mobility. We evaluate whether the enacted policies generate the intended consequences. First, we reconstruct the strategic choice and resulting institutions regarding pastoral mobility in the commons domain, where herders jointly use common pastures. Second, we track the process in the political economy domain, where pasture users choose to support or resist policies. Finally, we evaluate the complementarity of the strategic choices and institutions in both domains. In our field research, we employ the "process tracing" method. It relies on observations to trace recurring processes within and between herding communities and incorporates triangulation via various tools, such as expert interviews and focus group discussions. Our findings identify complementarity between the enacted policies and pastoral mobility as individual households comply with the rules and select mobile herding strategies. However, for the complementarity conditions to be held and to create an overall institutional arrangement, a critical mass of herders choosing to comply with the regulations and practice pastoral mobility to reach a social threshold will be crucial.

Introduction

Biodiversity loss significantly reduces nature's capacity to contribute to people's well-being. Current social-ecological transformations of drylands' social-ecological systems (SES) push the entire ecosystem across ecological and social thresholds. Specifically, the decline of the mobility of pastoralists is of great concern, as flexible responses to the dynamic environment are crucial for the sustainability of drylands' SES. In Mongolia, nomadic pastoralists' sedentarisation changes their grazing practices, for example reducing mobility and use of grazing reserves. This change substantially impacts ecological and herders' livelihood resilience (Fernández-Giménez *et al.,* 2018)"ISSN":"17489326","abs tract":"Temperate grasslands, including those of northern Eurasia, are among the most imperiled ecosystems on Earth. Eighty percent of Mongolia's land area is rangeland, where interacting climate, land-use and changes in governance threaten the sustainability of Mongolia's rangelands and pastoral culture. Particularly concerning are the potential ecological impacts of changing pastoral grazing practices-namely declining use of grazing reserves and pastoral mobility. However, like other grazing practices globally, there have been no empirical studies to evaluate the effects of specific Mongolian grazing practices on ecological function at a management scale. We collected data on the grazing practices of 130 pastoral households across four ecological zones and sampled ecological conditions in their winter pastures. We used a novel social-ecological analysis process to (1. As a result, more than 22% of rangeland have been heavily and entirely degraded (Densambuu *et al.,* 2018). In a policy response, the Mongolian government is implementing new pasture use and conservation policies. These policies coordinate access to pastures and incorporate new pasture management approaches at the community level, including land tenure, community-based

management, assessment and monitoring of pastures, and resource use planning. The objective of this study is to evaluate whether the enacted policies generate the intended consequences. To do so, we investigate herders' strategic choices in the commons and political economy domains and evaluate the complementarity of these choices and resulting institutions that coordinate pastoral mobility. We employ the equilibrium notion of institutions and define institutional complementarity when "one type of institution rather than another becomes viable in one domain when a fitting institution is present in another domain, and vice versa" (Aoki, 2001: 3005).

Materials and Methods

Study Area

In our study, we employ the "process tracing" method (Skarbek, 2020). It relies on causal process observations to trace recurring processes/ events within a studied case by making "inferences about hypotheses on how that process took place and whether and how it generated the outcome of interest" (Bennet and Checkel, 2015 cited in Skarbek, 2020: 416). The method is recommended to study institutional change (Skarbek, 2020) and relies strongly on triangulation via various tools, such as interviews, focus groups, and participant observation. To investigate socio-ecological dynamics in the Mongolian steppe ecosystem, we include four provinces (*aimag*) in our study: the Tuv *aimag* in the central Mongolian region, as well as three eastern provinces – the Khentii, Dornod and Sukhbaatar *aimags*. Within these four provinces, ten core sites were selected for a more detailed analysis at the municipality (*soum*) and community *(bag*) level based on their differences between more densely populated and relatively pristine areas. During field research in July-September 2019, the research team travelled to all core sites and conducted 40 qualitative interviews with herders, administrators and experts. Furthermore, we conducted a focus group discussion at a stakeholder meeting on 28 August 2019 in Ulaanbaatar.

Results

Strategic choice and resulting institution in the commons domain

We follow the game-theoretic approach in our institutional analysis (Aoki 2001) and assume that herders represent strategic players who interact over repeated periods to use pastures and maximise their payoffs. It is costly for them to exclude others from using common pool resources such as pasture and water. The herders are interdependent as their payoffs depend on choices of other members of their community. The strategic choice is influenced by internal and external constraints, such as (i) knowledge about the consequences of herders' action from the previous periods, (ii) a set of actions available to herders, and (iii) expectations of others' strategic choices. The equilibrium of herders' strategic choices creates institutions that coordinate pastoral mobility.

(i) Knowledge about the consequences of previous actions: Traditionally, Mongolian herders employed highly mobile and flexible herding strategies to effectively use the diverse heterogeneous resources of the grassland ecosystem (Fernández-Giménez, 1999). This valuable experience constrains their strategic choice today as well. A herder in our study area explains the reasons behind his choice of pastures: "Well, in spring, during the birth season, Gobi habitat is beneficial for milk production. However, if livestock grazes only in the Gobi habitat, it will be difficult for them to overcome the cold weather. Thus, we herd animals by switching between the Gobi and Steppe and letting them graze on different grasses". Based on their experience, herders also use seasonal pastures allowing them to regenerate: "When the grass starts to grow well, we come here around the start of June until August. In August, we move to the autumn camp. […]. When we move to the autumn camp, the area will regenerate" (a herder, core site 4). The herding experience instructs herders to respond to environmental uncertainties (e.g., created by the scarcity of pastures or decrease of their quality) by moving long distances to practice *otor* – rapid movements of a subgroup household with their livestock to a distant pasture. Often, herders are forced to move to other provinces and municipalities when overgrazing of their pastures occurs. Water scarcity or decrease in their quality, especially in summer, is another important factor that constrains the strategic choice as "herders follow the water". The respondents noted that wealthy herders tend to move to remote pastures, but their choice is often constrained by water availability. Furthermore, natural disaster risks, such as extremely cold winters (*dzuds),* droughts and wildfires, increase environmental uncertainty and force herders to move.

(ii) Set of feasible actions: Income of Mongolian herders depends very much on livestock and livestock products. Cashmere wool and sheep meat are the most valuable products. These led to a substantial increase in livestock since 1990, mostly of goats (ca. 50%) and sheep (ca. 30%) (NSO, 2019). To maximise their benefits from using pastures, herders feasible set of actions is related to strategic decisions regarding livestock

abundance and pastoral mobility. To increase their herd, herders decide how many and what type of animals they keep (with a preference for sheep and goats). Herders balance their herd size and structure by selling weaker and older animals in autumn and keeping young and good-quality livestock. Herders tend to increase their herd size based on what a household can manage and feed on pastures available to them. Pasture users decide when and where to move to feed and drink their livestock using seasonal pastures. Some herders move for longer distances following growth of grasses: "Our winter pasture is far from here, it is about 30 km away. To get there, we need to move 3 to 4 times."[…]. In the good old times, we moved 5 to 6 times." (a herder, core site 3). However, many herders have significantly reduced their movement rising concerns by local authorities and experts. A *soum* governor in core site 7 complains: "Herders stay in one place for a whole year. Others switch between winter and spring camp, and during summertime going to the summer camp. As the distance between camps is not far from each other, herders just move around one place where pastureland degrades eventually." The set of feasible actions related to pastoral mobility can be classified into two options: practising low to moderate pastoral mobility or moderate to high pastoral mobility.

(iii) Expectation of others' strategic choices: Herders consider other pasture users' choices to predict the consequences of their own choices. Competition and conflicts regarding access to pasture and water resources shape their movement decisions: "The main reason why herders do not want to move is their fear that others would take over their land for agricultural or mining purposes. […]. Agricultural companies tend to use more areas than allocated to them" (a *bag* leader, core site 8).

Building on interviews from local leaders, experts and herders, we conclude that the equilibrium of strategic choices and resulting institutions in this domain are related to practising low to moderate pastoral mobility.

Strategic choice and institutions in the political economy domain

The herders' strategic choice in this domain is to support or resist the policies. In the following, we briefly describe the Mongolian government's policies and reconstruct the herders' choices.

Leasing and Certification of Land for Winter and Spring Camps: Since 1998, the land for winter and spring camps can be leased and certified to individual herding households for periods of 15-60 years, allowing herders to control surrounding pasture areas (Fernández-Giménez & Batbuyan, 2004). The land-use rights provided by certificates are inheritable and can be extended for 40 years. *Soum* governors issue the land certificates to herding households after the land registration office recorded their applications at the *aimag* level. In our study area, the strategic choice is to support the certification policy. Especially, wealthy herders with high a number of livestock tend to legalise their land-use rights as they need secured places for their animals. For example, in core site 8, up to 50% of herding households have obtained the certificate. The share is higher in core sites 3 and 7 (up to 70% and 90% respectively). A herder from core site 3 explains: "We got the land certificate soon after we married and got our marriage certificate. We need the certificate because we always stay there during the spring and winter. These are winter and spring pastures of my parents, who have been here for a long time. […]. Almost every herder in our community has his land certificate". However, some communities (e.g., in core site 10) stop issuing certificates when land disputes occurred. In relation to pastoral mobility, the effect of broad support for policy certification is twofold. On the one hand, the land certificates secure access to pasture land excluding others (e.g., their neighbours, herders from other communities, mining and agricultural companies). Our respondents believe that by certifying winter pastures, conflicts would be resolved. On the other hand, the secured pastures through certificates encourage herders to invest in fencing pastureland and building winter shelters for their livestock. Consequently, such investments may also contribute to decreasing pastoral mobility: "When herders build shelters and fences for their livestock, they cannot move away for a longer period" (a *bag* leader, core site 5).

Establishing Pasture User Groups (PUGs): The groups are organised based on pasture units boundaries delineated together with *soum* leaders and herder representatives. They can also be based on already existing groupings (often kin-based) with delineated grazing territories. A PUG may consist of 10-50 households. Involved herders receive training, technical assistance and financial support (e.g., through access to micro-credits with low-interest rate). As of 2018, 830 groups were created in 11 *aimags* in Mongolia. In many cases, herder groups have signed rangeland use agreements with their *soum* governors (Densambuu *et al.,* 2018). In our study area, several communities have been involved (e.g., in core sites 5, 6 and 7). The strategic choice herders face here is to support the policy by joining the formal group or to resist.

A *bag* leader explains the effect of the group membership: "We jointly organise the seasonal movements from spring to summer, autumn and then to winter camps. We discuss every month pasture use related issues. I think we do not have any unresolved issues regarding pastureland at the bag level. If we continue working like this for another year, there will be no problem in our *bag* at all" (a *bag* leader, core site 6). Also, the *otor* movement has been better organised: "During former times, only a few people used to move to *otor*. However, last year, 100% of people moved" (a herder, core site 6). Still, the majority of herders has not yet been convinced. For instance, in core site 10, a *soum* governor complains that herders are not very active and eager to form groups: "Herders believe that they are better off by caring for their livestock individually" (a *soum* governor, core site 10). Respondents informed us that many do not have enough information about the policy, but they do not rule out a possibility to join a group in the future. Local leaders recognise the need to support the creation of herder groups: "Herders are not moving to other places by themselves. They need to recognise their [collective] responsibility" (a *bag* leader, core site 7). It will take some time until a critical number of herders would get on board. Until then, local leaders argue for patience: "Of course, no force. We should start with herders who agree. If it is useful and productive, others will come by themselves. First, we need to raise awareness about the group activities, and then a majority of herders may follow" (a *bag* leader, core site 5). Building on interviews from local leaders, we conclude that there seems to be a tendency that not enough herders join PUGs to allow grasslands to recover after grazing periods.

Pasture Use Planning: By 2018, photo-monitoring of 4200 sites at seasonal pastures in 278 *soums* was conducted to provide annual information regarding plant cover in Mongolia (Densambuu *et al.,* 2018). The collected data were analysed by Mongolian experts and included in the land management databases. The data helps in the estimation of the animal carrying capacity and animal stocking rates. Municipal administrations are responsible for creating annual pasture use plans, organising pasture movement that takes into account stocking rates and coordinating use of seasonal and emergency reserve pastures. Implementation of pasture use planning is vital for promoting pastoral mobility. However, the policy's impact depends on how herders respond to it with their strategic choices – to support the policy by following the pasture use plan or to resist.

Implementation of pasture use plans differs across the study area. In some communities, there was "no limitation on livestock and no directions to move" provided (a herder, core site 5). In others, the local authorities directed herders to move to winter pastures with less snow and more vegetation (a herder, core site 10). The quality of pasture use plans differs significantly. It is more developed in *soums* where development agencies supported local experts in evaluating pastures and integrated pasture rotation in local resource use plans (e.g., in core sites 3, 4 and 7). Local leaders and experts acknowledge the challenge to convince herders: "It is a long way until the majority of herders will understand and follow. For instance, we persuaded a group of herders residing in a particular area, to move to a different place from August to October, to enable pastures to recover. Meanwhile, livestock from another herder came to this pasture and ate grass there. The reason why people do not want to move is that they are afraid to lose their land to others" (a *soum* expert on land use, core site 3). At least for now, a majority of herders in our study area did not follow pasture use plans and thus resist this policy.

Discussion and Conclusions

Herders face alternative strategic choices in the commons and political economy domains. Their strategic choices and institutions are complementary when benefits of herders choosing to practice moderate to high pastoral mobility increase from choosing to support rather than to resist a policy, as well as when benefits of actors choosing support a policy increase from choosing to practice moderate to high pastoral mobility rather than low to moderate pastoral mobility. We could not establish a clear, stable institutional arrangement between the following strategic choices: practising moderate to high pastoral mobility and support the Leasing and Certification of Land for Winter and Spring Camps policy. Herders largely support this policy as it reduces institutional uncertainty by securing their access to winter and spring pastures, but it also encourages herders to fence their winter and spring pastures and build winter shelters reducing their mobility. The study identifies institutional complementarity between the strategic choices to support Establishing PUGs and Pasture Use Planning policies and the choice to practice moderate to high pastoral mobility as some individual households join groups, comply with the pasture use plans and increase their pastoral mobility. Both policy interventions are effectively reducing institutional uncertainty by improving knowledge about the consequences of previous actions, establishing platforms for negotiating pasture use and excluding external actors from

access to the resources. However, for the strategic complementarity conditions to be held and to create an overall institutional arrangement, a critical mass of herders choosing to comply with these policies, practising pastoral mobility, thus reaching the necessary social threshold will be crucial.

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