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IMPROVING RANGELAND MANAGEMENT THROUGH HERDERS' INVOLVEMENT – THE CASE OF KHONGOR SOUM IN MONGOLIA

Odonchimeg Binderiya

Plant Science Agricultural Research Institute of Mongolian University of Life Sciences
Darkhan-Uul aimag, Mongolia

odonchimeg@sab.edu.mn, odnood2001@yahoo.com

Supervisor

Thorunn Petursdottir

Soil Conservation Service of Iceland (SCSI)

thorunnp@land.is

ABSTRACT

Around 75% of Mongolian territory is classified as rangeland. These rangelands are grazed by domestic livestock, owned by Mongolian herders. After the collapse of the socialist system in 1990 no regulations on rangeland management were in place and the number of livestock increased substantially, resulting in rangeland degradation. For the last years, the Mongolian government, in collaboration with several donor programs, have established formal local herder groups where the herders directly contribute to rangeland management. Even though these groups have operated for less than 10 years, investigation shows that they have in some cases already improved the institutional capacity within the areas where they have operated. Although 50% of the territory of Khongor soum, one of the regions in Mongolia, is comprised by rangelands, the soum is classified as an agricultural area and is thus not eligible to participate in one of these rangeland management programs run by the government.

In this report, herders and key governmental officials were asked about their perception of rangeland conditions and rangeland management practices within Khongor soum. Furthermore, they were asked if they would support the establishment of formal herder groups in the area, in line with the governmental projects already in place in some other regions of Mongolia.

Herders and local government officials agreed and supported the importance of herders'/users' active involvement in rangeland management and decision making. Nevertheless, they do not have a clear idea or plan for how to structure such a management scheme, so they are waiting for actions or interventions initiated by a third party.

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Rangelands and livelihood in Mongolia.....	1
1.2	Current state of Mongolian rangelands	2
1.3	Statement of the problem.....	4
1.4	Importance of the study	5
1.5	Objective.....	5
1.6	Research questions	5
2	METHODS	5
2.1	Study area description	5
2.2	Data collection methods	9
2.3	Data analysis.....	10
3	RESULTS	10
3.1	State of rangeland health	10
3.2	Rangeland management practices	11
3.3	Rangeland management strategy.....	13
3.4	Conflicts between different stakeholder groups	13
4	DISCUSSION.....	14
4.1	State of rangeland health	14
4.2	Rangeland management practices	15
4.3	Rangeland management strategy.....	16
4.4	Conflicts between different stakeholder groups	17
5	CONCLUSIONS	17
	ACKNOWLEDGEMENTS	19
	LITERATURE CITED	20
	APPENDIX	23

1 INTRODUCTION

1.1 Rangelands and livelihood in Mongolia

Up to 75% of Mongolia's ecosystems are defined as rangelands. The rangelands in Mongolia are state properties (commons with open access to all citizens), grazed by domestic livestock. The Mongolian society has a strong nomadic culture and throughout the centuries the rangelands were the main providers of food and income. Rangeland exploitation is still of high socio-economic importance for the Mongolian society and around 40% of the population earn their living as herders. The rangelands, for instance, support the livelihood of 33% of the total population of the country and stand for about 14% of its annual GDP. Furthermore, livestock production based on rangeland exploitation is still the main provider of meat for the Mongolian population (MOR2 2015b).

With the collapse of the Soviet collective system in 1990, national livestock was privatized back to herder families. Yet, the rangelands remained as open access public properties without proper national grazing regulations to control the exploitation. Thousands of former employees of state-run cooperatives and enterprises who lost their jobs during the transition period started herding to sustain their livelihood. Within a decade, the number of herder families and livestock has tripled. According to research, livestock numbers have surpassed the carrying capacity of the rangelands by 2-3 times and substantially accelerated rangeland degradation (SDC 2012). In 2015, Mongolian herders kept around 70 million domestic animals (National Statistical Office of Mongolia, 2015) or 70% more than in 1990 (Ministry of Food and Agriculture of Mongolia 2015).

As a result, conflicts have emerged between the traditional and the new herders regarding access to rangelands. Poverty has consistently remained widespread among herder families and the annual income of around 60% of herder households in Mongolia is below the national poverty line (MOR2 2015a).

In the wake of the 2000s, during two consecutive years of difficult wintering, Mongolian herder families lost about 14 million of their livestock and many were left without a single animal. At the request of the Mongolian government, the government of Switzerland provided humanitarian assistance to herder families during these years. The Green Gold Project was formulated as a follow-up to humanitarian assistance to Mongolia. The Green Gold Project, funded by the Swiss Agency for Development and Cooperation (SDC), was conceived to support Mongolia to address the underlying problem of rangeland degradation, or the "tragedy of the commons" (SDC 2012). Other rangeland management projects supported by donors include, for instance, the Sustainable Grassland Management and the Sustainable Land Management Programs funded by the UN Development Program; Daurian Steppe Scapes Project funded by the New Zealand Nature Institute/GTZ; and the Wildlife Conservation Society. The main targets of these projects are related to improved grazing and land management. Organization of herders in the form of Pasture User Groups, cooperatives and any other forms, including customary institutions, is thus of high relevance to economic development at the local scale (MOR2 2015b).

Notes:

Aimag (= province) is the largest sub-national administrative unit; within the *aimag* there are the *soums* (= districts), which are then divided into *baghs* (= sub-district). In the capital the districts are called *duureg* and the sub-districts are called *khoroо*.

1.2 Current state of Mongolian rangelands

A recent monitoring of the ecological condition of Mongolian rangelands revealed that up to 65% of the rangeland ecosystems are degraded to some extent (SDC 2012). Since 1990, the degradation has been largely driven by overgrazing by livestock and land conversion due to mining activities and crop production under changing climate conditions (World Bank 2003). Research has shown that it would be possible to recover around 48% of the degraded rangeland ecosystems through improved grazing management and decreased grazing pressure (Ministry of Food and Agriculture of Mongolia 2015).

The governance system of land management in Mongolia is relatively complicated because several agencies and ministerial structures are involved in the system. For instance, the Ministry of Environment, Green Development and Tourism, is responsible for environmental conservation and monitoring; the Ministry of Construction and Urban Development is responsible for infrastructure management, planning and implementation; while the Ministry of Food and Agriculture is in charge of land, crops and rangeland utilization (Fig.1).

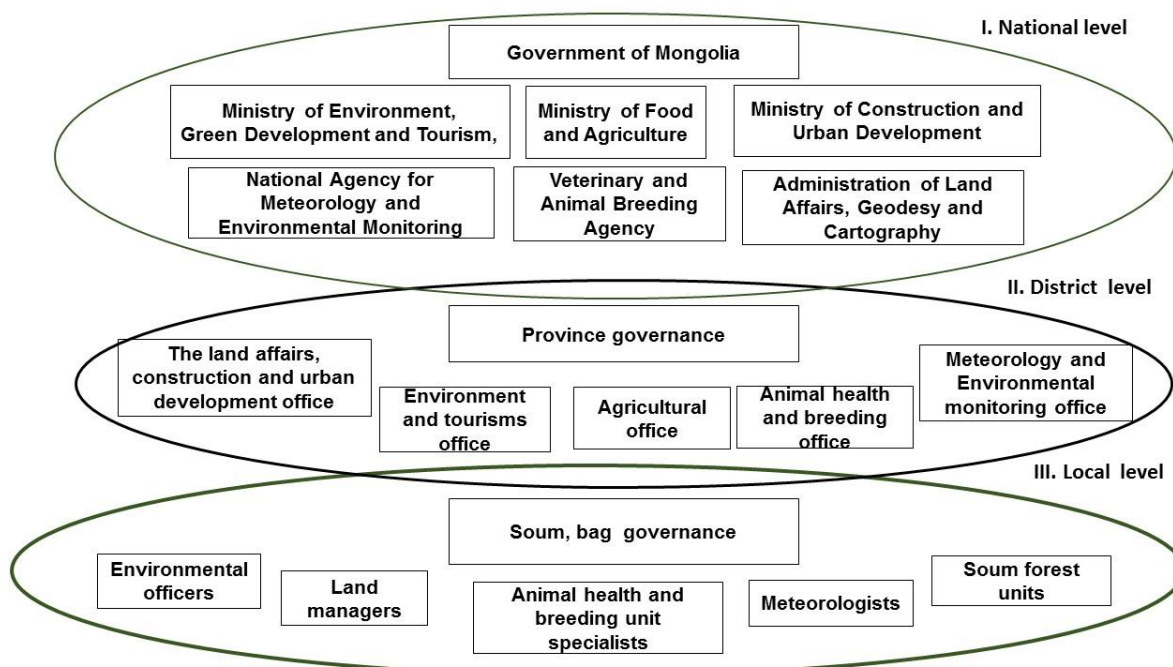


Figure 1. The rangeland governance system in Mongolia (Source: Government Resolution of Mongolia 2012).

Representatives from all these ministries are present at the grass-roots level, including the soum level, and have the task to report to their line ministries; however, collaboration and coordination among them is weak (Ministry of Food and Agriculture of Mongolia 2015).

The Mongolian government is just changing its land use planning strategy at the local level towards more active participation of users in all management stages; such as planning, enforcing and monitoring, based on the ecological potential of the area. As a start of this new program, pilot projects are already running in a certain number of soums representing different ecological regions (SDC 2012).

Traditionally, Mongolians have collectively managed their rangeland utilization through unofficial herder groups that shared the same areas. During the socialist times pre-1990, the herders were organized into collectives and all rangeland management decisions were made top-down. Furthermore, all livestock was state owned (World Bank 2003). After the transition from the socialist system to a free market system, the collectives collapsed and the ownership of the domestic animals was privatized. Due to a weak legal regulation where privately owned grazing animals could basically graze the state-owned rangelands uncontrolled, the land condition rapidly declined (World Bank 2003). In the current system, the herders do not pay fees for grazing their livestock on the rangelands (Fernandez-Gimenez & Batjav 2004). Rangelands are generally considered as interdependent systems of organisms with biological units such as soil, vegetation, fauna and human beings all supported by rangelands (Anderies et al 2004). Nevertheless, many Mongolian herders see the rangelands only as a source of forage for livestock but do not consider other resources and services that they provide (Ministry of Food and Agriculture of Mongolia 2015).

To design a proper management program for an open access rangeland system, it is essential to understand and describe the social ecological system (SES) within which it is embedded. An SES refers to the subset of social systems where interdependent relationships among humans are coordinated through interactions of biophysical and non-biological units (Anderies et al. 2004). It is generally seen that activities implemented by one herder may affect and even reduce other herders' income by further declining rangeland productivity (Jamsranjav 2009).

However, the application of the SES framework requires a logical approach that considers the interactions and outcomes related to a resource system and related units, the actors involved and the governance systems that influence the behaviour of the actors (McGinnis & Ostrom 2014).

The Mongolian government, with the support of several external donors, has initiated rangeland management programs that focus on supporting the local SES arrangements where the herders' cooperative efforts in a social system are promoted (MOR2 2015b). The herders that participate in such programs are expected to collaboratively manage rotational grazing systems and reduce grazing pressure where it is too intense. Furthermore, they are expected to develop an interest in investing resources for water points and hay field improvement in order to cope with diverse internal and external environmental disturbances such as heavy snow and drought (MOR2 2015b).

Mongolian communities that have participated in rangeland management programs for the last 16 years seem to have developed a social capacity to facilitate improved grazing management (MOR2 2015b). According to Baival (2012) the social capacity can be achieved if it is based within the community and if inhabitants develop existing cooperation with customary neighbourhoods. Such community-based management efforts offer structural arrangements that the society needs in order to stimulate constructive changes (Baival 2012). Although herder groups at the smaller community level are more focused on economic or market interests, the focus of the wider pasture user groups centralize more on rangeland management. Efforts are under way to review and strengthen the SES framework for Mongolian rangelands with the goal of enhancing data collection. The focus will in particular be on the processes that are affecting the sustainability of forests, pastures and water systems (Ulambayar et al. 2015).

So far, community-based rangeland management (CBRM) has been established in 20 regions of Mongolia with the support of donor programs. This approach has already facilitated several

positive social-ecological changes within the regions where it has been implemented. For instance, the CBRM approach has increased trust and provided better access for the herders to the advisory system and decreased grazing pressure in some cases (MOR2 2015b). Nevertheless, only the regions that are defined as highly dependent on rangeland utilization are eligible for participation in the aforementioned donor project. That excludes areas such as Khongor soum in Darkhan, which is defined as an agricultural zone for cultivation even though half of its territory is comprised by rangelands.

1.3 Statement of the problem

Khongor soum has the advantages of better access to market and better environmental conditions compared to other Mongolian districts. This has intensified the migration of herder families from the western aimags, e.g. Uvs, Zavhan, and Hovd, to Khongor soum. That especially happens after harsh winters such as Zud (Bataa 2015). According to the World Bank (2003), the western aimags are considered to be the poorest regions of Mongolia, with harsher climatic conditions and are more remote from the capital city than the other aimags of the country.

Sometimes cultural differences trigger conflicts between newcomers and the local community concerning, for instance, the utilization of natural resources and challenges related to equitable service provision in health and education. Furthermore, as Khongor soum has more fertile soil and a more favourable precipitation distribution on average than other regions of Mongolia (Agency of Land Affair, Geodesy and Cartography 2009). The population size is increasing, thus accelerating environmental degradation due to the continuous, high pressure exerted on natural resources.

According to the National Report on Rangeland Health of Mongolia (2015), the rangelands within Khongor soum have a potential of recovery in the range of 0 – 50% (an indication of severe degradation) compared to the rest of the areas in the country (Fig. 2).

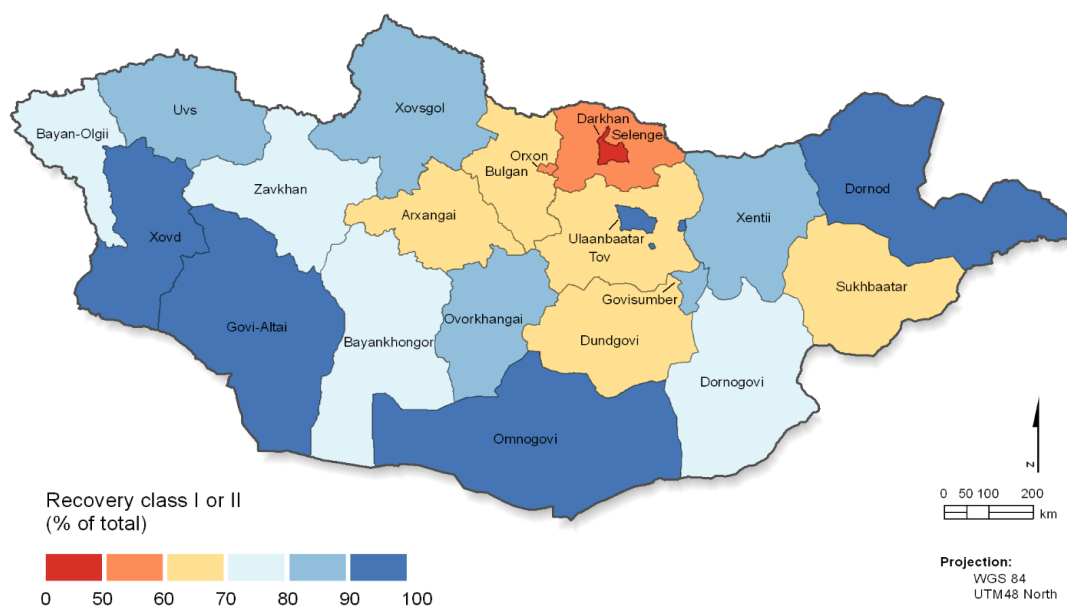


Figure 2. The percent of total monitoring sites within each aimag classified as Recovery Class I or II. Redder colors indicate a higher percentage of highly degraded sites requiring extended recovery time (Source: Ministry of Food and Agriculture of Mongolia 2015).

Over 50% of Khongor soum's population are herders whose life directly depends on rangeland utilization. The profitability of a multiple land use system in Khongor soum for crop farmers and mining companies to increase their profits by expanding the crop fields and mining area conflicts with the herders' perspective of maintaining their livelihoods through increasing their livestock numbers (Agency of Land Affairs, Geodesy and Cartography 2009).

1.4 Importance of the study

The current rangeland management system in Khongor soum needs to be improved. As the soum is defined as a crop production area it doesn't qualify for participating in an official specific rangeland management program. Nevertheless, due to the increased number of herders and domestic livestock in the last several decades, the current grazing pressure is foreseen to increase further in the coming years and accelerate rangeland degradation processes. Without a well-managed rotational grazing system, the grazing pressure might result in ecological collapse of the rangelands, in particular in the most densely grazed areas.

1.5 Objective

To analyse the perceptions of herders who are direct beneficiaries of rangelands and the perception of key officials working in the local governance system related to rangeland management towards: a) the current rangeland condition, b) the need for improving rangeland condition, c) the need for improving the existing grazing management practices, and d) the interest of the participants to being involved in management and decision making processes.

1.6 Research questions

Are the herders and the local officials aware of the decline in rangeland quality?

What are the main conflicts between herders and other stakeholders concerning land use?

Do the herders want to participate in formal herder groups to collaboratively manage rangeland exploitation?

Do the local officials support the idea of establishing formal herder groups that would actively contribute to user-based rangeland management?

2 METHODS

2.1 Study area description

Khongor soum in Darkhan-Uul aimag is in northern Mongolia. It is located 25 km from Darkhan-Uul aimag (the second biggest city in Mongolia). Khongor soum is part of the Mongolian forest steppe ecological zone 700-1500 m.a.s.l. It is in the eastern valley of the Kharaa river with large fertile lowland plains and forested hills and mountains. The winters in that area are long and harsh but the summers are warm and dry (Shagdar 1969).

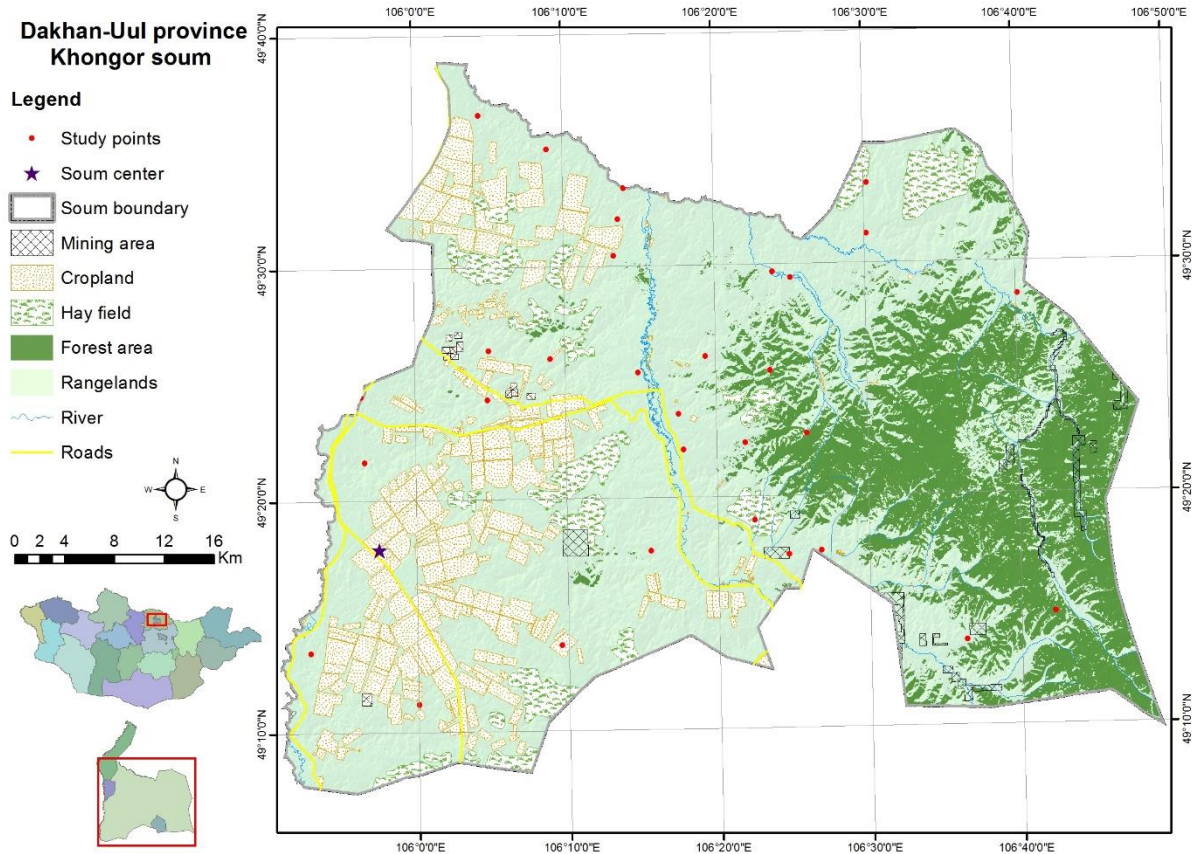


Figure 3. The study area, location and land use type (Binderiya, Mongolian University of Life Sciences Darkhan-Uul, 2015)

During the socialist period, Khongor soum was one of the four largest collective crop farms in Mongolia. It was established in 1958 under the first period of soil cultivation in Mongolia. The soum was the main provider of wheat within the country with large fields of cultivated lands. After the collapse of the socialist system in 1990, all collective farms were privatized, including the one in Khongor soum (World Bank 2003). Due to the small size of private companies that did not have the technical or financial capacity needed to continue wheat cropping as it was practiced before the collapse, thousands of hectares of croplands were abandoned and Mongolia started to import its wheat flour. As the result of a government program since 2008 aimed at supporting and subsidizing the crop sector, the technical and financial capacity of agricultural companies has improved substantially and all previously abandoned areas are again utilized for crop production (Mongolian Government 2009). In 2015, 45 entities planted crops on 17,000 ha of Khongor soum's total 31,700 ha of agricultural land (Land Affairs, Construction and Urban Development Office 2015). Since 2000, as the result of technological weaknesses such as old equipment and techniques, approximately 6000 ha of land in the Khongor soum area were eroded by crop production and increased desertification (Land Affairs, Construction and Urban Development Office 2012).

Although Khongor soum is defined as an agricultural area by the Mongolian government (Mongolian Government 2005) over 50% of its territory is classified as rangeland. Around 28% of the total area is classified as forest and 12% as cropland. Only 2% of Khongor soum is classified as mining areas (Table 1).

Table 1. Land use classification for Khongor soum in 2015 showing land use type and area size (hectares and %)

Land use	Area/ha	Size (%)
Rangelands	137.9	52
Hay field	6.9	3
Cropland	31.7	12
Road power lines	3.6	1
Forest area	70.7	27
Mining	4.8	2
Rural area	5.7	2
State special consumption area	2.6	1
Total area	263,9	100

(Source: Land Affairs, Construction and Urban Development Office Darkhan-Uul, 2015)

The total population of Khongor is 6,105 inhabitants and over 3000 of them are members of a herder family. Only 120 inhabitants are cropland farmers. Nevertheless, 12% of the land is utilized for crop production (Table 2).

Table 2. Population development in Khongor soum from 2012-2015, emphasizing the number of herders, herder families and cropland farmers.

Year	Total population	Herders	Herders family	Cropland farmers
2012	5,693	774	2,587	118
2013	5,759	782	2,619	118
2014	6,101	803	3,203	120
2015	6,105	960	3,264	120

(Source: National Statistical Office of Mongolia, 2015)

Administratively, Khongor soum has three baghs, Salkhit, Buural and Zulzaga (National Statistical Office of Mongolia, 2015). Most of the population in Salkhit bagh are railway workers due to the railway station which lies in the bagh’s territory. The main railway and highway of Mongolia from the Russian border to the Chinese border through the country runs across Khongor soum, resulting in a better infrastructure for health, education and services. In Zulzaga bagh there are multiple land use systems covering animal husbandry, crop land, mining, community-based forest management, and tourism. Buural bagh covers a soum centre where a school, kindergarten, health and service facilities with centrally managed energy, heating and sewage system are located (Fig. 4).

During the summer, most of the herders live in the river basin; however, animals stray to neighbouring croplands and often destroy the crops. That sometimes triggers conflicts between the herders and the crop farmers (Agency of Land Affairs, Geodesy and Cartography 2009). The herders located far from major towns face a challenge when it comes to marketing their animal products. As a result, larger numbers of herders choose to live closer to the main urban dwellings during the summer in order to facilitate the marketing of their animal products. That has led to the development of herders’ clusters near the urban areas with the following overexploitation of the closest grazing areas (Bataa 2015).

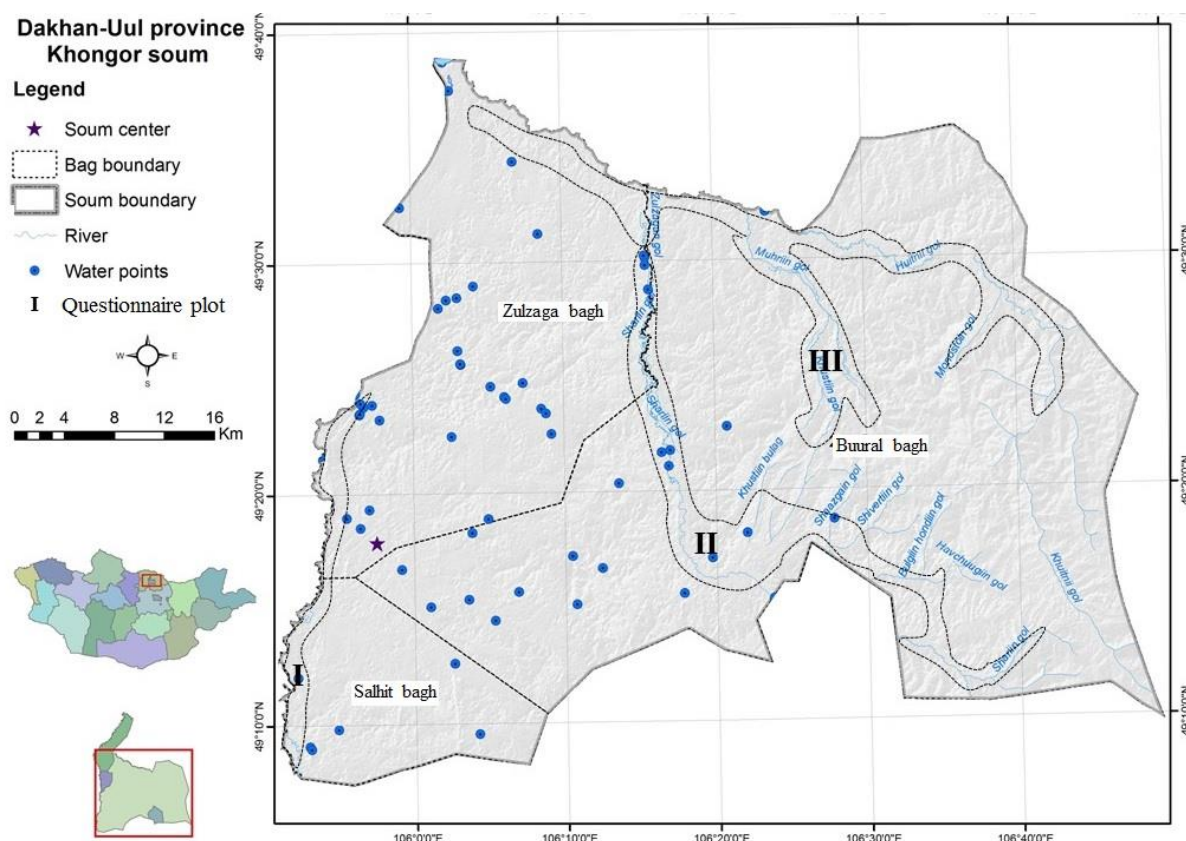


Figure 4. The study area Khongor soum, bagh boundaries and questionnaire plot (Binderiya, Mongolian University of Life Sciences in Darkhan-Uul, 2016)

According to the local government regulation, during the cropping season, from May 25th to September 25th, the herders are required to leave the cultivated areas and settle instead around river basins. Although most of the herders comply with these regulations (in particular herders with smaller livestock - like sheep and goats), some of the owners of larger animals (like horses and cattle which are normally left on free range) continue to roam their livestock within the cropping area. Hence, these herders create a situation that potentially triggers conflicts with the crop farmers.

In recent years, some herders have started to graze their livestock in the forests. This has caused the destruction of forests and led to conflict with the forestry department. Although it is prohibited to make hay in forested areas or to harvest or graze on afforested areas without explicit permission (Mongolian Law on Forest 2012), the herders continue these activities.

According to provisions of the agricultural policy, farmers are expected to build a fence around each crop field to protect their crops from foraging animals. This is not done, however, due to high costs. Thus, the crop fields are left unfenced and livestock stray into them.

During the last 4 years the total livestock numbers in Khongor soum grew from 125,514 to 170,658 (> 74%). The goat population increased by 76% and the sheep population by 74% (Table 3).

Table 3. The development of livestock numbers in Khongor soum from 2012-2015

Year	Total livestock	Sheep	Goat	Cattle	Horse	Camel
2012	125514	70874	37571	11611	5455	3
2013	127535	73812	35455	12535	5607	0
2014	172794	97633	49465	18090	7600	6
2015	170658	95996	49256	17813	7587	6

(Source: National Statistical Office of Mongolia, 2015)

2.2 Data collection methods

A survey was conducted in three pre-selected herders' summer camp areas within Khongor soum of Mongolia in July 2016. In the survey, 99 herders and 7 government officials were asked to answer a questionnaire on rangeland management. The questionnaire was administered by NGO staff working at the Environmental Research Centre in Darkhan-Uul aimag. Khongor soum has officials working in the areas of environmental inspection, animal husbandry, climate, land management and forestry. Grazing management in Khongor soum is managed by the soum governors through an assembly that is mandated to make decisions which are implemented in the field by the professional staff of the soum. The officials that were invited to participate in the survey were all identified as key persons within the soum government, working closely with the herders (Table 4).

Table 4. Position, role and gender (f = female; m = male) of the governmental officials that participated in the survey

Official position	Role	Gender
Soum Citizens' Representative Meeting member	Soum level decision making on rangeland management	m
Bagh Citizens' Representative Meeting member	Bagh level decision making on rangeland management	f
Land manager	Soum rangeland management planning, presenting the plan to Soum Citizens Parliament, and land management impact monitoring	f
Rangeland specialist	RM implementation; forage supply, rotational grazing; improvement of water points	m
Forest specialist	Forest management, forest restoration	f
1st Bagh governor	Implementation of Bagh Citizen's Parliament decisions	m
2nd Bagh governor		m

The survey was composed of four main categories: category 1 assessed the attitude of participants towards state of current rangeland health; category 2 assessed their perception of current rangeland management practices; category 3 assessed the approach of participants concerning rangeland management strategy; and category 4 assessed issues related to potential conflicts between various users of natural resources. The survey consisted of main questions followed by sub-questions. In total 54 questions were administered. The questionnaire was developed following a Likert scale (Vagias 2006) to give participants the opportunity to express how much they agreed or disagreed with the given statements.

2.3 Data analysis

Data were compiled to make summaries that were entered onto spreadsheets (Excel). Descriptive statistics were used to analyse the data; the data were presented in tables for ease in drawing conclusions. A Wilcoxon-Mann-Whitney non-parametric test (Dytham 2011) was used to compare the perception of herders of different origins like a local who immigrated before 1990 or immigrated after 1990, and by gender. The view of the herders and the government officials and herders' views were also compared.

3 RESULTS

In total 99 herders participated in the survey; 90% of them had finished basic education, 1% had finished high school or a diploma degree, and 9% had finished a university degree. The data analysis revealed no significant difference in replies from the herders that participated in the survey when tested against gender or time of migration. The herders shared in all cases the same opinions and were highly in favour of being part of formal herder groups to improve rangeland management within Khongor soum.

Close to 50% of the herders migrated to Khongor soum from other 17 aimags across Mongolia, with 62% of the migrating herders (Table 5) from the western aimags.

Table 5. A summary showing for how long each herder had lived in Khongor soum.

Status of herders	Herders (number)	Percent
Local herders	27	27
Herders immigrated before 1990	23	24
Herders immigrated after 1990	49	49

More than 70% of the herders owned less than 200 animals each and only 3% of them owned more than 1000 animals each (Table 6).

Table 6. A summary showing the livestock population size of each herder.

Livestock (number)	Herders (number)	Percent
< 200	73	74
201-500	17	17
501-1000	6	6
More than 1001	3	3

3.1 State of rangeland health

Close to 90% of the herders and the officials stated that rangelands are an important source of livelihood for herders (Table 7).

More than 65% of the herders agreed that the summer grazing rangelands were in good condition for livestock grazing (Table 7). Nevertheless, the Wilcoxon test revealed a significant difference between the herders' opinions based on whether they were born in Khongor soum or migrated there before 1990 and those who migrated there after 1990 ($p=0.03$). The herders who

had lived in Khongor the shortest time felt that the summer grazing rangeland was in worse condition than the other two groups thought. Over 85% of all the herders and the officials agreed that the summer grazing rangelands were partially degraded (Table 7). Close to 60% of the herders and 14% of the government officials considered the winter pasture in good condition, while a relatively higher proportion of them or 90% of the herders and 71% of the officials agreed that the winter grazing rangelands were partially degraded.

Table 7. Participants’ views on the current state of rangeland health: The relative ranking (%) of respondents’ attitudes towards the state of rangeland health. Those who neither agreed nor disagreed have been excluded. The anticipated and the observed outcome of each question is symbolized with A (Agree) or D (Disagree).

Attitude towards state of current rangeland health	Herders		Governance	
	A	D	A	D
1) Rangelands are important source of herder’s livelihood	98	2	86	0
2) The summer grazing rangelands are:				
^{a)} in general, in good condition for livestock grazing	67	24	29	57
^{b)} partially degraded	90	4	86	0
3) The winter grazing rangelands are:				
^{a)} in general, in good condition for livestock grazing	58	28	14	43
^{b)} partially degraded	90	5	71	0
4) Increased size of croplands has enhanced rangeland degradation	86	10	100	0
5) Rangeland degradation due to mining activities is an issue	86	5	57	14
6) Rangeland degradation due to overgrazing in summer is an issue	96	1	86	14
7) Rangeland degradation due to overgrazing in winter is an issue	91	4	100	0
8) The current grazing pressure in summer is acceptable	94	3	100	0
9) The current grazing pressure in winter is acceptable	92	4	71	0
10) Herders have to depend on additional forage for their livestock during winter	85	7	57	14

3.2 Rangeland management practices

More than 55% of the herders stated that the summer grazing of rangeland is managed in a sustainable way, but one third of them disagreed. Roughly 40% of the officials agreed to the statement, but more than half of them disagreed (Table 8). Roughly 60% of the herders stated the winter grazing rangelands were managed in a sustainable way, but one quarter of them disagreed. Roughly 40% of the officials supported the statement, whereas roughly 40% of them disagreed (Table 8).

Close to 90 % of the herders and about 70% of the officials agreed that those rangelands in forested areas were important for summer grazing. More than 80% of the herders and 57% of the officials agreed that rangeland in forested areas were important for winter grazing; nevertheless, roughly 40% of governmental officials disagreed.

More than 80% of the herders and the officials considered rangeland in forested areas to be of importance for hay making.

Over 70% of the herders stated that they carried out rotational rangeland grazing, but one quarter of them stated they did not. Only 10% of the officials agreed with the statement, but

close to 70% of them claimed the herders were not practicing rotational rangeland grazing. More than 90% of the herders and all the officials agreed that the main driver of rangeland degradation was the year round grazing with no or little rotation and that herders should play a key role in rangeland management (Table 8).

Close to 91% of the herders and all the officials agreed that it would be important to involve herders much more strongly in rangeland management processes, such as in the planning phase, in implementing selected management practices and in monitoring rangeland condition. Furthermore, the Wilcoxon test revealed a significant difference between the herders' opinions based on whether they were born in Khongor soum or migrated there before 1990 and those who migrated there after 1990 ($p=0.03$).

Over 60% of the herders supported the idea that a grazing fee should be introduced but close to 30% of them disagreed. More than 86% of the officials agreed that rangeland management should be based on a grazing fee (Table 8).

Table 8. Herders' perceptions about the current rangeland management practices. The relative ranking (%) of respondents' attitudes towards current rangeland management practices. Those who neither agreed nor disagreed are excluded. The anticipated and the observed outcome of each question is symbolized with A (Agree) or D (Disagree).

Attitude towards current rangeland management practices	Herders		Governance	
	A	D	A	D
11) Rangeland grazing in summer is managed in a sustainable way	58	34	43	57
12) Rangeland grazing in winter is managed in a sustainable way	63	26	43	43
13) Rangelands in forested areas are important for:				
a) Summer grazing	89	4	71	14
b) Winter grazing	84	8	57	43
c) Hay making	84	5	86	14
d) Only under harsh climate condition (such as during Zud winters)	91	3	86	14
14) Herders perform rotational grazing in the rangelands	72	22	14	71
15) Herders can collaboratively develop the grazing plan	91	3	100	0
16) Sustainable rangeland management should base on:				
a) Local government should have stronger regulations at the soum level than currently exists.	91	7	100	0
b) Grazing fee should be introduced	64	31	86	14
c) Herders should play a key role in rangeland management practices.	97	1	100	0
17) Main drivers of rangeland degradation are:				
a) Weak grazing regulations by the national government	88	4	71	14
b) Communal ownership of rangeland	83	11	71	0
c) Increase in livestock numbers	79	13	86	0
d) All year grazing with no or little rotation	93	3	100	0
e) Land tenure (where land is government owned) that promotes open access	74	16	57	0

3.3 Rangeland management strategy

Around 90% of both the herders and the officials agreed that livestock grazing on rangelands should be managed by local herders' groups. Over 80% of the herders and the government officials agreed that when herders were organized in groups, it would be easier to regulate livestock numbers. More than 90% of the herders and 70% of the government officials agreed to the statement that when herders are organized in groups they can more effectively monitor rangeland condition (Table 9).

Table 9. Management strategy and associated benefits. The relative ranking (%) of respondents' attitudes towards the state of rangeland health. Those who neither agreed nor disagreed are excluded. The anticipated and the observed outcome of each question is symbolized with A (Agree) or D (Disagree).

Attitude towards rangeland management strategy	Herders		Governance	
	A	D	A	D
18) Livestock grazing on rangelands should be managed by local herders' groups	98	1	86	0
19) I would support herder groups participation in rangeland improvement	92	3	86	14
20) What could be the advantages of being a herder group member:				
a) More opportunities for labour sharing	91	1	100	0
b) Better rangeland management	94	0	71	0
c) Better herd management	96	0	71	14
d) Time saving	93	1	100	0
e) Cost saving	89	2	100	0
21) What could be the disadvantages of being a herder group member:				
a) Being responsible for others	68	18	43	14
b) Time consuming	68	19	14	29
c) Group decisions might undervalue my individual interest	76	13	57	14
22) When herders are organized in groups, it will be possible to regulate livestock numbers	86	9	86	0
23) When herders are organized in groups, they can effectively monitor rangeland conditions.	94	2	71	0
24) When herders are organized in groups, they can effectively assess the grazing management impact.	93	2	71	0

3.4 Conflicts between different stakeholder groups

More than 90% of the herders and close to 70% of the officials stated that grazing areas have been reduced in size due to cropland farming; 80% of herders and 71% of government officials agreed crops were damaged by animals (Table 10). Close to 90% of the herders and about 60% of the officials stated that grazing areas have been reduced in size due to mining activities. Nevertheless, one-third of the officials disagreed with the statement. More than 80% of the herders and the officials claimed that herders' camps were lost due to mining activities.

Table 10. Potential reasons for conflict between herders and other stakeholders. The relative ranking (%) of respondents' attitude towards state of rangeland health. Those who neither agreed nor disagreed are excluded. The anticipated and the observed outcome of each question is symbolized with A (Agree) or D (Disagree).

Attitude towards conflict amongst different stakeholders	Herders		Governance	
	A	D	A	D
25) Advantages of being a herder in active cropland area:				
a) Better access to additional forage	76	17	57	14
b) Able to graze in cropland after harvesting	79	19	71	14
c) Better access to market	83	11	43	14
26) Challenges of being a herder in active cropland area:				
a) Grazing land conflicts	87	8	71	14
b) Lack of summer pasture	92	4	57	14
27) What are the perceived conflicts between herders and farmers?				
a) Grazing area reduction due to cropping	92	4	71	14
b) Crops damage by animals	80	18	71	14
28) What are the perceived conflicts between herders and mining sector?				
a) Grazing area reduction due to mining activities	87	6	57	29
b) Animals loss to poisoning from mining activities	87	5	86	14
c) Camps are lost due to mining activities.	85	10	86	0
29) Herders participate in local decision making through:				
a) Bagh citizens meeting	74	12	86	0
b) Face-to-face meeting with decision makers	69	15	57	14
c) Through media	69	1	43	14

4 DISCUSSION

According to a World Bank report on Mongolia (2003), herder families are categorized depending on the number of animals they own. A herder family is considered poor if their animals number less than 200; middle level if the animals number between 201-500; rich if they have 501-1000 animals; and wealthy if they have more than 1001 animals. According to our survey in Khongor soum, 74% of the herders that participated in the survey would be defined as poor as they own less than 200 animals (Table 6). That finding is in line with the statement that poverty consistently remains widespread among herder families in Mongolia and the herders' annual income is below the national poverty line (MOR2 2015b).

4.1 State of rangeland health

Livestock herding is an important practice of the Mongolian nomadic culture (ADB 2014) and still remains as a main source of herders' livelihood as in ancient times (Sodnomdarjaa 2011). In the beginning of the Green Gold project in 2004, many herders, and decision makers as well, claimed that rangeland degradation in Mongolia was driven by global warming and lack of precipitation (Green Gold 2005). According to the desertification map of Mongolia from 2012 the southern part of Mongolia is affected by desertification (Institute of Geocology, Mongolian Academy of Sciences 2013). That drove a misunderstanding among people that the sparsely vegetated scrubland area in Gobi was in a poor ecological condition due to heavy degradation, while the ecosystems in the north, the forest steppe, for instance, was still seen as being at a healthy level because of its high biomass production. But in reality the forest steppe is also

affected by serious degradation problems, where palatable and valuable species have been replaced by unpalatable, invasive species (Densambuu et al. 2013).

Herders and government officials in Khongor soum all agreed that rangeland degradation evidence and high grazing pressure or overstocking was in their opinion the main factor causing the degradation. According to the National Report on Rangeland Health of Mongolia (2015), the rangelands within Khongor soum have a potential of recovery in the range of 0 – 50% (an indication of severe degradation) compared to the rest of the areas in the country.

The current situation of herders' awareness and acceptance about the current rangeland degradation and logical understanding of the main causes provide a promising strong platform for making management changes to improve the situation.

Livestock numbers in Khongor soum have increased by 74% since 2012 while, parallel to that, the rangeland areas have been reduced in size by 427,4 ha (Land Affairs, Construction and Urban Development Office of Darkhan-Uul aimag 2015).

Reports on rangeland production and quality decline (Ministry of Food and Agriculture of Mongolia 2015), replacement of palatable species (Bataa 2015) and also the high grazing pressures (Agency of Land Affairs, Geodesy and Cartography 2009) are in line with the perception of herders and local government officials in Khongor soum.

Increased understanding of rangeland conditions among herders in Khongor soum and the perceived positive attitude or willingness to make changes and find a good way to solve the problem might be a result of the current situation of intensive growth of animal numbers and a reduction in grazing land and also the geographical features located in the centre of the cropland region.

4.2 Rangeland management practices

The challenge that may arise in the near future is with adjusting stocking numbers; according to this survey the herders think that the current stocking rates are acceptable but at the same time they claim that the rangelands are in a degraded state. These contradictory views need sound regulations and technological recommendations to maintain adequate number of livestock in Khongor soum. For all the factors that have been pointed out as the drivers of rangeland degradation, management options can be planned as, according to the survey, the herders were positive toward the establishment of herder groups, paying a grazing fee and to be more closely engaged in decision making.

The governmental officials claimed that the herders can get higher economic benefits by applying proper rangeland management through formal herder groups. The herders can be involved in effective monitoring, regulation, rangeland assessment and general grazing management. Governmental supports such as policy regulation to legitimize the herders' primary user right and a well-targeted subsidy system could play key roles in successful management practices.

4.3 Rangeland management strategy

According to Ulambayar et al.'s (2015) studies on community-based rangeland management (CBRM) in Mongolia, many CBRM strategies are adequately fostering social outcomes of pastoral groups. However, building social capital and attaining livelihood improvement may require time and significant changes, and this often comes slowly. The CBRM programme in Mongolia, if fully developed and passed to other communities abroad, may encourage pastoral communities to cooperate and work for sustainable management of their resources. This could be achieved with careful facilitation and logical consideration of the dynamics of the local resource systems under consideration in order to achieve increased social outcomes (Ulambayar 2015).

According to the herders' perception of the current practices of rangeland management, rangeland grazing can be sustainable when the herders are fully involved in rotational grazing, even though the government regulated the herders. Increased livestock numbers and communal ownership of rangelands have been pointed out as a cause of degradation.

According to a study on rangeland management effectiveness based on local community based management groups in Mongolia, the herder groups can contribute to ensure rangeland health. However, in order to further strengthen this approach, it is better to have co-management with these organized herders' groups (Reid et al. 2015). Although the goal that the herders should play key roles in the management of rangelands is good, a regulatory role by the local government (a view that is also agreed by the herders) should accompany any efforts made by the herders. The government officials believed that the herders are incapable of managing the rangelands sufficiently well, both in the winter and summer. The government officials also doubt the ability of herders to organize rotational grazing, given the current situation. According to Ulambayar et al. (2015), when herders' groups are well organized and supported, especially on information exchange, development of rules and resource usage, the herders' groups can help contribute to the improved health of rangelands.

One other measure that has been supported by herders as one way of sustainable management of rangelands is the introduction of grazing fees. This can be a good alternative but it requires better leadership so that the fees paid by herders can be used to improve rangeland condition (Ulambayar et al. 2015). It therefore remains as a task for the government officials to organize the herders if sustainable pasture management is to be achieved. The choice of grazing fee is an option that is positively looked on by the professionals.

The present situation of Mongolia with intensive growth of livestock numbers and high grazing pressure on common rangelands is a classic example of the "Common pool tragedy" of Hardin (1968). Herders are looking for a way to increase their family income and the present way to grow the animals on public rangeland for free is the most advantageous for them. The herders realize and agree with the negative impact of overgrazing and that overstocking causes the degradation, but this practice is, nevertheless, the only way to improve their livelihood. Another thing that motivates the herders to continue to increase the number of livestock is that the profit from the livestock production is realized per herder while the negative impacts of overgrazing are shared by all herders.

According to our survey, the perceptions of the local government officials and the herders indicated that there is a positive and strong platform in place within Khongor soum for the most

efficient and economically sound management of natural resources built on Ostrom's (2009) concept of a self-regulation system by local users.

4.4 Conflicts between different stakeholder groups

The herders claimed that grazing of forest areas was important to their livestock. This is in contradiction to the current laws meant to ensure forest conservation, as in earlier times; livestock have caused destruction of forest vegetation. The herders considered rangelands in forested areas as generally important for grazing both in the summer and winter and also for hay making. There has been a negative impact on the biodiversity in forest ecosystems; several herders who live next to the forest areas take their animals to the forests, which has destroyed the bark of the trees. Currently, Khongor has more than 60 legal forest user groups with 1200 members; 800 of these members are herders. Herders prepare hay and graze their livestock in the forest. In addition, goats and sheep climb up to trees and eat their bark. Trees severely damaged by the animals usually die within two years. Although it is prohibited to make hay in the forest land without explicit permission, and to harvest or graze on afforested areas (Mongolian Law on Forest 2012), the herders have continued to do so.

Even if the herders improved the grazing management of rangelands, the existing conflicts between them and the mining companies and crop farmers may be a challenge that could be difficult to address. Combined efforts involving political leaders and all the stakeholders engaged in these conflicts should be initiated. These efforts should focus on ensuring that the actions of one stakeholder should not affect the others and so they should live in peace. However, according to the findings presented in this report, it is clearly seen that herders are mostly affected by the activities of crop farmers and mining companies. Even though there are conflicts between individual herders and between herders and crop farmers, it might be an opportunity to bring herders and crop farmers together to discuss how they can cooperate to reduce friction among themselves. These conflicts can be addressed when these stakeholders come together. According to the new cropland law (2016), only intensive farming can operate within cropland areas. That potentially brings in deeper conflicts between the herders and the cropland farmers, especially because intensive or semi-intensive cattle farms can operate within the region, whereas sheep and goat herding cannot. The law has not yet been validated, but herders should be prepared for it.

Conflicts between herders and mining companies are reported in active mining areas such as Umnugobi, Gobi Altai and other western aimags. For example, mining workers who settled with their families in those areas started to have some livestock. They then increased their livestock numbers as an alternative source of income. This caused conflicts with local herders (UNDP 2016). Another type of conflicts also come up due to the negative environmental impacts of mining, such as dust from mining roads and poisonous pollution such as cyanide, which causes trouble for animals (QGX 2016). To overcome these conflicts, the policy regulation supporting legitimization of the primary users' rights and their ownership will be crucial.

5 CONCLUSIONS

According to the communal survey, herders and a local official in Khongor soum are aware of the current situation of rangeland health and the need to carry out interventions to sustain the rangeland ecosystem services and prevent shifts toward a further undesirable regime.

Even so, growth in livestock numbers is the only way at present to improve herders' livelihood. As the survey clearly showed, herders are positive toward the establishment of herder groups to collectively manage the grazing area, paying grazing fees and being more closely engaged in decision making that will build the users' ownership.

The survey showed a strong positive indication that there is a positive and strong platform in place within Khongor soum for the most efficient and economically sound management of natural resources built on Ostrom's (2009) concept of a self-regulation system of local users. This communal survey results will be used as an entry point for planning a herders' engagement program for a user-based rangeland management approach in Khongor soum.

Governmental support such as policy regulation to legitimize the herders' primary user right and a well-targeted subsidy system are essential for successful management practices based on user needs.

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APPENDIX

RESEARCH QUESTIONNAIRE

Khongor soum is typical in having a multiple land use system such as rangeland, cropland, forestry and mining. Due to having a multiple land use system there are many conflicts related to land degradation, conflicts between different land users and low income.

The objective of my research project is to develop management recommendations based on the investigation of the local community's perception of the state of rangeland health, current management practices, and needs and measures to improve it.

BACKGROUND INFORMATION

A. Your:

Age: Sex: Education:

B. When did you arrive in Khongor soum?

- a. Local
- b. Immigrated before 1990
- c. Immigrated after 1990

C. What aimag are you from before being in Khongor soum?

D. Number of animals at presently owned?

- a. < 200
- b. 201-500
- c. 501-1000
- d. Higher than 1001

A. STATE OF RANGELAND HEALTH

1. Mongolian rangelands are an important source of livelihood

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

2. The summer grazing rangelands of Khongor Soum are

a. In general, in good condition for livestock grazing

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

b. Partially degraded

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

3. The winter grazing rangelands of Khongor Soum are

a. In general, in good condition for livestock grazing

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

b. Partially degraded

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

4. Increased size of croplands has enhanced rangeland degradation

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

5. Rangeland degradation due to mining activities is an issue

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

6. Rangeland degradation due to overgrazing in summer is an issue

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

7. Rangeland degradation due to overgrazing in winter is an issue

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

8. The current grazing pressure in summer is acceptable

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

9. The current grazing pressure in winter is acceptable

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

10. Herders have to depend on additional forage for their livestock during winter

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

B. RANGELAND MANAGEMENT

11. Rangeland grazing in summer is managed in a sustainable way

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

12. Rangeland grazing in winter is managed in a sustainable way

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

13. Rangelands in forested areas are important for

a. Summer grazing

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

b. Winter grazing

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

c. Hay making

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

d. Only under harsh climate conditions (such as during Zud winters)

Strongly disagree
 Disagree
 Neither agree or disagree
 Agree
 Strongly agree

14. Herders perform rotational grazing in the rangelands

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

15. Herders can collaboratively develop the grazing plan

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

16. Sustainable rangeland management should be based on:

a. Local government should have stronger regulation at the soum level than currently exists.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Grazing fees should be introduced

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Herders should play a key role in rangeland management practices.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

17. Main drivers of rangeland degradation are:

a. Weak grazing regulation by the national government

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Communal ownership of rangeland

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Increase in livestock numbers

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

d. All year round grazing with no or little rotational grazing

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

e. Land tenure (where land is government owned) that promotes open access

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

C. RANGELAND MANAGEMENT STRATEGY

18. Livestock grazing on rangelands should be managed by local herders' groups

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

19. I would like to become a member of such a herders' group

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

20. What could be the advantages of being a herder group member?

a. Opportunities for labour sharing

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Better rangeland management

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Better herd management

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

d. Time saving

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

e. Cost saving

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

21. What could be the disadvantages of being a herder group member?

a. Being responsible for others

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Time consuming

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Group decisions might undervalue my individual interest

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

22. When herders are organized in groups, it will be possible to regulate livestock numbers

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

23. When herders are organized in groups, they can effectively monitor rangeland conditions.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

24. When herders are organized in groups, they can effectively assess the grazing management impact.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

D. POTENTIAL CONFLICTS BETWEEN VARIOUS USERS OF NATURAL RESOURCES

25. Advantages of being a herder in active cropland area.

a. Better access to additional forage

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Able to graze in cropland after harvesting

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Better access to market

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

26. Challenges of being a herder in active cropland area.

a. Grazing land conflicts

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Lack of summer pasture

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

27. What are the perceived conflicts between herders and farmers?

a. Grazing area reduction due to cropping

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Crop damage by animals

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

28. What are the perceived conflicts between herders and the mining sector?

a. Grazing area reduction due to mining activities

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Animals loss to poisoning from mining activities

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

c. Camps are lost due to mining activities

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

29. Herders participate in local decision making through

a. Bagh citizens meeting

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

b. Face-to-face meeting with decision makers

Strongly disagree

Disagree

Neither agree or disagree

Agree

Strongly agree

c. Through media

Strongly disagree

Disagree

Neither agree or disagree

Agree

Strongly agree

Thank you very much for your time and honest answers.
This study will be a great contribution to building up a sustainable rangeland management
program for Khongor soum.