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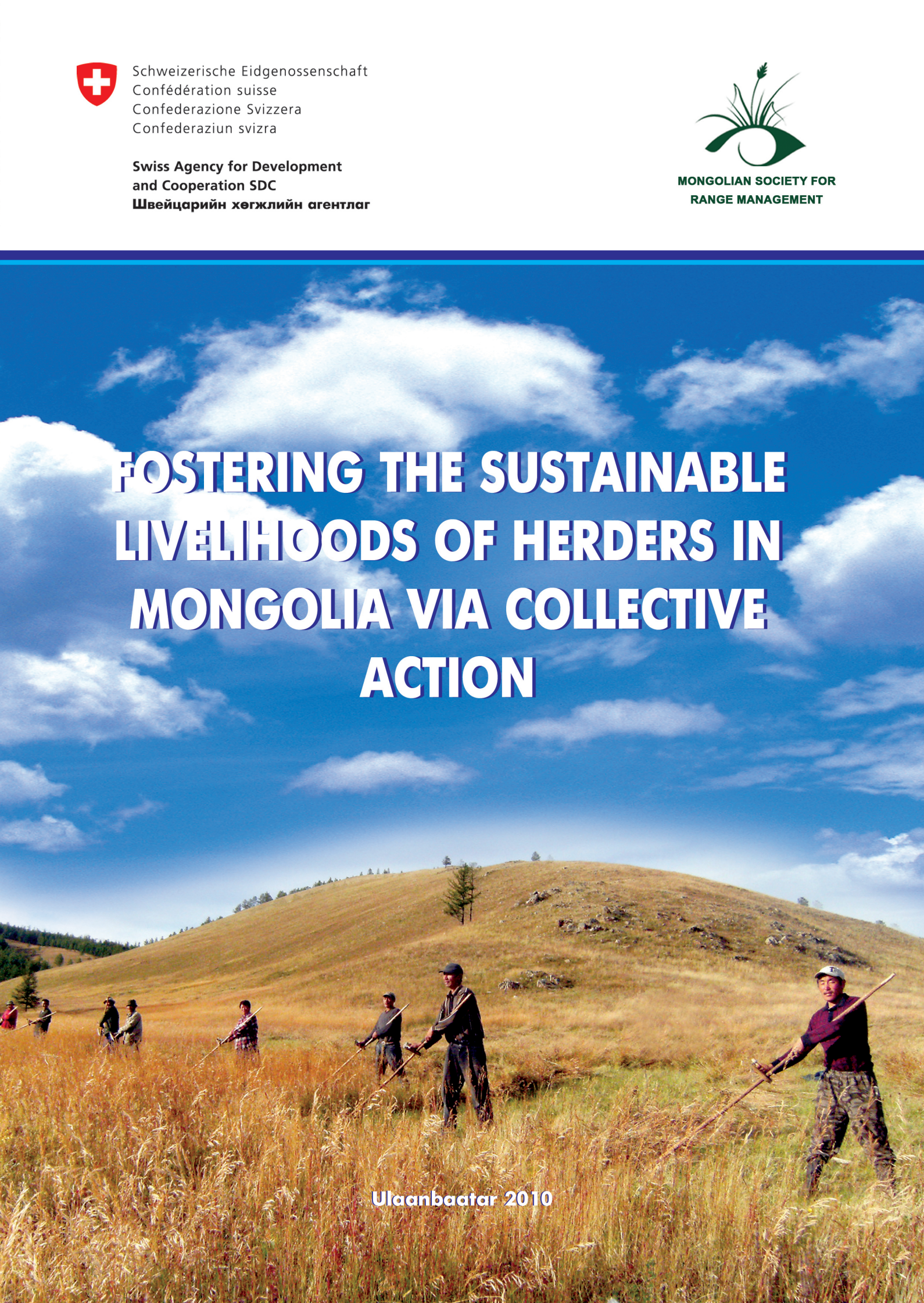
MONGOLIAN SOCIETY FOR RANGE MANAGEMENT

FOSTERING THE SUSTAINABLE LIVELIHOODS OF HERDERS IN MONGOLIA VIA COLLECTIVE ACTION



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Batsaikhan Usukh, Hans P. Binswanger-Mkhize,

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Foreword

Can We Foster the Sustainable Livelihoods of Herders in Mongolia via Collective Action?

This was the question the study team addressed to find an answer in this report.

As a supplementary study to a broader livelihoods study, this report pays special attention to the question of "if collective actions and collective organizations could play a vital role for the better wellbeing of herders around the country and also help reduce rangeland degradation".

First of all, it is worth mentioning that herder families who traditionally use the same pastures have formed Pasture-User Groups (PUGs) based on territorial boundaries, which are working quite effectively in some parts of the country.

The report pays special attention to the differences between organized and non-organized herder's livelihoods and assesses the economic, technical, institutional and legal frameworks for community organizations in rural areas.

It also investigates the different institutions that are required for the collective action of herders, describes the territorial approach to self-governing herder organizations, discusses the present pasture-related laws and regulations, and explores the role of central and local governments.

The report has concluded that government support and good leadership are also necessary for sustainability and effective performance of herder community organizarions.

Nevertheless, the PUG system is built around supporting associations of PUGs at the soum level that will continue beyond the project, thus fulfilling a crucial function for sustainability that is lacking for herder groups.

The study's underlying hypothesis was that *a territory-based approach to herder-group organization leads to sustainable pasture and livestock management under the condition that groups (a) are autonomous, (b) are supported by local government, and (c) have access to technical advice and financial support for their projects.*

Because the territorial approach to herder organizations has only been tested in Mongolia for the past four years, the hypothesis cannot be conclusively accepted or rejected. Instead, it will be assessed according to the speed and ease of setting up organizations, the range and intensity of sustainable and other practices that have been introduced, and the conditions for organizational success and sustainability.

It is emphasized that collective action will help herders to overcome such economic challenges as savings and marketing cooperatives and the state of environment. A good ecological balance and economic stability will enable herders to align livestock numbers with the pasture's carrying capacity.

It is hoped that the assessment will provide a better understanding of the community organizations of herders in Mongolia and their strategies to adapt to changes, and provide necessary information for policy discussion and a harmonized donor approach within the sector.

Let the Pasture-Green Gold be ever green.

Felix Fellman

Country Director
SDC, Mongolia

D.Dorligsuren

Executive Director
Mongolian Society for Range Management

About Authors

Batsaikhan Usukh, Ph.D., is a freelance researcher and affiliated with the School of Economics and Business at the Mongolian State University of Agriculture. His main field of interest is related to community development, pasture management, agricultural policy analysis, economic and financial analysis of investment projects, and institutional development.

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Hans Binswanger-Mkhize, Ph.D., is a well known agricultural development economist. After a long career in the World Bank he now works as an independent consultant from South Africa, where he is honorary professor at the Institute for Economic Research on Innovation at Tshwane University of Technology. He is a fellow of the American Association for the Advancement of Sciences and of the American Agricultural Economics Association, a recipient of the Elmhirst Medal of the International Association of Agricultural Economists, and is listed in "Who is Who in Economics."

He has published on a wide range of topics: the economics of technology generation and its impact, food security, agricultural mechanization, the evolution of farming systems in Africa, farmer behavior under risk, agricultural supply response, the impact of rural finance on agricultural investment, production relations in agriculture, the world history of land accumulation and land reform, the political economy of agricultural and agrarian policies, agriculture and food policy, land policy and land reform, community-driven development, rural development strategy, and approaches to combat HIV and AIDS.

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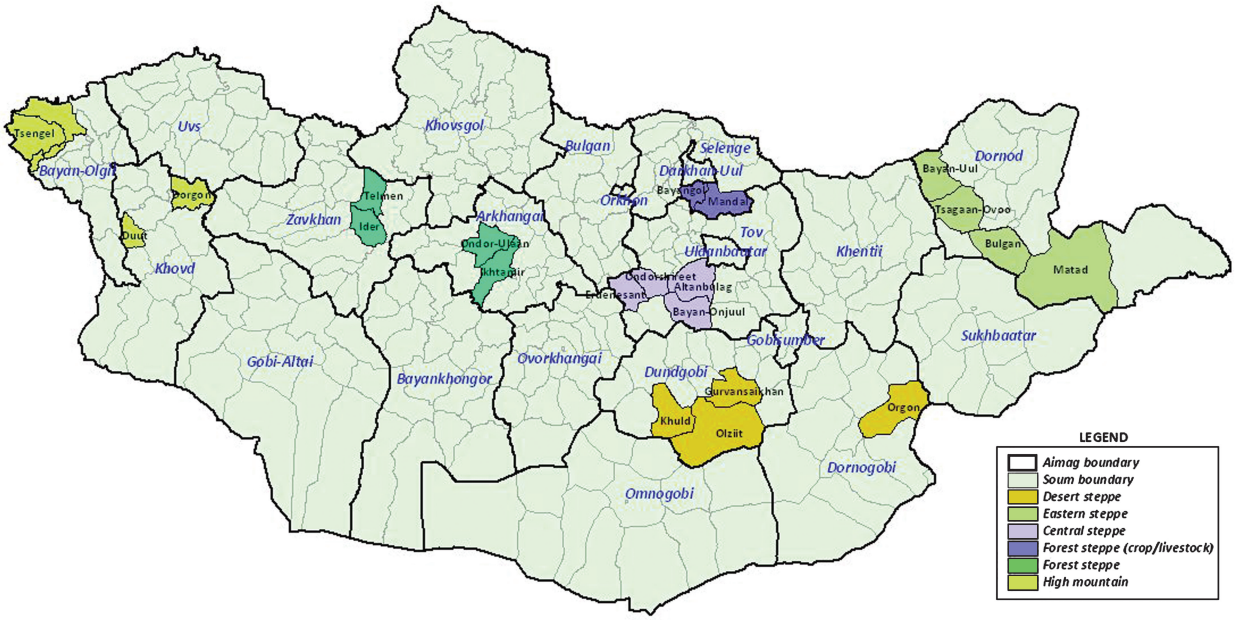
Contents

Glossary

English	Definition	Монгол
Access right	Right to access a resource	Хүртэх эрх
Aimag	A province of Mongolia	Аймаг
Bag	Smallest area of local government corresponding to a sub-district	Баг
Customary rights	A right acquired via custom of a group inhabiting a particular region	Уламжлалт эрх
Exclusive use right	The exclusive right (of a person, a defined group of persons, or an institution) to use a natural resource	Давуу эрхээр ашиглах
Facilitating NGO	The NGO set up by the Mongolian Society of Range Management to facilitate the setting up and functioning of the PUG/APUG system	Идэвхжүүлэгч ТББ
Green Gold (GG-PEM)	Green Gold Pasture Ecosystem Management Project financed by the Swiss Agency for Development and Cooperation	Ногоон алт (НА-БЭМ)
Herder Group (HG)	Formal or informal groups of herders formed on the basis of a common interest	Малчдын бүлэг (МБ)
MSRM	Mongolian Society for Range Management	МБМХ
Ownership	Ownership is the right to exclusive use and management of a resource, including the right to transfer these rights to a third party.	Өмчлөл
Otor	Reserve pasture areas set aside	Отор
Pasture-user group (PUG)	An inclusive group of traditional herders that is based on a common territory to which group members have exclusive use rights	Бэлчээр ашиглагчдын хэсэг (БАХ)
Association of Pasture User Groups (APUG)	An association (or federation) of pasture-user groups at soum, aimag or national levels	Бэлчээр ашиглагчдын хэсгүүдийн холбоо (БАХХ)
Pasture-user group system	A territory-based system of PUGs and APUGs supported by the local government, a facilitating NGO, and other service providers to support the sustainable livelihoods of livestock herders, including the productivity and sustainability of pastureland and livestock herds	Бэлчээр ашиглагчдын хэсгүүдийн тогтолцоо
Property right	Same as ownership right	Хөрөнгийн эрх
Possession	The exclusive right to use and manage a resource (e.g. pastureland) for a fixed duration without the possibility of transferring these privileges to a third party	Эзэмшил
Soum	Sub-national tier of government below the aimag corresponding to a district	Сум
Sustainable Livelihood Project (SLP)	A livelihood and pasture-management programme financed by the World Bank	Тогтвортой амьжиргаа төсөл (ТАТ)
Use right	The right to use a certain natural resource (such as pastureland, water, fuel, wood, but not necessarily an exclusive right)	Ашиглах эрх

Figure 1: Soums covered by the study



Summary and conclusions

Livestock herding in Mongolia accounts for 20.6 percent of GNP and almost 40 percent of employment. It is practiced in a variety of systems, ranging from nomadic to semi-nomadic livestock herding in all ecological zones from the desert to the more fertile forest steppe. With the advent of industrial development and urbanisation after the Second World War, the share of the economically active population in the rural economy progressively declined. However, this trend was reversed after the transition from a centralised socialist system to a market economy in the early 1990s. The transition to a market economy provoked an economic crisis and massive levels of unemployment due to the downscaling of the state. Many urban residents therefore moved to rural areas and took up herding as a survival strategy. At the same time, the collectives were abolished and livestock privatised. Because the collectives played an important social-welfare role for the rural population, their disappearance resulted in a deterioration of social and livestock services and increased poverty to a level that has not since declined. Not only did the collectives provide social services and technical assistance, they also formed the core institutional mechanism for the governance of nomadic pastoralism. The collectives managed land allocations and seasonal rotations. With this management institution gone, replaced by a newly introduced constitutional freedom of movement which was not granted during socialism, herders became free to move anywhere, thus transforming the herding system from a controlled pasture system to an open-access system. While subsequent legislation has attempted to provide a regulatory framework for pastureland use, with management powers vested in the aimag, soum and bag governments, these efforts have to date proven ineffective and insufficient for re-regulating pastureland use.

Today, we observe the twin crises of pastureland degradation and rural poverty in Mongolia (Mongolian Society for Range Management, 2009). Ground measures of species diversity and ground-cover density that have been conducted since the 1960s indicate a clear linear trend of pasture degradation since that time (ibid.). At the same time, an equally linear trend of increasing temperatures all over Mongolia is observable. Therefore, there are two very likely causes for the observed pasture degradation: climate change and the failure of pastureland-management regulatory institutions in the 1990s. However, the current data does not allow for a clear separation of the effects of climate change and institutional failure in relation to pastureland health, but it is assumed that they reinforce each other.

Recent poverty trends show that in rural areas between 2002/03 and 2007/08, the per capita index increased by 7 percent from 42.7 percent to 49.7 percent, meaning that half of the rural population is now living in poverty (World Bank 2005, 2009). This rise in poverty is particularly disturbing as these years correspond with one of the greatest growth spurts in the world economy and with rapid economic growth within Mongolia itself (Poverty Profile in Mongolia, NSO, 2009). In light of the alarming poverty trends and the global downturn, it is therefore particularly urgent to reintroduce a sustainable livestock herding system in Mongolia.

The Swiss Agency for Development and Cooperation's (SDC) Green Gold Pasture Ecosystem Management Project (Green Gold) has been supporting herders since 2004 in developing community-based pasture-management activities, preparing winter and spring fodder, improving animal productivity and initiating alternative-income-generation activities. Green Gold is experimenting with an intensive approach to the organisation of herders into pasture management and user groups that is embedded into local government structures. Herder families traditionally using the same pastures form a pasture-user group (PUG) that is based on territorial boundaries, which are defined in a deliberative process involving the concerned herders and are validated by the soum government. PUG membership of residents in PUG area is mandatory in order to avoid conflicts between members and non-members that would weaken the PUG's pasture-management capacity. PUGs are not collectives, they are autonomous organisations aimed at jointly developing, enforcing and monitoring pasture-management plans (PMPs) for their respective territories. PUGs are supported by local government, and for the time being through technical advice and the co-financing of pasture-management related projects provided through Green Gold. The assumption of Green Gold is that PUGs will learn through the implementation of increasingly complex pasture-management activities that require collective action until they are able to address the most demanding task of adapting the number of animals to the carrying capacity of their pastureland. At the soum level, PUGs are federated into associations of pasture-user groups (APUGs). APUGs are NGOs with a small permanent staff and a secretariat that support PUGs through technical assistance and should guarantee the PUGs' survival beyond the duration of the Green Gold project.

This study tries to assess the collective learning capacity of the PUGs that is a necessary precondition for fostering sustainable livelihoods. More specifically, the study asks if the collective-action-based system of PUGs (1) Makes a significant contribution to sustainable livelihoods through improved pasture and animal productivity; and (2) Provides an alternative to the ineffective regulatory framework for sustainable pastureland management.

In order to answer these two core questions, qualitative case studies were conducted in six regions that differed in respect to their ecological and economic properties, and included four of Mongolia's five agro-ecological zones. Qualitative interviews were conducted in 22 soums to investigate herders' perceptions of pasture degradation and its causes, the difficulties of setting up and running organisations for collective action, collective-action activities for managing pastures and seasonal movements, and productivity-enhancing activities that required either collective action for implementation or could be implemented individually. The study also investigated the degree to which collective organisations satisfied the conditions for effective functioning and sustainability that had been defined by a group of experts. In addition, the herders' expectations were assessed in relation to: (a) The influence of the pasture-user system on seasonal rotations, inter-annual and emergency migrations; and (b) The capacity of this system to limit livestock numbers in the future.

Green Gold is not the only programme in Mongolia supporting herders in creating formal membership organisations for collaborative pasture management and livelihood improvement. However, other projects use a different approach to community development that builds on ad hoc herder groups (HGs) with voluntary membership based on a common interest. The herder-group approach is not a singular and coherent system. Members of HGs work together for income-generation and pasture and livestock improvement. As opposed to PUGs, HGs' territorial base is less strong as they do not cover entire administrative areas and only sometimes have pasture leasehold agreements with the soum government. The soums where HGs operate also prepare PMPs, but these are initiated by the soum government and its officials, who also take the lead in terms of implementation responsibilities. In order to assess the performance of the PUG design, HGs are compared in this study with PUGs in terms of the criteria mentioned above.

Interviews with herders and other stakeholders have revealed that PUGs have the capacity to successfully organise herders to plan and implement pasture-management and movement plans in the equilibrium pasture-management zones, and perhaps in the mixed zone of the central steppe (see Appendix A I. for definitions). HGs, on the other hand, have shown little such capacity, primarily because they do not have control over a territory to the same extent as PUGs. Strong facilitation by a dedicated support organisation, like the APUG in each soum, appears to be necessary to enable the PUGs to perform these tasks on a sustainable basis. Government support and good leadership are also necessary for sustainability and effective performance. In the desert steppe, where the disequilibrium system prevails and movements are vast and irregular, the PUG system does not appear to fulfill the needs of herders. They do not see it as an appropriate response to declining pasture productivity. Indeed, neither science nor herder perceptions suggest that pasture degradation in disequilibrium systems has been caused by livestock density and other management factors. The same applies to a greater extent to the desert zone, which we did not study.

The more intensive PUG system may also have an advantage in performing productivity-oriented activities that either do or do not require collective action. That may be a consequence of the presence of a dedicated support organisation and/or may reflect the greater ability of the larger PUGs to motivate and manage such activities. Similarly, the PUGs, after some time of operation, fulfill the conditions for sustainability better than the HGs, which often become inactive after project support terminates. It has to be noted that the PUG system is in development and every PUG therefore still enjoys project support. Hence, no direct comparison between HGs and PUGs without project support is possible. Nevertheless, the PUG system is built around a supporting APUG that will continue beyond the project, thus fulfilling a crucial function for sustainability that is lacking for HGs.

At present, the capacity to deal with weather-related risks such as dzuds and droughts seems to be weak in the more peripheral regions of Mongolia. For instance, in the mountain zone, efforts to destock before winter after a dry summer, during which livestock did not gain a significant amount of weight, ended in a price collapse due to a market oversupply. This price collapse occurred across the nation and affected herders' decision-making on destocking throughout the country, beyond those areas that were initially affected. As meat prices dropped below a threshold, herders did not continue to destock and thus entered winter with an oversized and undernourished herd, which led to many fatalities in winter and the loss of offspring in spring. On the other hand, herders in proximity to large urban markets are better able to protect themselves against potential livestock loss during hard winters. They buy fodder for winter and sell their animals on the high-price spring market.

The respondents noticed that the style of herding had changed in the past decade, with movements

being increasingly directed by water scarcity rather than rotational grazing. Free movement facilitated by a flat topography in the desert steppe has become a problem and challenges collective-action initiatives in this zone. This shows that the drawing of boundaries and enforcement is greatly facilitated by topography and equilibrium conditions that reduce the need for inter-annual migrations. The strategy for facilitating collective action in the steppe should be rethought and measures devised to reduce the problem of the seasonal movements of herders from the outside via greater collaboration with soum and aimag governments. The challenge in the desert steppe or desert is even greater, and may lead to the development of organisational models that are quite different from those of other areas.

In areas where herd size and herd composition are a cause of degradation, herders clearly perceive the number of goats and the overall number of animals to be the prime causes of pasture degradation. Interestingly, however, there is little correspondence between herders' assessment of pasture health and scientific degradation assessments. In some very degraded areas, herders perceived the level of degradation to be moderate, and vice versa. The incongruence of scientific pasture health assessment and herders' perception needs to be further investigated. For instance, evidence from Southern Africa suggests a relatively good match between pastoralists' perceptions and botanical assessments (Wesuls and Lang, 2010).

PUGs and HGs appear to face a number of functionality challenges. Analysis of the interviews shows that it is easy to establish a HG or a PUG, however sceptical herders may not initially participate in PUGs. Successfully running a herder organisation is more challenging. HGs often suffer from inactivity, and their activities often break down after the supporting project is terminated without having left behind a functioning supporting NGO. HGs also often suffer from conflicts between members and non-members over pasture entitlements and the sharing of benefits.

HGs seem to be less sustainable than PUGs, however this finding should be interpreted with care given the young age of most organisations. Both types of groups appear to depend on a facilitating organisation that assists with mobilisation, planning and technical assistance. Common challenges facing the sustainability of both HGs and PUGs are financial sustainability, clear relations with non-members and marketing. Sustainability seems to be enhanced by strong leadership from a supporting NGO and a good working relationship with the soum government. Also, longer-established organisations appear to be operating more efficiently.

After sufficient sensitisation and a strong organisational effort, herders in many areas appear to be willing to consider limiting the number of livestock if the productivity improvements resulting from the PUG do not bring livestock numbers into line with carrying capacities.

This study therefore identifies four main findings. First, an ecological zone with its topographical specificities has an influence on social organisation. The desert steppe is much more challenging for collective action than the forest steppe and the mountains, with the steppe somewhere in between. Social and spatial boundaries are less evident and more difficult to create. Second, pasture management and the control of seasonal movements can only be achieved through territory-based organisations and in close collaboration with local government. Third, collective action requires the assistance of a support organisation such as a facilitating NGO. HGs that did not benefit from such support after the termination of project activities became inactive. How to make such a system permanent will be an initial challenge for the projects, but ultimately the government will have to find a solution. Finally, there are encouraging signs that given time and sufficient sensitisation, and with the support of local government institutions, herders may be willing to limit herd sizes if they receive support for increasing livestock and pasture productivity.

I. Introduction and background

The crisis of nomadic pastoralism in Mongolia

Livestock herding in Mongolia accounts for 20.6 percent of GNP and almost 40 percent of employment. It is practiced in a variety of systems, ranging from nomadic livestock herding in the desert zone to semi-nomadic systems in the more fertile forest steppe. With the advent of industrial development and urbanisation after the Second World War, the share of the economically active population in the rural economy progressively declined. However, this trend was reversed after the transition from a centralised socialist system to a market economy in the early 1990s. The transition to a market economy provoked an economic crisis and massive levels of unemployment due to the downscaling of the state. Many urban residents therefore moved to rural areas and took up herding as a survival strategy. At the same time, the collectives were abolished and livestock privatised. Because the collectives played an important social-welfare role for the rural population, their disappearance induced a deterioration of social and livestock services and increased poverty to a level that has not since declined. Not only did the collectives provide social services and technical assistance, they also formed the core institutional mechanism for the governance of nomadic pastoralism. The collectives managed land allocations and seasonal rotations. With this management institution gone, replaced by a newly introduced constitutional freedom of movement which was not granted during socialism, herders became free to move anywhere, thus transforming the herding system from a controlled pasture system to an open-access system. While subsequent legislation has attempted to provide a regulatory framework for pastureland use, with management powers vested in the aimag, soum and bag governments, these efforts have to date proven ineffective and insufficient for re-regulating pastureland use.

Today, we observe the twin crises of pastureland degradation and rural poverty in Mongolia (Mongolian Society for Range Management, 2009). Ground measures of species diversity and ground-cover density that have been conducted since the 1960s indicate a clear linear trend of pasture degradation since that time (ibid.). At the same time, an equally linear trend of increasing temperatures all over Mongolia is observable. Therefore, there are two very likely causes for the observed pasture degradation: climate change and the failure of pastureland-management regulatory institutions in the 1990s. However, the current data does not allow for a clear separation of the effects of climate change and institutional failure in relation to pastureland health, but it is assumed that they reinforce each other.

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For most of Mongolia, the harshness of the climate, the unpredictability of the weather and pasture productivity, and periodic droughts followed by extremely harsh winters (dzuds) imply that nomadic or semi-nomadic extensive-herding systems remain the most economic and viable option for the production of livestock and livestock products. The extent of inter-annual and intra-annual movements of livestock varies across agro-ecological zones, being the highest in the desert and desert steppe and lowest in the less dry forest steppe.

How to overcome institutional failures

The degradation of Mongolian pastureland is not a singular experience. Common pool resources such as pastures, forests, fisheries, water and air all face the threat of similar degradation if access and harvesting are not appropriately governed. In economic terms, common pool resources are rival and non-exclusive goods, which means that it is difficult to restrict their utilisation (e.g. cutting trees), while harvesting diminishes the resource stock (a logged tree has to be replaced a by a new one in order for a forest to maintain its size). While full privatisation is one way of eliminating open access (Hardin, 1968), it is often not feasible, and particularly not in the case of Mongolian pasture where the mobility of animals within years, and in certain areas across years, is required. However, many common pool resources have been sustainably managed without the allocation of individual ownership rights by clearly defining resource boundaries, use rights, withdrawal quantities and monitoring those rules that are implemented via collective management (Ostrom, 1990, 2000, 2009).

A set of necessary conditions follows on from this observation that enables collective action for the sustainable community-based management of pastureland. They are: (a) An appropriate policy and legal framework for assigning possession and use rights to specific users or user groups; (b) Appropriate institutions and organisations designated to assign rights and monitor and enforce rules; and (c) A reliable method to measure resource extraction.

Donor approaches to community-based pasture management

Appropriate collective action on the part of herders may be a way of establishing sustainable livestock and pasture management in the Mongolian extensive-livestock system. Donor organisations, including the Swiss Agency for Development and Cooperation (SDC), the World Bank (WB) and the United Nations Development Programme (UNDP), have been experimenting with various collective-action approaches in different regions of the country. Most of these projects work with voluntary herder groups that are formed based on common interests, and often in terms of income-generation or natural resource management. The WB-financed Sustainable Livelihoods Project (SLP) works closely with soum and bag government structures and supports their capacity development and the development of soum-level PMPs.

SDC's Green Gold Pasture Ecosystem Management Project (Green Gold) has been supporting herders since 2004 in developing community-based pasture-management activities, preparing winter and spring fodder, improving animal productivity and initiating alternative income-generation activities. Green Gold is experimenting with an intensive approach to the organisation of herders into pasture management and user groups that is embedded into local government structures. Herder families traditionally using the same pastures form a pasture-user group (PUG) that is based on territorial boundaries, which are defined in a deliberative process involving the concerned herders and are validated by the soum government. The membership of residents in a PUG area is mandatory in order to avoid conflicts between members and non-members that would weaken the PUG's pasture-management capacity. PUGs are not collectives, they are autonomous organisations aimed at jointly developing, enforcing and monitoring PMPs for their respective territories. PUGs are supported by local government, and for the time being through technical advice and the co-financing of pasture-management-related projects provided through Green Gold. The assumption of Green Gold is that PUGs will learn through the implementation of increasingly complex pasture-management activities that require collective action until they are able to address the most demanding task of adapting the number of animals to the carrying capacity of their pastureland. At the soum level, PUGs are federated into associations of pasture-user groups (APUG). APUGs are NGOs with a small permanent staff and a secretariat that support PUGs through technical assistance and should guarantee the PUGs' survival beyond the duration of the Green Gold project.

The effectiveness and sustainability of pasture-user groups

In 2009, before the planning of the second phase of the Green Gold Project, the Mongolian Society for Range Management (MSRM) carried out a comprehensive Livelihood Study of Herders in Mongolia. The overall question addressed in that study was how to generate sustainable livelihoods in the Mongolian herder economy. The report paid special attention to the economic, technical, institutional, legal and marketing environments that are needed to overcome range degradation. The study found that herders were responsive to market and other signals in terms of livestock composition, numbers, investment and migration. It also found that there were numerous technical solutions that could be implemented to reduce pasture degradation and increase carrying capacity, such as restoring proper seasonal movements, resting, haymaking, and road and well repair and development. However, most of these technical solutions require collective action, for which the enabling institutional and legal frameworks are lacking in Mongolia at present. Therefore, the necessity of collective action for most of these measures imposes clear limits on what can be achieved with programmes and policies that are based on individual incentives.

Strengthening the organisational capacity of herders and the capacity of local governments to provide advice and technical support to herders appears to be the only possible approach to control and reverse pasture degradation and sustain or improve rural livelihoods. The question of which approach is best is therefore at the core of the sustainable livelihoods issue.

The present study is complementary to the main study. It investigates whether Green Gold's territorial approach to herder-group organisation has the capacity to: (a) Create sustainable collective-action organisations; (b) Have a positive impact on pasture and livestock productivity; and (c) Control pasture degradation, and thus have a sustainable and beneficial effect on herder livelihoods. For this purpose, six qualitative case studies in distinct agro-ecological zones were compiled and interviews conducted in 22 soums.

The study's underlying hypothesis was that *a territory-based approach to herder-group organisation leads to sustainable pasture and livestock management under the condition that groups (a) are autonomous, (b) are supported by local government, and (c) have access to technical advice and financial support for their projects.*

Because the territorial approach to herder organisations has only been tested in Mongolia for the past four years, the hypothesis cannot be conclusively accepted or rejected. Instead, it will be assessed according to the speed and ease of setting up organisations, the range and intensity of sustainable and other practices that have been introduced, and the conditions for organisational success and sustainability.

II. The proposed territorial organisation of herders in Mongolia

The Green Gold project began by fostering the formation of HGs that were formed on the basis of a common livelihood or pasture-management interest. This was the same approach that had been used by other donor-supported projects. However, these voluntary organisations lacked well-defined territories and did not include all herders in a given territory, and soon proved unable to tackle the most important pasture-management issues, such as regulating seasonal movements or allocating and enforcing reserve pasture areas. As a result, the project shifted to the organisation of pasture-user groups (PUGs) that brought together all herders in a territory and was based on traditional herding systems.

The pasture-user group system

Herder families traditionally using the same pastures form a pasture-user group (PUG) that is based on territorial boundaries, which are defined in a deliberative process involving the concerned herders and are validated by the soum government. The membership of residents in a PUG area is mandatory in order to avoid conflicts between members and non-members that would weaken the PUG's pasture-management capacity. PUGs are not collectives; they are autonomous organisations aimed at jointly developing, enforcing and monitoring PMPs for their respective territories. They can also facilitate and negotiate seasonal and permanent movements in and out of their areas. PUGs are supported by local government, and for the time being through technical advice and the co-financing of pasture-management-related projects provided through Green Gold. The assumption of Green Gold is that PUGs will learn through the implementation of increasingly complex pasture-management activities that require collective actions of increasing complexity until they are able to address the most demanding task of adapting the number of animals to the carrying capacity of their pastureland.

Associations of pasture-user groups (APUGs)

At the soum level, PUGs are federated into associations of pasture-user groups (APUGs). APUGs are NGOs with a small permanent staff and a secretariat that support PUGs through technical assistance and should guarantee the PUGs' survival beyond the duration of the Green Gold project. APUGs play an important role in interacting with the soum government and assisting PUGs in the negotiation of movements beyond a PUG's territory or an administrative boundary as necessitated by bad weather. APUGs can also federate at the aimag or national levels.

The role of local government and central governmental services: In order for the PUG system to function effectively, close collaboration between PUGs, APUGs and local governmental institutions and central governmental services at the soum level are necessary. While herders themselves define the territorial boundaries of PUGs, it is the soum *khural* (the elected citizens' assembly) that validates them. PUGs' PMPs require endorsement by the soum governor. Soum governments also play a role in coordinating *otor* movements in collaboration with the protected areas administration. Furthermore, PUGs benefit from such governmental services at the soum level as technical assistance provided by the land officer and agricultural extension officer. The soum government is the only body that can allocate right, and thus only it can take ultimate responsibility for the enforcement of rights and management plans.

The longer-term vision for the PUG system

The PUG system is based on the assumption that PUGs, supported by a favorable legal environment and with the help of local authorities, technicians and non-governmental facilitating service providers, will be able to gradually introduce sustainable pasture-management practices and develop the productivity of the pastureland and their herds. More specifically, PUGs:

- Are allocated use and possession rights to pastures;
- Regulate and facilitate seasonal rotations and inter-annual movements;
- Apply various technical solutions and investments for sustainable pasture management;
- Ensure respect for reserve pastures (*otor*), jointly agreed upon with local governments;
- Foster a gender balance and the equitable sharing of development benefits;
- Prevent and resolve conflicts;
- Facilitate economic diversification and value-chain activities; and
- Where necessary, regulate the number of animals in line with the carrying capacity of the land.

Conditions for the success and sustainability of PUGs and APUGs

In order for PUGs and APUGs to successfully carry out their functions, including developing, managing and enforcing PMPs and making collective investments in pasture and herd productivity, a number of institutional and organisational factors need to be in place. During brainstorming sessions on project experiences with the MSRM and its experts and other relevant authorities, the study identified the following sustainability criteria, which are explored in this study:

1. **Functions**: PUGs need to be empowered with relevant and appropriate functions.
2. **Constitution**: PUGs must have a good constitution and bylaws.
3. **Relations** between members and non-members of PUGs must be clearly spelled out in order to avoid conflicts.
4. **Enforcement**: PUGs must be able to enforce and receive support from local authorities for enforcing collective decisions regarding pasture management.
5. **Accountability** of the leaders of the organisations to their members for plans and activities.
6. **Accountability** of the leaders of the organisations to their members in relation to financial matters.
7. **Leadership**: They require good leadership and democratic mechanisms for renewing leadership.
8. **Capacity**: They need to improve their capacities via training and learning by doing.
9. **Financial sustainability**: PUGs need financial resources in order to undertake group projects. Financial sustainability must first of all be based on their own revenue sources, which they decide upon and implement. For most of their projects, co-financing from the government or other sources is necessary. It is also beneficial to develop a revolving fund that can finance small individual and group projects.
10. **Head office**: In order to become a functioning organisation, an APUG needs to own and operate an office.
11. **Operational manual**: Such a document summarises the institutional set-up of the PUGs and APUGs, their functions, planning, decision-making, financing and implementation mechanisms, relationships to government, facilitators and donors, accountability mechanisms, etc. It is a living document that can be periodically revised.
12. **Sharing of benefits**: All members of the organisation must benefit from the organisation. The basic principles of equity and fairness must be followed in relation to the distribution of benefits. These principles should be stated in the constitution and bylaws.
13. **Political backing**: They need to have strong relationships with, and backing from, local and central governments.
14. **Political influence**, such as having herders elected to soum and aimag assemblies.

Challenges to the pasture-user group system

The implications of vegetation dynamics for community organisation

The experiences of Green Gold and UNDP's Sustainable Land Management project have shown that community-led efforts to develop HGs have been successful in the mountains, forest steppe and steppe regions of Mongolia. In these regions, vegetation dynamics are either in equilibrium or mixed equilibrium-disequilibrium systems, rather than the disequilibrium pasture systems of the desert and desert steppe. Put simply, an equilibrium model of rangeland vegetation dynamics is characterised by climatic conditions that allow for regular patterns of vegetation growth with little variation between years (for a detailed explanation, see Annex AI). Hence, vegetation dynamics are likely to affect social organisation, with potentially bigger challenges for the desert steppe and desert zone.

Regulatory prerequisites for community-based natural resource management

The current Land Law provides for the possibility of use and possession rights for individual herders or groups for winter and spring pastures (Fernandez-Gimenez et al., 2008). The power to make these land allocations are vested in the soum government, which decides on who will receive possession rights and for how long. At present, PUGs do not have a distinct legal status that would give them legal recognition for their pasture-management obligations. Therefore, their effective capacity to develop, implement and enforce PMPs is limited because non-compliance with group rules and PMPs cannot be legally sanctioned. *Therefore, the necessary legal and institutional and organisational framework of the PUGs is as yet incomplete* (see also the legal chapter in the main livelihood report).

III. Collective action and herder livelihoods

A number of projects have been undertaken in Mongolia that deal with some aspect of livestock herding, and most have been implemented in at least one soum covered by this study. As shown in Table 1a, the WB-funded Sustainable Livelihood (SLP) project has the most reach, and as of 2008 was being scaled up nationwide. The SLP is followed in extent of coverage by World Vision (WV) and Green Gold. The Social Basic Complex Service (SBCS) project financed by UNICEF and the Sustainable Land Management for Combating Desertification (SLMCD) project financed by UNDP operate in two zones, while all other projects - including Mercy Corps (MC), the World Wildlife Fund (WWF) project, the UNDP's Altai Sayan Eco-region project, the Intensive Crop-Livestock Integrated Model Farm project financed by JICA, the Local Government Initiative (LGI) in Bayangol soum in the crop-livestock integration zone, the Khustai National Park (KNP) project supported by the Dutch Government, and the Rural Poverty Reduction Programme (RPRP) financed by IFAD - are each being implemented in one of the zones. The Sustainable Grassland Management Project financed by UNDP was implemented in the crop-livestock zone between 2003 and 2008. Although this project has been completed, we have included some of its activities as it dealt with a number of pasture-management issues in the zone. A brief introduction to the projects and their approaches, mainly based on the information from the field, are provided below.

Donor Projects

Sustainable Livelihood Project

The SLP has four components: (i) Pastoral risk management with the objective of continuing to strengthen the capacity of rural families, particularly livestock herder households, in order to manage environmental, financial, social and other forms of risk that can adversely affect their livelihoods; (ii) A community initiatives fund that has the objective of providing funding for the identification, preparation and implementation of community investments; (iii) A microfinance development fund that has the objective of reaching residents in remote rural and financially under-solved areas by providing sustainable financial services, and expanding the outreach of such services by improving the quality of financial services and products; and (iv) Project management and capacity building with the objective of ensuring effective, efficient and timely implementation and management of all project activities at the national level.

The SLP directly deals with pasture-management and livestock-productivity issues through the first component. Within this component, it supports capacity-building for local governments, the mapping of pastureland and the development of soum PMPs that are anchored in bag PMPs. No territory-based PUGs are formed within the soum or bags, therefore pasture-management initiatives are led by land and agricultural officers at the soum level, by soum authorities and by bag governors and bag assemblies. In addition to the local government-led PMPs, the SLP facilitates the establishment of voluntary herder groups for pasture and livestock, as well as for income-generation purposes. Activities that are eligible to be financed by the project include the fencing of pasture, hay and fodder preparation, the building of water dams and fodder storage houses, the creation of fodder reserves, animal health measures, the building of animal sheds, improving livestock quality, the sowing of fodder plants, the fencing of river sources, and the making and repairing of wells.

The SLP categorises soums in two ways: a pastoral risk-management model soum or a project beneficiary soum. Very few soums – generally one or two per aimag - are selected as model soums; all others are deemed project beneficiary soums. In model soums, the project implements an almost complete range of those activities mentioned above, However, in beneficiary soums, support is primarily based on community initiatives.

The Center for Policy Research Mongolia (CPR) is the main implementation partner for the first component of the project. Two kinds of loans (loans to HGs and cooperatives, and loans for enterprise equipment), as well as grants, are given out. However, because loan requirements are very rigid, few HGs qualify. One of the requirements is that the loan applicant must be a legal entity. Therefore, project-supported HGs need to become legal entities. There are two reasons why the SLP facilitates herders to become HGs or NGOs: (i) Well-organised herder organisations more readily receive support from donors; and (ii) To be eligible to apply for an SLP loan.

The grant program is implemented based on proposals that emerged from the bag assembly. The project pays 90 percent and the beneficiaries pay 10 percent of the total costs of all investments.

Green Gold

While the Green Gold Project began in 2004, the start-up date in each of the zones varies. For example, the project started in the high mountain and forest steppe zones in 2005, and in the central steppe zone in 2007. The main difference in herder organisation between Green Gold and other donor projects is that Green Gold covers the entire area of a soum, with all residents becoming members of a PUG. This enables the project to introduce a territory-based livestock and pasture-management approach, while other projects encourage smaller numbers of herders who have social ties to form themselves into self-selected HGs. As a consequence, these groups do not include all pasture users in a given area and the projects therefore have to rely on soum and bag governors if they want to achieve inclusive pasture-management objectives. Within each of the soums supported by Green Gold, a facilitating NGO (APUG) is established to mobilise and support the PUGs in all their pasture-management and livestock-productivity activities. This means that the project is developing a support organisation within each soum.

The heads of PUGs become members of the NGO steering committee. All herders become members of a PUG based on their territory. Government participation and support are provided through a pasture co-management committee that consists of representatives from the local government, the supporting NGO and the heads of PUGs. Green Gold works in five zones, including the desert zone, but not in the eastern steppe zone where livestock pressure is low.

Sustainable Land Management for Combating Desertification

UNDP's Sustainable Land Management for Combating Desertification (SLMCD) project began at the end of 2008 in some areas of the central steppe and desert steppe zones. The overall goal of the project is to combat land degradation and desertification in Mongolia in order to protect and restore ecosystems and essential ecosystem services that are central to reducing poverty. Within one of its components, the project supports community-based approaches in integrated natural resources management, with a focus on grassland and water management and sylvo-pastoralism. The SLMCD, which has adopted the same approach as the former UNDP Sustainable Grassland Management Project, is establishing HGs in its beneficiary soums.

Sustainable Grassland Management Project

UNDP's Sustainable Grassland Management (SGM) project was implemented from 2003-2007 in several areas of Mongolia, although the only implementation site covered by this study was located in the integrated crop-livestock zone. The project was aimed at supporting herders by enabling the formation of HGs and by targeting pasture and livestock management. In Bayangol soum, half of all herder families were covered by the project. Initially, six HGs were selected and two more were added later. At the outset of the project, a certain number of herders from each bag were chosen. However, because of conflicts over pasture use between members and non-members, all herders in the bags were included. Since the project ended in 2007, most of the HGs have become inactive, and some of them have turned to partnerships in order to protect natural resources, particularly forests as partnerships for forest protection receive government support.

Rural Poverty Reduction Program

The Rural Poverty Reduction Program (RPRP) by the International Fund for Agricultural Development (IFAD) is only implemented in the forest steppe zone, amongst the area covered in this study. The goal of the program is poverty eradication among vulnerable rural households, living in an environment with increasingly degraded natural resources. The program works with five components: (i) livestock and natural resource management, (ii) social development, (iii) program management, (iv) economic activities, and (v) rural financial services. Within its first component, the program encourages herder group formation for fostering natural disaster preparedness and mitigation, developing common economic activities, and integrating poor herders in program and social activities. Since 2003, 1662 herder groups have been facilitated in the program's four pilot sites.

World Vision

The Herders' Livelihood Development Programme financed by World Vision (WV) is implemented in some areas of the eastern steppe zone. The main objective of the programme is to alleviate poverty in an environmentally friendly manner. The programme supports herders by: (i) Providing them with perennial seed and equipment in crop areas; (ii) Improving animal quality in the livestock sector; and (iii) Providing them with equipment for small-scale business in business areas. All related training is provided. Under the programme, voluntary HGs are also established and supported. Another concept promoted is the establishment of HG revolving funds derived from the income herders have earned from activities supported by WV.

Khustai National Park Project

The Khustai National Park (KNP) project – which has been running since 1996 in Altanbulag soum, Tuv aimag, in the central steppe zone – is aimed at the reintroduction of the Takhi (wild horse). The project supports all soums in the Khustai buffer zone in a number of different ways. First, it gives grants to the soum to improve social conditions. Within this framework, MNT 195 million was spent on repairing the secondary school and kindergarten buildings, and providing support for the soum hospital. Second, the Khustai National Park Council provides loans for commercial activities to resident communities in the buffer zone for up to two years at a monthly interest rate of 0.5 percent. Small loans of up to MNT 1 million per applicant are also provided by the Soum Buffer Zone Council for improving the livelihoods of residents. Third, small grants to support herder collective action in the buffer zone are provided for pasture-management and income-generation activities.

Altai Sayan Eco-region Project

UNDP's Altai Sayan Eco-region project (actual name of the project is: Community-based conservation of biological diversity in the mountain landscapes of Mongolia's Altai Sayan eco-region project)), started in 2008, is implemented in Ulaan Khus soum in the high mountain zone and supports two HGs in protecting wild animals and guiding foreign hunters and tourists. The HGs contract for hunting rights with the Ministry of Nature and Environment. Those HGs then receive a share of the hunting income from the soum government.

World Wildlife Fund

The World Wildlife Fund (WWF) project (Rural Development and Environmental Education in Mongolia) is implemented in Durgun soum in the high mountain zone and is aimed at natural resource conservation. The philosophy is that herders will not use and destroy natural resources if they have sufficient incomes. Therefore, WWF supports two HGs in the soum, one of which was already in existence for their own income-generation purposes. The HGs produce simple household items from wool, down and hair, which they process. They also produce dairy products from camel milk.

Intensive Crop-Livestock Integrated Model Farm Project

The Japan International Cooperation Agency (JICA)-funded Intensive Crop-Livestock Integrated Model Farm project was implemented in crop-livestock integrated zone soums. The project began in June 2006 and terminated at the end of 2009. The aim of the integrated farms was to reduce the impact of natural risks and seasonal fluctuations of income. The JICA project in Bayangol soum of Selenge aimag worked with three beneficiaries: one cooperative and two family farms. All three owned livestock and cultivated vegetables. The vegetables were used for household consumption and the surplus was sold. The project in Mandal soum of Selenge aimag also had three different beneficiaries: a cooperative, a household and a HG with 10 families, who were not necessarily rural herders. All had livestock and crops, predominantly vegetables. The JICA project also provided capacity-building training for the project beneficiaries.

Local Government Initiative

The Local Government Initiative (LGI) started in Selenge aimag after a local governmental conference in February 2009. The aim of the LGI is to promote Selenge aimag as an intensive livestock and crop-growing region of Mongolia. Selenge aimag authorities want to take advantage of the province's large crop-growing area, the largest in Mongolia, and its good infrastructure and spatial proximity to large markets in Erdenet, Darkhan and Ulaanbaatar. The government of Bayangol soum of Selenge aimag, in which the crop-livestock zone is located, started an initiative to control livestock numbers that aims to reduce the current number of 142,600 animals to 60,000 by paying attention to the herd species composition. According to the initiative, herds should be comprised of 5 percent horses, 45 percent cattle, 35 percent sheep and 15 percent goats. All herders should follow this herd ratio. In order to reach this goal, the number of livestock has to be reduced by 16,500-26,400 each year. Sales from destocking should yield about MNT 1.2-2.0 billion. Half of the revenue would be allocated to buy dairy cows. As a result, the number of cattle would increase by 2100-4200 head. Although there has been some resistance to this plan, most herders see the necessity of lowering stocking rates and investing in herd productivity and health.

Other membership organisations

Other collective organisations that exist in all soums are the statutory organisations of elders, women and youth which encompass all people in those groups and sometimes have a considerable level of social and economic activity, and a variety of NGOs, although the latter are often small and have limited capacity. Each of the soums has its own savings and credit cooperative (SCC) created by the Khas Bank franchise service. Membership of the soum SCC is open to anyone in the soum, and the contribution of each member is MNT 50,000 per annum. SCCs are not to be confused with the revolving funds set up and co-financed by the Green Gold project.

Herder groups and pasture-user groups

Each of the projects establishes HGs within their implementation framework. However, the function of HGs differs from donor to donor. For WB's SLP, an HG is a group of herder families who qualify on the basis of their income-generation initiatives. For the UNDP Altai Sayan and WWF projects, HGs are groups of herder families who protect natural resources by increasing their income from other sources. For Green Gold, HGs are groups of herders organised around economic activities, whose members are simultaneously members of a PUG.

Green Gold makes a distinction between groups of herders whose function is enabling collective action for planning, implementing and enforcing PMPs and smaller groups that are formed around shared economic interests. The first are PUGs in which membership is mandatory and which are defined based on the area of residence. PUGs are large groups with many members who do not necessarily have shared interests and social bonds beyond the use of the same pastures. The smaller HGs are purely voluntary organisations that can be incorporated into a PUG or have members from different PUGs. This can generate social cohesion among the many members of the much larger PUG by facilitating shared economic activities and implementing part of the PUG's pasture-management plan. In addition to PUGs and HGs, there is a pasture co-management committee, a facilitating NGO affiliated with the MSRM and a herders' savings and revolving fund in each Green Gold project-implementation soum. The savings and revolving fund is co-financed by Green Gold and the herders themselves. The revolving fund in Tsengel soum of Bayan-Ulgii aimag currently offers short-term loans to member herders at a 2.0 percent monthly interest rate for a maximum of six months. The same system has been developed in Duut soum of Hovd aimag, where all herder families are divided into nine PUGs based on their territory. The facilitating NGO affiliated with the MSRM plays a special role in the Green Gold soums: It has two or three permanent staff members, including a pasture-management technician who is recruited from the soum population. The NGO has a secretariat for the APUGs and helps manage financial allocations from Green Gold. In addition, it may raise its own revenues, such as in Duut soum where it received an allocation of resources for project implementation from the aimag government.

IV. Research approach

Case selection

A profiling study was designed and carried out in 22 soums in the following agro-ecological zones: the western mountain zone, the forest steppe, the steppe (one zone in the central steppe with high animal pressure and one zone in the eastern steppe with low animal pressure) and the desert steppe. In addition, a northern region with significant cropland, where the potential for productivity growth via crop-livestock integration was high, was also studied (see Appendix A II for more details on the selected soums).

Special attention was paid to the four different donor projects that have been implemented in the selected soums: (i) SDC's Green Gold PEM Project that is implemented by the MSRM; (ii) The Sustainable Livelihood Project supported by WB; (iii) The Sustainable Land Management project sponsored by the UNDP; and (iv) IFAD's Rural Poverty Reduction Program. In addition, in Selenge aimag in the forest steppe, the Bayangol soum government has developed a pasture and cropland management plan that will be compared with a similar non-project supported soum. In the past two years, Green Gold has carried out a socio-economic and a sociological survey of herders in six aimags in four agro-ecological zones. In each of these aimags, a soum that was involved in the MSRM pilot project was studied, along with a soum not involved in any projects. In order to capitalise on this research, the present study, with the exception of one agro-ecological zone, includes all these soums. The non-project soums that were selected were similar to the Green Gold project soums in terms of carrying capacity and ecological and geographical size and complexity.

In areas where the PUG system had not been implemented, we investigated what organisational structures were already in place that could be incorporated into the PUG system or would prove to be helpful in its development, such as herder assemblies, HGs, NGOs and revolving funds. In addition to surveying the presence of voluntary organisations, we assessed how much herders and officials knew about the PUG system and whether there was a strong demand to set up such a system. We also assessed which of the tasks that were included in the vision of the PUG system were being performed by other organisations.

Interview methodology and data analysis

Within the soums, semi-structured interviews were carried out with officials, supporting organisations, herders' organisations and herders. In times when it was difficult to assemble groups, individual household interviews were conducted. In view of the time constraints for the study, the HGs or households were purposely selected rather than randomly sampled. In general, a group approach to interviews was taken. This approach was an obvious choice for the studying of collective action, and also had the advantage that the information would be more complete and could be cross-checked among group members. In some cases, group interviews were not feasible and individual interviews were instead conducted.

The purpose of the interviews was to gather the following information:

1. Activities of herder groups and pasture-user groups:
   - What are the priority issues and tasks that a PUG should tackle in the eyes of herders?
   - Have they been undertaken at the prompting of, and with support from, a donor project, or have they been initiated on their own?
   - At what pace and scale have they been implemented?
   - How well have they been implemented?
   - Who is the beneficiary of the activities?
   - How complex are the implemented activities and tasks?
   - What were the problems encountered?

2. Degree of realisation of the sustainability criteria:
   - Has group formation been initiated at the prompting of, and with support from, a donor-financed project such as Green Gold, the facilitating NGO, the soum government or by herders themselves?
   - At what pace and scale have they been implemented?
   - How well have they been implemented?
   - How broad is the participation of community members in the institutional mechanisms supporting sustainability?
   - What were the problems encountered?

The principal author conducted the interview in three zones, while a trained interviewer conducted interviews in the other two. The interviewer had an assistant transcribe the answers into semi-structured interview schedules. These schedules were then corrected and finalised by the two investigators. The data for each soum was then summarised into nine summary tables for each of the zones. The soum data and scores in the tables are aggregates of the interview responses of the relevant groups or individuals, except in some cases where the full range of interview answers is provided. For each of the zones, a report based on these nine tables was prepared, focusing on the comparison of soum results across different project approaches and with soums with no intervention.

The present report summarises the results from the individual zone reports and makes a comparison of the different agro-ecological zones and the different donor interventions.

Trip preparation and schedule of interviews

Prior to the field visit, the study team compiled data on the soums to be visited, including area, agricultural area, livestock numbers, and ecological and meteorological conditions. Unfortunately, rainfall data was not easily available or reliable at the soum level, and is therefore not presented. Documents related to PMPs within the different donor-supported projects were also collected.

During the field trip, the same three-day protocol was followed for visits to each soum. The first day was dedicated to interviews with government officials and project facilitators at the soum centre about the general situation, pasture conditions, weather conditions, present donor projects, the coordination of seasonal rotations by the government, and inter-soum migrations. On the second day, interviews were conducted in a bag that was not located within the immediate proximity of the soum centre. Interviewed were the bag governor, heads of PUGs or members involved in a HG, a relatively wealthy household, a relatively poor household and a single-headed household. Questions were asked about pasture-management activities and in regard to the sustainability conditions of community pasture-management organisations. On the final day, the soum centre was again visited in order to brief local government authorities, central governmental agencies at the soum level, and PUG or HG heads about the findings and to ask final clarifying questions.

V. Findings

The findings of this study are presented in seven sections, which are based on comparison tables across zones and between different types of herder organisations. These summary tables are in turn derived from more detailed tables covering each ecological zone that gave rise to individual reports for each of the zones. The reader is encouraged to look for further details in these zonal reports.

Characteristics of the study zones

Tables 1a and 1b describe the study zones, the projects operating in them, the weather conditions in the summer and winter preceding the interview (2008-09), and the perceptions of herders and other stakeholders on pasture degradation.

Geography and climate

The high mountain zone in the west has an average altitude at soum headquarters of more than 1500m, which is the average elevation of the country. It is characterised by dry rocky soils, and cool temperatures prevail even in summer and fall. The vegetation is very sparse. We visited the zone in the spring when fodder resources were at their lowest, and at times it was difficult to believe that large herds of livestock could survive in that zone. Unlike in the rest of Mongolia, the summer and fall of 2008 were quite dry. Animals thus entered winter with a lower weight gain than was usual and with little available fodder in the winter and spring pasture areas. During the winter and spring months, a large number of animals died due to the lack of fodder. In some soums, up to 85 percent of the offspring of goats and sheep did not survive in the spring. In some areas, people considered the year to have been a snowless dzud. The general topography of the zone is characterised by high rocky mountains which hinder the free movement of herders and their ability to use all the available pastureland in the region. Because this is the westernmost and poorest area of Mongolia, there is no immigration from other regions. However, intra-aimag and inter-aimag movements are frequent at the borders of neighbouring soums and aimags.

The forest steppe zone in northwestern Mongolia has an average altitude at soum headquarters above the average elevation of the country. It is characterised by dry brown soils, and cold temperatures prevail in the remote northern areas. Vegetation is abundant near the centre of Mongolia and sparse towards the west. The summer of 2009 was quite good throughout most of the zone. Depending on the particular geographic location, the winter of 2008 was either good or bad, with some incidences of livestock mortality in the westernmost part of the zone. Generally, the topography is characterised by forest-covered mountains, valleys and steppe, through which herders move around freely without any barriers, except in a few places where mountains block herders' use of some pastures. Relatively few intra-aimag movements were observed due to the abundance of pasture. However, the region has become a transit zone in the migration of herders from the western high mountain zone to the central region (mostly to the forest steppe area of the central region).

The crop-livestock integration zone located in the northern part of central Mongolia has an average altitude at soum headquarters below the average of Mongolia. It is characterised by dry steppe brown soil, and there is dense vegetation in summer and fall. We visited the zone at the beginning of the summer when intense vegetation development had already taken place. The beginning of summer was not as good as expected in terms of the presence of green vegetation. As in most parts of Mongolia, the summer and fall of 2008 were quite good. Animals entered the winter with good weight gains, and fodder availability in the winter and spring pasture areas was also good. In the past 15 years, soums in this zone have received many permanent migrant herders from the high mountain and remote forest steppe zones. This has significantly contributed to the increase in the number of livestock. Intra and inter-aimag movements are also frequent from neighbouring soums and aimags, particularly from Tuv and Dundgobi aimags.

The central steppe zone has an average altitude at soum headquarters of below 1500m. It is characterised by dry steppe brown soils and lower hills, and experiences the normal Mongolian hot summers and cold winters. According to the local population, the vegetation was becoming more sparse and with fewer species. In 2009, the summer got off to a good start in the central part of the country. We visited the zone in the middle of June, when green vegetation was already present. However, the level of vegetation differed significantly depending on the location. Compared with some areas of the country, especially to the west, the last winter was relatively mild and there was no noticeable animal mortality during winter and spring. The topography of the zone is characterised by plain steppes with low hills

that allow herders to move about freely. However, the zone has exceptional difficulties in dealing with seasonal herder movements as it is located at the intersection of winter and spring movements of herders from the desert steppe zone and summer and autumn movements of herders from the north, where surface water sources have become scarce.

The eastern steppe zone has an average altitude at soum headquarters below 1500m. It has the lowest livestock density in Mongolia, partly because of limited and hard-to-reach groundwater, which means it has few water points. It is characterised by dry steppe soils and low hills. The vegetation is abundant. We visited the zone at the end of June of 2009. Although locals believed the pasture was degrading, it was not particularly noticeable compared with the rest of the country. The region was spared the 1999-2002 dzuds that wreaked havoc throughout the rest of Mongolia. Summers and winters had been normal, except for a very cold rainstorm that occurred in the middle of June, during which the aimag lost more than 70,000 livestock. The summer of 2009 started somewhat late, but following the rainstorm it turned out to be a good season with plentiful green grass. The topography is characterised by low hills and flat land that allow herders to move about freely. Despite a migration influx from neighbouring soums and herders from central Mongolia who let their horses graze here during winter (otor), the pasture has not yet been seriously disturbed.

The desert steppe zone has low lands and small hills, even surfaces and an average altitude below 1400m, and is characterised by low rainfall and dry, hot summers. Pasture vegetation is sparse and short. In the past few years, pasture vegetation cover and species diversity have been reduced. The low hills and flat lands allow herders to move about freely. As a consequence of the sparse vegetation, herders stay far from one another in the vast spaces available. Because of a shortage of vegetation, many herders move to *otor* areas over long distances across the country, primarily to the north. There have been instances in which some herders have not returned from *otor* in drought years due to the scarcity of vegetation. In the desert steppe zone, there is little opportunity to prepare winter fodder, forcing herders to move to other herders' areas to survive the winter, particularly during severe winters.

Changes in herding practices

In mountain areas where the preceding summer had been unusually dry, herders wanted to sell their animals before the onset of winter. However, the dry summer negatively affected livestock weight gain, which meant livestock had a low market value. In addition, mass livestock sales caused the price of meat to plummet in autumn. Thus, meat prices were equally low across the region, suggesting that both local and regional market conditions were affected by the excess supply of animals. As a result, herders did not sell enough of their animals and experienced considerable livestock losses during winter and low offspring survival rates in spring (Table 1a).

In some areas, especially those close to main markets, such as in the central steppe and crop-livestock integrated zones, herders do not sell their animals after a bad summer. Instead, they buy fodder from the market and feed their animals during winter, preferring to sell them in spring when meat prices peak.

Herders are concerned about the changing practices and conditions in traditional pastoral herding systems. The most cited change in the herding style in most zones (with the exception of the high mountains) was the need to increase seasonal rotations as a result of the search for water for livestock. This trend is consistent with data on declining water sources that is discussed in the livelihood report (Mongolian Society for Range Management, 2009). In the high mountain zone, the problem is less severe as there still is water during the summer from melting glaciers. Water availability should therefore be a key consideration in delineating PUG territories.

The second change in the herding style is the growing share of goats in herds that alters herd species composition in the forest steppe, crop-livestock and eastern steppe zones – areas that are traditionally non-goat zones. Increasing the number of goats has been a response to the high prices of cashmere that have prevailed for the past decade. Herders and authorities alike have realised that this shift in the herd composition has a very negative effect on pasture health and is contributing to degradation.

Improving animal quality and health is a high priority in the crop-livestock, the central steppe and eastern steppe zones where herders understand the importance of owning high-quality, healthy animals. These zones have not been traditionally used for the grazing of goats, and hence herders in these zones may have devised different strategies to improve their livelihoods by generating more income from better-quality livestock.

While respondents in the high mountain zone were concerned over changing herding practices, they were not concerned with the changes in the natural environment, which are the result of an increasing number of animals, reduced rainfall and pasture degradation. Herders in the central steppe zone prepared more fodder in order to survive winter and to supply fattened animals to the Ulaanbaatar market. In the desert steppe region, herders were beginning to tend their livestock with motor vehicles rather than horses. This is consistent with the

low density of animals in the zone, the flat territory and the vast distances involved.

In all regions, people felt that the pastureland was degrading, particularly in the high mountain and desert steppe zones where the level of degradation was perceived to be severe. As illustrated in Table 1a, the most cited reason for pasture degradation was the change in herd composition, particularly the increase in the number of goats in all zones except the desert steppe. This was followed by the increasing number of animals in all regions, except the eastern steppe and desert steppe zones. In the eastern steppe, animal numbers are still far below carrying capacity, and therefore herders did not perceive livestock numbers as the main cause of pasture degradation. The desert steppe is part of the disequilibrium pasture system, in which pasture health is primarily determined by weather and climate factors rather than by stocking rates. It was therefore not surprising that herders did not view pasture degradation as being the result of their behaviour or their stocking rates. In the eastern and desert steppe zones, the pasture was degraded not as a result of an increasing number of animals, but because of reduced rainfall and water scarcity. In the central steppe zone, the temporary in-migration of herders from other areas for the purpose of using *otor* is one of greatest contributors to pasture degradation. In the desert steppe zone, sandstorms and frequent droughts were seen to be the main cause of degradation.

The decline in seasonal rotations was seen to significantly contribute to the degradation of pastureland in the high mountain, crop-livestock and eastern steppe zones. However, discussions with herders on the changes in the herding style showed that herders had begun to increase the frequency of their seasonal movements. The two findings may seem contradictory, however they are consistent given that herders have moved more frequently in the past few years following a decline in the availability of water. This differs from moving seasonally to access pasture vegetation. Indeed, such movements in search of water may degrade pasture to a greater extent around water sources. The perceptions of the causes of pasture degradation were in line with the scientific understanding of equilibrium, mixed and disequilibrium systems. In the first instance, degradation is caused by overstocking and herd composition in favour of goats, while in the last instance it is a consequence of weather variations and climate change. This congruence of perceptions with the scientific understanding suggests that the methodology for the study has led to reliable results. On the other hand, a detailed inspection of the regional reports shows that herders' perceptions of pasture degradation do not match the data on carrying capacity and stocking rates. In order to explain this incongruence, more detailed study is necessary on how herders assess rangeland health and on the appropriateness of the current carrying capacity measurement methodology for accurately reflecting variations in the specific natural environments. Evidence from Africa suggests a correspondence between pastoralists' perceptions and botanical assessment of rangeland health (Wesuls and Lang, 2010) and there is a complex local knowledge about rangeland conditions and environmental variability (Thomas and Twyman, 2004).

Conclusions

1. Herders in all the zones studied perceived pasture degradation to be increasing. The main factor for pasture degradation in all but the desert steppe and the eastern steppe zones was seen to be caused by an increase in the number of animals, particularly goats, resulting in changes to herd composition. This was followed by an increasing number of animals. The herders' perceptions of pasture degradation and their causes tallies with the scientific explanations of the differences between equilibrium and disequilibrium herding systems.
2. On the other hand, herders' perceptions about pasture degradation did not tally with the data on overstocking.
3. In the desert steppe and central steppe, long distances and frequent movements of herders in search of water and good pasture conditions is likely to be a challenge to the future development of a territorial pasture-management system.
4. The main change in the herding style is herders moving more often in search of water for their animals, while seasonal rotations for pasture use and resting may have declined.
5. Herders in the central region, more so than in other regions, are increasingly focusing on improving animal quality and health rather than increasing the number of livestock, especially goats. Herders in proximity to urban markets have taken advantage of the opportunity of buy fodder in order for their animals to survive winter. In that way, they have managed to reduce animal mortality and have been able to sell livestock during spring at peak prices rather than on the oversupplied fall market. Herders in remote areas tried to destock after the dry 2008 summer in order to prevent large livestock losses during winter. This strategy led to an oversupply of the market and an eventual price collapse.
6. Depressed livestock prices due to oversupply made adequate destocking in the mountain zone after the poor summer impossible. Consequently, livestock mortality during the winter and the mortality of offspring the following spring were high.

Table 1a: Weather conditions, changes in herding, and pasture degradation

Soum	How was		Percent animals lost (%)	Ability to sell after last bad summer	Three most important		Projects present and since
	Last summer	Last winter			Changes related to herding	Reasons for pasture degradation	
High mountains	Dry, little rain	Not bad weather, not enough grass on the pasture	1.0-50.0	Very poor	- Increasing number of animals - Reduced rainfall - Pasture degradation	- Increasing number of animals - Change in herd composition towards goats - Less seasonal rotations	- SLP --- 2002 - MC --- 2004 - GG --- 2005 - SBCS ---2005 - WV --- 2006 - WWF --- 2007 - Altai Sayan - 2008
Forest steppe	Good, but quite dry in two soums: Ider and Undur-Ulaan	Beginning was good but the end was a very cold, severe winter	No animal mortality except in Ider, where it was 15 percent	Low	- Change in herd composition, with an increasing number of animals - More movements in search of water for animals - Moving more to otor (reserve pasture)	- Increasing number of animals - Change in herd composition towards goats - Grasshoppers and rodents are a problem in Telmen and Ider	- RPRP - 2003 - SLP --- 2002 - GG --- 2005 - WV --- 2005
Crop-livestock	Started late, but was good	Not bad, but windy at the end	No	Poor, but did not try to do so	- Moving more in search of water and because of pasture unavailability - Change in herd composition, with an increasing number of goats - Improving animal quality and health	- Increasing number of animals - Change in herd composition towards goats - Fewer seasonal rotations	- SGM 2003-2007 - SLP --- 2002 - WV -- -2004 - JICA --- 2006 - LGI --- 2009
Central steppe	Very good summer, except in one soum where it became dry earlier	Good winter with little snow	No	Low, but they did not try to do so	- Improving animal quality - Preparing more fodder to pass winter and to sell fattened animals in spring - Rotating pasture due to declining water availability for animals	- Increasing number of animals - Movement to otor by herders from outside - Change in herd composition towards goats	- KNP --- 1994 - SLP --- 2003 - GG --- 2007 - SLMCD --- 2008
Eastern steppe	Beginning was dry, but good summer	Good winter	No	Never tried to do so	- Moving more in search of water for animals - Improving animal quality because of water scarcity - Change in herd composition with the increasing number of goats	- Change in herd composition towards goats - Reduced rainfall and water scarcity for animals - Fewer seasonal pasture rotations	- SLP --- 2003 - SBCS --- 2003 - WV --- 2007
Desert steppe	Very dry, except one soum where it was good	Good winter, but less grass on pasture	No	Poor, but did not try to do so	- Rotating pasture not only in the soum, but also in neighboring soums/aimags for water for animals - Looking after animals with motor vehicles - Moving to otor without a camp	- Frequent droughts - Sandstorms and movement - Lack of water availability for animals	- MC-- 1998-2008 - SLP --- 2002 - GG --- 2004 - WV --- 2006 - SLMCD --- 2009

Table 1b: Conditions and degradation in PUG soums

	High Mountain		Forest Steppe		Crop-livestock	Central steppe	Desert steppe
	Tsengel	Duut	Ikh-tamir	Telmen	Bayangol	Undurshireet	Ulziit
Perceived degradation	Severe	Severe	Becoming degraded	Becoming degraded	Becoming degraded	Becoming degraded	Severe
Carrying capacity	18 percent exceeded	39 percent exceeded	118.5 percent exceeded	Not exceeded	90 percent exceeded	1.5 percent exceeded	27 percent exceeded

Difficulties involved in setting up and running herder organisations

Table 2 presents the difficulties encountered in setting up and running herder organisations. They are shown separately for HGs and PUGs.

Herder groups

Although the concept of a HG differs from donor to donor and from area to area, the same questions related to the challenges of initiating and running a HG were asked to members of different HGs. The most cited difficulty in three out of four regions (except in the high mountains) was that no supporting head organisation remained after project activities terminated. Technical support was also frequently mentioned as a crucial factor in setting up HGs in the high mountain, central and eastern steppe zones. These two factors may explain why, after project completion, most of the HGs disbanded. Lack of financial support, inadequate member initiatives and participation, price drops in livestock products, and conflicts between members and non-members were also often cited as critical determinants of HG survival.

Pasture user-groups and associations

Difficulties in setting up and running PUGs are diverse, and it is hard to find any common factors. The crop-livestock integrated zone does not have PUGS but does have local government initiatives for pasture and livestock management. However, inadequate member initiatives and participation was a common problem for both HGs and PUGs. Perhaps more incentives and time are needed to intensify initiatives and the participation of local communities in collective action. The central steppe zone has experienced poor selection of PUG and APUG heads, meaning that leadership was also an important factor in the future existence of herder organisations. Water difficulties were cited in the forest steppe and desert steppe zones. The lack of water in PUG territories meant the PUG territorial system was sometimes threatened, and at times resulted in conflicts. Respondents complained that no one listened to the heads of PUGs and APUGs in the central steppe zone in relation to the movement of herders from outside to *otor* areas. Local authorities, particularly aimag authorities, regulated movements in PUGs areas without consultation with PUG leaders. Some herders said it appeared that government policy was against Green Gold activity in this zone.

Conclusions

1. Setting up organisations was not generally seen to be particularly difficult, however running those organisations effectively posed difficulties that differed from area to area and by organisational type and age.
2. The most common problem facing the sustainability of HGs was that no support from a head office remained in the field after project completion that would continue to provide project services to the beneficiaries. This was also suggested by the expressed need of HGs for continuing technical assistance. Clearly, the creation of a sustainable support organisation for herder collective action is critical.
3. Difficulties in running PUGs are more diversified and reflect the specificities of the zones. The experience of the central steppe suggests that leadership quality and close coordination with the local government are critical for bringing open access under control via the PUG system.

Table 2a: Difficulties involved in setting up HGs

Zones	Three most cited difficulties (in order of number of citations)
High mountain	- Lack of financial support, technical support, members' initiatives and participation, drop in the price of agricultural products
Crop-livestock without local government initiatives	- No head office remaining after project completion, lack of market capacity, conflict among members and non-members
Crop-livestock with local government initiatives	- No head organisation remaining at soum headquarters after project completion, lack of members' initiatives and participation, poor selection of heads of APUGs and PUGs
Central steppe	- Lack of technical support, fewer members' initiatives and participation, no head office remaining after project completion, conflict
Eastern steppe	- Lack of financial support, technical support, no head organisation remaining after project completion, price drop for agricultural products

Table 2b: Difficulties involved in setting up PUGs

Zones	Three most cited difficulties (in order of number of citations)
High mountain	- Lack of members' initiative and participation, grasshoppers and rodents, technical support, drop in prices
Forest steppe	- Weather risks, members' initiatives and participations, water difficulties, herders ignoring their own PUG
Central steppe	- Poor selection of heads of APUGs and PUGs, "GG project does not wash the brain of herders sufficiently", meaning that they do not make them fully understand the nature and urgency of dealing with pasture degradation, no one listens to heads of PUGs,
Desert steppe	- Lack of water for animals, administrative bureaucracy, conflict

The perception of the herders of their own organisations

Herder groups

Tables 3a and 3b show that active participation in herder organisations by members was generally good in all zones after establishment but subsequently declined. In the high mountain and central steppe zones, herder groups had become inactive, while participation was mixed in the crop-livestock and eastern steppe zones. This diminishing trend of participation, from good to mixed and/or inactive, shows that HGs currently do not work as well as expected. Respondents said herders most often formed groups with the expectation of receiving material support from donors. If support expectations were not met, group activities ceased, however not without preserving the HG's name. Herders do not leave HGs, which indicates that inactivity is not due to disappointment with the organisation. HGs face conflicts with non-member herders about pasture access and use.

Pasture-user groups

For PUGs, insufficient member participation was a problem in all ecological zones. As shown in Table 3b, initial participation was good in three of the regions and mixed in two zones: the crop-livestock zone (where the government, rather than PUGs, is the primary actor) and the central steppe, which has more livestock movements. Nevertheless, the current level of participation is good, with the exception of the desert steppe zone where herders feel that the PUG system is not the best answer to their problems. Initial participation was mixed in the central steppe zone, which has the highest number of wealthy families. Wealthy families either do not want to join PUGs or PUG members do not want to accept wealthy families into their PUGs because of their large herds. In the desert steppe zone, initial participation was good, but it became mixed over time, suggesting that the present PUG system might have to be adapted to the high mobility context of this region. As Table 3b suggests, some herders openly resist the introduction of the PUG system in the desert steppe.

There have been some conflicts within PUGs. These include benefit-sharing issues in relation to haymaking areas in the high mountain zone and territorial issues between PUGs in the forest steppe and central steppe zones. Such problems are usually caused by the insufficient participation of herders during the delineation process of the PUG territory and during meetings where long-term strategies are discussed.

Disagreement is not limited to the PUG system. Herders in the crop-livestock zone are not in full agreement with soum government pasture-management initiatives.

Conclusion

1. A low rate of participation in HGs indicates that the system is not working well.
2. HGs encounter problems with non-member herders.
3. PUGs sometimes encounter difficulties in defining boundaries when all herders do not participate from the outset.
4. The current PUG system does not work well in the desert steppe zone.
5. Pasture management initiated from the top in the crop-livestock zone does not result in sufficient participation.

Table 3a: The perception of herders of their HGs

Soum	Initial participation	Current participation	Current Resistance	Conflict	Disappointment
High mountain	Good	Inactive	No	No	No
Crop-livestock	Good	Mixed	No	With non-members over pasture use	No
Central steppe	Good	Inactive	No	With non-members over pasture use	No
Eastern steppe	Good	Mixed	No	With non-members over pasture use	No

Table 3b: The perception of herders of their PUGs

Soum	Initial participation	Current participation	Current Resistance	Conflict	Disappointment
High mountain	Good	Good	No	Emerged over time (benefit-sharing)	No
Forest steppe	Good	Good	No	Emerged over time (pasture use)	No
Central steppe	Mixed	Good	No	Emerged over time (pasture allocations to PUGS)	No
Desert steppe	Good	Mixed	Sometimes	Sometimes	No
Crop-livestock	Mixed	Mixed	No	With non-members	No

Economic and pasture management activities

During the interviews, up to 25 different pasture and herd-management activities were identified, with the number of activities varying across the surveyed zones and soums. All pasture-management and livestock-productivity activities were divided into three categories: land allocation and the movement of herders (up to eight activities in each soum), productivity improvement with collective action (nine activities), and productivity improvement without collective action. This division of activities is important in being able to identify what kind of activities need to be undertaken by PUGs under an entire territory-based approach and what kind of activities can be conducted by smaller groups of herders such as HGs that do not require a territory-based approach. Below we list these activities and their relationship to sustainable livelihoods.

Land allocations and the movement of herders include:

- Delineating and allocating PUG territories;
- Allocating winter and spring pasture to herders;
- Allocating individual winter pasture areas;
- Allocating summer/autumn pasture;
- Allocating pasture for all seasons (depending on the area, it is not necessary to make summer pasture allocations; however, it can sometimes be necessary);
- Ensuring seasonal rotations: This is necessary to

ensure the proper resting of pasture areas within the year;
- Coordinating inter-soum movements;
- Coordinating inter-bag movements; and
- Preventing conflicts.

Some of these activities are needed to be make the allocation of land every year operational, particularly in difficult years.

Productivity-improvement activities with collective action: Specific activities include:
- Setting aside *otor* areas;
- Defining, creating and allocating haymaking areas either to individuals or to groups;
- Setting aside pastures to be rested;
- Making fences for either individual or group plots;
- Planting forage as groups;
- Seeding haymaking areas and pastures;
- Improving and building irrigation systems;
- Planting trees or shrubs as a group;
- Shooting clouds for making rain;
- Discussing a reduction in the number of animals;
- Improving or constructing new mountain roads to enable access to unused pastures;
- Repairing and building wells in inaccessible areas; and
- Fighting grasshoppers and rodents.

Productivity improvements that can be implemented without collective action:
- Producing forage;
- Removing stones from haymaking areas;
- Vaccinating animals;
- Improving livestock quality; and
- Planting trees or shrubs.

In order to get a better picture of the intensity with which such activities as haymaking were carried out, intensity scores of from one to three were assigned to activities. One denotes a low intensity, two a medium intensity, and three a high intensity. Such intensity scores did not make sense for “either/or” activities, such as land allocations and movement activities.

We note here that data on the activities of HGs was not collected in the forest steppe and desert steppe, and there was no PUG in the crop-livestock zone. Therefore, we are only comparing activity levels between HGs and PUGs in the high mountain zone and the central steppe zone. As shown in Table 4a, the number of overall activities conducted by HGs ranged from five to 13, with the lowest in Matad soum of Dornod aimag in the eastern steppe and the highest in Ulaan Khus soum of Bayan Ulgii aimag in the high mountain zone and Bulgan soum in the eastern steppe. The total number of activities undertaken was generally higher in the PUGs than in the HGs, with the exception of Duut soum where PUGs had only been operating for nine months and the money for undertaking activities had not yet arrived at the time of the interviews (Table 4b).

In the two cases where a direct comparison between HGs and PUGs was possible, PUGs were found to be more active than HGs in managing seasonal rotations and other pasture-management tasks. In the high mountain zone, there were eight activities in PUG soums compared with two in soums that only had HGs. In the central steppe, there were five activities in the PUG soum compared with three to five in soums with only HGs. When comparing activities within PUGs across zones, the number of activities involving the management of pastures and seasonal movements was higher in the equilibrium systems of the mountains than in the mixed system of the steppe and the disequilibrium system in the desert steppe. These comparisons highlight the better performance of the territorial approach to herder organisation in terms of the management of pastures and seasonal movements in equilibrium and mixed systems, and the greater difficulty of territory-based management in the mixed and disequilibrium systems.

When it to comes to productive activities that require collective action, HGs completed between two and seven activities and PUGs between two and eleven, depending on the zone. Without taking into consideration the levels of intensity, which will be examined in the next subsection, there seems to be little difference in relation to the suitability of either group model in terms of collective action for productive activities. For productive activities that do not require collective action and can be undertaken by individuals or groups, HGs completed from one to four of such activities, while PUGs completed from two to five. In terms of these activities, there seems to be little difference between HGs and PUGs.

The data suggests that while HGs are able to execute a fair number of collective tasks, they are weak in the areas of pasture-management and the control of seasonal movements, which are essential for bringing open access under control. PUGs fare better and are equally able to perform productive tasks that require collective action than those that do not.

Table 4a: Number of activities by herder groups

	High mountain	Crop-Livestock		Central steppe			Eastern steppe			
	Ulaan Khus	Mandal	Bayangol	Erdenesant	Bayan-Unjuul	Altanbulag	Matad	Bayan-Uul	Tsagaan-Ovoo	Bulgan
Overall	13	12	11	10	6	10	5	6	10	13
Pasture management and movement	2	3	3	3	3	5	2	1	5	5
Productivity with collective action	7	5	4	4	2	4	2	3	4	5
Productivity without collective action	4	4	4	3	1	1	1	2	1	3

Table 4b: Number of activities by pasture-user groups

	High Mountain		Forest Steppe		Central steppe	Desert steppe
	Tsengel	Duut	Ikh-tamir	Telmen	Undurshireet	Ulziit
Overall	24	12	17	22	11	10
Pasture management and movement	8	8	8	7	5	6
Productivity with collective action	11	2	7	10	3	2
Productivity without collective action	5	2	2	5	3	2

In table 4c and 4d we look at individual activities. As reported previously, pasture-management and movement activities at the HG level are undertaken with local government leadership and support. Therefore, each of the soums that have HGs has its own MPMs. The HGs in these soums also plan and implement collective activities, some of which do not figure in the soum pasture-management plan. For example, helping each other in reducing the goat population and/or with movements is not part of a soum pasture-management plan. The PUG system differs from HGs in that regard. PUGs represent all herders, and collective action depends on PUGs' initiative. In practice, this means that the soum pasture-management plan is essentially an aggregation of the PUGs' plans, and not the other way around. Tables 4c-h provide an overview of activities implemented by PUGs and HGs. Clearly, PUGs implement a wider variety of pasture and movement-control activities than soums without PUGs. For example, they are more likely to allocate summer and fall pastures and to regulate inter-bag and inter-soum movements that are essential in gaining control over open access.

In Table 4e and 4f, productivity activities involving collective action are listed for both HGs and PUGs. In these tables, we also take into account the level of intensity of the productive activities, which ranges from one to three. We list only those activities that are actually carried out at levels two or three, rather than those just initiated. Although the number of activities in both systems is comparable, when we look at only those that are at an intensity level of at least two, a difference emerges. HGs at most implement three activities at level two or higher; that figure rises to 11 in the case of PUGs. The length of time since community mobilisation has a strong influence on levels of activity, as illustrated by the difference in the high mountain zone between Tsengel soum and Duut soum. The latter had been unable to begin actual implementation as its organisation had only been in existence for nine months and they had not yet received finance for implementation, while in Tsengel soum the PUG has been operating for three years. Another example is Altanbulag in the central steppe zone, which has been heavily involved with the Khustai National Park Project since 1994 and has the highest number of activities at an intensity level of two and more. In a similar vein, Ikh-tamir and Telmen soums have the longest engagement with Green Gold and all their activity levels are intense. The intensity level of collective-action activities is lower in the eastern steppe and desert steppe zones, highlighting again that the demand for the collective action is lower in these areas.

Productivity activities that can be undertaken without collective action are shown in Tables 4g and 4h. These activities are poorly implemented by both HGs and PUGs. However, PUGs are slightly more active and conduct such operations as removing stones from haymaking areas and seeding pastures and hay fields.

Table 4c: HGs' implementing activities

	High mountain	Crop-Livestock		Central steppe			Eastern steppe			
	Ulaan Khus	Bayangol	Mandal	Erdenesant	Bayan-Unjuul	Altanbulag	Matad	Bayan-Uul	Tsagaan-Ovoo	Bulgan
Pasture management and movement	2 1. Have HG, soum PMPs 2. Make seasonal rotations	3 1. Have HG 2. Make seasonal rotations 3. Avoid conflicts	3 1. Have HG, soum PMPs as appropriate 2. Allocate summer and autumn pastures 3. Make seasonal rotations	3 1. Have HG, soum PMPs as appropriate 2. Make seasonal rotations 3. Avoid conflicts	3 1. Have HG, soum PMPs as appropriate 2. Make seasonal rotations 3. Allocate winter and spring pastures	5 1. Have HG, soum PMPs as appropriate 2. Allocate winter and spring pastures 3. Make seasonal rotations 4. Participate in facilitating inter-soum movements 5. Participate in avoiding conflicts	2 1. Have HG, soum PMPs as appropriate 2. Make seasonal rotations	1 1. Have HG, soum PMPs as appropriate	5 1. Have HG, soum PMPs as appropriate 2. Allocate winter and spring pastures 3. Allocate summer and autumn pastures 4. Make seasonal rotations 5. Avoid conflicts	5 1. Have HG, soum PMPs as appropriate 2. Allocate winter and spring pastures 3. Allocate summer and autumn pastures 4. Make seasonal rotations 5. Avoid conflicts
Most of these activities are conducted under government initiative and are mostly carried out by local governments. None of the activities are carried out independently by HGs, except those in HGs' plans.										

Table 4d: PUGs' implementing activities

	High Mountain		Forest Steppe		Central steppe	Desert steppe
	Tsengel	Duut	Ikh-tamir	Telmen	Undurshireet	Ulziit
Pasture management and movement	8 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Allocate summer and autumn pastures 5. Make seasonal rotations 6. Facilitate inter-soum movements 7. Organise inter-bag movements 8. Avoid conflicts	8 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Allocate summer and autumn pastures 5. Make seasonal rotations 6. Facilitate inter-soum movements 7. Organise inter-bag movements 8. Avoid conflicts	8 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Allocate summer and autumn pastures 5. Make seasonal rotations 6. Facilitate inter-soum movements 7. Organise inter-bag movements 8. Avoid conflicts	7 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Allocate summer and autumn pastures 5. Make seasonal rotations 6. Facilitate inter-soum movements 7. Avoid conflicts	5 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Make seasonal rotations 5. Facilitate inter-soum movements	6 1. Have PUG, or soum PMPs as appropriate 2. Delineate PUGs' territory 3. Allocate winter and spring pastures to PUGs 4. Make seasonal rotations 5. Facilitate inter-soum movements 6. Avoid conflicts
	Activities are mostly undertaken by PUGs with support from their local governments					

Table 4e: HGs' implementing activities

	High mountain	Crop-Livestock		Central steppe			Eastern steppe			
	Ulaan Khus	Bayangol	Mandal	Erdenesant	Bayan-Unjuul	Altanbulag	Matad	Bayan-Uul	Tsagaan-Ovoo	Bulgan
Productivity with collective action Only activities that are at an intensity level of 2	7 1. Set aside otor area	4 1. Establish haymaking area	5 1. Establish haymaking areas 2. Plant forage	4 1. Facilitate otor area 2. Fence haymaking areas 3. Make and repair wells	2 1. Establish haymaking areas 2. Make and repair wells 3. Fight grasshoppers and rodents	4 1. Set aside otor areas 2. Establish haymaking areas 3. Fight grasshoppers and rodents 4. Make and repair wells	2	3	4	5

Table 4f: PUGs implementing activities

	High Mountain		Forest Steppe		Central steppe	Desert steppe
	Tsengel	**Duut**	**Ikh-tamir**	**Telmen**	**Undurshireet**	**Ulziit**
Productivity with collective action Only activities that are at an intensity level of 2	11 1. Set aside otor areas 2. Establish haymaking areas 3. Make fences 4. Improve or establish irrigation 5. identify pastures to be rested 6. Plant trees or bushes 7. Repair or build wells 8. Improve or build new mountain roads 9. Shoot clouds to make rain 10. Discuss number of animals 11. Fight grasshoppers and rodents	2 All activities are at an intensity level of 1	7 1. Set aside otor areas 2. Establish haymaking areas 3. Make fences 4. Identify pastures to be rested 5. Plant trees or bushes 6. Repair or build wells 7. Improve or build new mountain roads	10 1. Set aside otor areas 2. Establish haymaking areas 3. Make fences 4. Identify pastures to be rested 5. Plant trees or bushes 6. Build and repair irrigation system 7. Fight grasshoppers and rodents 8. Build new mountain roads 9. Make and repair wells	3 1. Establish haymaking areas 2. Make fences 3. Fight grasshoppers and rodents	2

Table 4g: HGs' implementing activities

	High mountain	Crop-Livestock		Central steppe			Eastern steppe			
	Ulaan Khus	**Bayangol**	**Mandal**	**Erdenesant**	**Bayan-Unjuul**	**Altanbulag**	**Matad**	**Bayan-Uul**	**Tsagaan-Ovoo**	**Bulgan**
Productivity without collective action Only activities that are at an intensity level of 2	4	4 - Remove stones from hay making area	4	3 1. Vaccinate animals 2. Improve animal quality 3. Plant forage	1 1. Vaccinate animals	1 1. Vaccinate animals	1 1. Vaccinate animals	2	1	3

Table 4h: PUGs' implementing activities

	High Mountain		Forest Steppe		Crop Livestock	Central steppe	Desert steppe
	Tsengel	**Duut**	**Ikh-tamir**	**Telmen**	**Bayangol**	**Undurshireet**	**Ulziit**
Productivity without collective action Only activities that are at an intensity level of 2	5 1. Remove stones from haymaking areas 2. Vaccinate animals	2 All activities are at an intensity level of 1	2 1. Vaccinate animals	5 1. Remove stones from haymaking areas 2. Plant forage 3. Seed haymaking and pasture areas 4. Vaccinate animals 5. Improve animal quality	4 - Remove stones from haymaking areas	3 1. Plant forage 2. Seed haymaking and pasture areas 3. Vaccinate animals	2

Table 4i: Difficulties facing HGs' activities

Zones	**Three most cited difficulties (in order of number of citations)**
High mountain	- Money, members' initiatives and participation, technical support, lack of local administrative experience
Central	- Money, technical support, members' initiative and participation, the influence of nature, low marketing capacity, fewer haymaking and otor areas in the soum, water difficulties
Eastern steppe	- Money, technical support, price drops, no head organisation remaining after project completion
Crop-livestock without local government initiative	- Technical support, money, members' initiatives and participation
Crop-livestock with local government initiative	- Members' initiatives and participation, conflict among members, technical support

Table 4j: Difficulties facing PUGs' activities

Zones	**Three most cited difficulties (in order of number of citations)**
High mountain	- Members' initiatives and participation, money, technical support, lack of local administrative experience, lack of extra pasture
Forest steppe	- Technical assistance, members' initiatives and participation/time, influence of nature, bureaucracy within local administrations, fewer otor and haymaking areas, pasture degradation
Central	- Technical support, members' initiatives and participation, water difficulties, non-compliance with local government agreements
Desert steppe	- Water difficulties, members' initiatives and participation, pasture degradation

In Tables 4i and 4j, the difficulties encountered in running the activities are shown. Much like the difficulties encountered in setting up and running herder organisations, difficulties in undertaking pasture-management and livestock-productivity activities were also quite common, starting with the need for technical support in all zones, followed by members' initiatives and participation. Depending on the specificities of each of the zones, money was an issue in the high mountain and central steppe zones, while in the central, eastern and crop-livestock integrated zones, the key issues were a lack of water for animals, livestock price falls, and no head office remaining after project completion.

In contrast with the difficulties involved in setting up PUGs, difficulties in relation to the actual undertaking of PUG activities were quite common. This means that running PUG activities is harder than setting up those organisations. A lack of members' initiative and technical support impeded the activities of PUGs and HGs to a similar degree. Money was an issue in the high mountain zone, and natural disasters remained an issue in the forest steppe zone. A scarcity of water resources was a crucial issue in the central and desert steppe zones.

Conclusions

1. PUGs are better suited to implement pasture-management and movement activities than voluntary HGs.
2. PUGs implement more pasture-management activities than economic activities, while HGs focus more on the latter.
3. While PUGs are more focused on pasture-management activities than economic activities, when intensity scores are taken into account, PUGs outperform HGs in terms of economic activities.
4. The length of time a group has been established and the number of activities it has implemented are positively linked, irrespective of the organisational model.
5. Fewer collective-action activities are done in the desert steppe zone, implying that the current PUG system is not suitable for this zone. There is a need to reconsider the focus and inter-soum and aimag linkages of the current PUGs in the central steppe zone.
6. Relying on government facilitation is not a sufficient condition for high levels of group activity.
7. Undertaking collective-action activities is more difficult than setting up herder organisations, irrespective of the system of collective action in place.

Progress towards organisational effectiveness and sustainability

In this section's tables, the effectiveness and sustainability of HGs and PUGs are evaluated based on the 13 criteria defined in Chapter II. In addition, we look at whether those groups had initiated collective action for improved marketing. Four different levels were used to rate effectiveness and sustainability: strong, good, emerging and no (if no clear action had been undertaken). These were applied according to the judgment of the respondents after the interviewers explained the concepts. Good and strong ratings are considered to be satisfactory.

Herder groups

As can be seen in Table 5a, depending on the zone, one to three criteria achieved the satisfactory level, with the lowest in the high mountain zone and the highest in the eastern steppe zone. The most common criteria that are easily met are HG constitutions and bylaws, knowledge about benefit-sharing, and political backing. Although members of all HGs in each of the soums had sufficient knowledge about benefit-sharing, very few HGs, and mainly those in the eastern steppe zone, had successfully created a good working environment with their local administration.

In the different soums, HGs were able to achieve between four and 11 of the sustainability conditions at the emerging level. This meant that HGs had undertaken an activity related to these criteria but had not yet reached a satisfactory level. Emerging criteria include a constitution and bylaws, a revolving fund, political backing and political influence. Political influence is measured if the HG has a representative and/or herder representative in the local government and if herders have a strong link with, or support from, the aimag and central governments. Those zones with the highest emerging criteria were the eastern steppe and the crop-livestock integrated zones. The high mountain zone was lowest in this category. The weakest links of the HGs are their accountability for plans and actions, clear relations with non-members, financial accountability, and improved marketing, while in some of the zones, particularly in the high mountain zone, the HGs failed to meet most of the criteria. It is not easy to interpret the variations of these results.

Pasture-user groups

As shown in Table 5b, a relatively higher number of criteria achieved a satisfactory level for PUGs, ranging from three in the central steppe zone to 13 in the forest steppe zone, followed by the high mountain and forest steppe zones. The difficulties in the central steppe reflect lower activity levels. Young PUGs have lower

criteria at the satisfactory level than those that have been established longer. All Green Gold PUGs were established from 2005 onwards, except in the central steppe zone and in Duut soum in the high mountain zone, which were formed less than two years ago. However, the criteria were met well in Duut soum, which may be due to the exceptionally strong leadership observed there. The analysis also shows that stronger leadership in combination with stronger cooperation with the local government (see political backing) is conducive to a higher level of PUG effectiveness and sustainability. It is difficult to say whether the PUG system is effective and sustainable in the central steppe zone as it has only been implemented for two years, and most of the criteria are at the emerging level.

Across the board, the worst-performing criteria are financial sustainability, clear relations with non-members and improved marketing. Clearly, projects should focus more on these areas. Telmen soum in the forest steppe zone has had the most success in areas where other PUGs had failed, including financial accountability and sustainability, leadership and capacity.

Conclusions

1. PUGs outperform HGs in terms of effectiveness and sustainability conditions, except in the desert steppe zone.
2. The weaknesses common to both PUGs and HGs are financial sustainability, clear relations with non-members and the insufficient marketing of products.
3. Leadership and good working relationships with local government increase the sustainability of PUGs.
4. Telmen soum in the forest steppe zone has met the most criteria and has succeeded in areas where other PUGs and HGs have failed. Therefore, it can used be a demonstration site.

Table 5a: Progress towards HGs' effectiveness and sustainability

	High mountain		Crop-Livestock		Central steppe			Eastern steppe			
	Ulaan Khus	**Durgun**	**Bayangol**	**Mandal**	**Erdenesant**	**Bayan-Unjuul**	**Altanbulag**	**Matad**	**Bayan-Uul**	**Tsagaan-Ovoo**	**Bulgan**
Good	1	1	2	1	1	2	2	1	2	3	3
Emerging	4	5	10	9	9	8	8	9	8	8	7
Missing	9	8	3	4	4	4	4	4	4	3	4
Significant Functions	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Constitution and/or bylaws	Emerging	Emerging	Emerging	Emerging	Emerging	Good	Good	Emerging	Good	Good	Good
Clear relations with non-members	Missing	Missing	Good	Missing	Missing	Missing	Missing	Missing	Missing	Emerging	Missing
Accountability for plans, actions	Missing	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Missing	Missing	Missing	Missing
Financial accountability	Missing	Missing	Emerging	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing
Leadership	Missing	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Capacity	Missing	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Financial sustainability	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Emerging	Emerging	Emerging	Emerging
Revolving fund	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Operational manual	Missing	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Sharing of benefits	Equal	Equal	Equal	Equal	Equal/ contribution	Equal	Equal	Equal	Equal	Labour contribution	Labour contribution
Political backing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Good	Good
Political influence	Emerging	Emerging	Missing	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Improved marketing	Missing	Missing	Emerging	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing

Table 5b: Progress towards PUGs' effectiveness and sustainability

	High Mountain		Forest Steppe		Central steppe	Desert steppe
	Tsengel	**Duut**	**Ikh-tamir**	**Telmen**	**Undurshireet**	**Ulziit**
Good	10	8	7	12	2	5
Emerging	3	2	6	1	9	6
Missing	1	4	1	1	3	3
Significant Functions	Good	Good	Good	Strong	Emerging	Good
Constitution and/or bylaws	Strong	Good	Good	Strong	Good	Good
Clear relations with non-member	Good	Missing	Missing	Missing	Missing	Good
Accountability for plans, actions	Good	Good	Good	Strong	Emerging	Missing
Financial accountability	Emerging	Missing	Good	Strong	Missing	Emerging
Leadership	Strong	Strong	Emerging	Strong	Emerging	Emerging
Capacity	Strong	Strong	Good	Good	Emerging!	Emerging!
Financial sustainability	Emerging	Emerging	Emerging	Strong	Emerging	Emerging
Revolving fund	Good	Emerging	Emerging	Good	Emerging	Good
Operational manual	Emerging	Missing	Good	Good	Emerging	Emerging
Sharing of benefits	Equal and/or participation	Equal	By labour	By labour	Equal	Equal
Political backing	Strong	Strong	Emerging	Strong	Emerging	Emerging
Political influence	Good	Good	Emerging	Strong	Emerging	Missing
Improved marketing	Missing	Missing	Emerging	Emerging	Missing	Missing

Moving outside the PUG areas in difficult years

Movement into other herders' customary grazing areas is often necessary in bad years but it can cause problems. Certain areas, such as the central steppe, are particularly vulnerable to such migrations. Table 6a/b suggests that permission for migrations within and between soums is almost never required in either the summer/autumn or in winter/spring areas, although in the latter case permission is sometimes sought from the "owner" or usual resident. In some instances, inter-soum movement agreements on a yearly basis are negotiated between soum governors.

Almost no difference could be found in the lack of success related to the control of migration between administrative units by HGs or PUGs. However, there was one exception in Duut soum, where PUGs had worked closely with the soum government to stop herder in-migration from three neighbouring soums. Instead of uncontrolled migration, an agreement on herder exchanges on a seasonal basis had been reached. In all other Green Gold soums, the APUG worked hard to regulate movements in cooperation with their local governments. However, with the exception of Duut soum, no solution had been found elsewhere.

The respondents felt that PMPs by HGs and PUGs would make seasonal movements across boundaries more difficult at a time when declining pasture and water availability required higher mobility. The only people who were not worried in this regard were the herders in Duut soum. The central fear was that overregulation might be an impediment to disaster-mitigation movements that were necessary, although highly irregular. The respondents thought the situation could be managed in a number of different ways, including special agreements between local governments for the establishment of semi-settled or settled farms that would allow for low-risk livestock production that was in accordance with carrying capacity.

Conclusions

1. Intra-soum movements were not considered a difficult issue in most areas, and permission was rarely required. Inter-soum movements were a problem in Duut soum, but were resolved via the PUG system by negotiations among soum governors.
2. The in-movement of herders from outside was considered by most respondents to be a serious issue that led to land degradation
3. In most soums, herders believed it would become more difficult to move in the future, but they also thought the difficulties could be managed.
4. The involvement of soum and aimag governors is sometimes helpful in regulating seasonal movements.

Table 6a: Making moves outside HG area in difficult years

Zone		Outsiders for Summer/autumn		Outsiders move in for winter/spring			More difficult to move in future?		How to manage the problems of moving?
			Difficulties	Permission	Difficulties	How resolved	Yes No	Why	
High mountain	Ulaan Khus	No	No	No outsiders	No	N/A	Yes	No place to move	No movement will be undertaken
	Durgun	Bag/soum governor talks	No, we also move to their soum in summer	Bag/soum governor gives permission	No	N/A	Yes	No pasture	Soum governor talks to others
Crop-livestock	Mandal	No	Permanent Immigration of herders from the west is significant	No	Pasture use	No solution, aimag government ordered not to receive animals from outside of the territory of the aimag	Yes	Can't use other herder's pasture	Not asked
	Bayangol	No	Permanent migration of herders from west	No	Pasture use	No solution, but herders without animals can move in and buy animals locally if they want to do so according to local government resolution	Yes	Can't use other herders' pasture	To engage in intensive farming
Central steppe	Erdenesant	No	Transit area of otor movement	No	Conflict over pasture use in otor transit zone	Complain to local government	Yes	No pasture available to us in others place	Do not know
	Bayan-Unjuul	No	As we also move to other herders' places, we just have friendly talks with them	Local and neighbouring soum herders move in without permission	Pasture quality is worsened by them	Some of them understand and move back, but some of them stay longer	Yes	They won't allow other herders' animals on their pasture	Need to protect our pasture, but it is impossible to distribute pasture in our soum
	Altanbulag	No	Pasture has been degraded significantly due to otor transit	No	Pasture is degraded	Bag governors gave permission to some of them without informing local herders	Yes	Impossible to move to other herders' pasture	Need to have special permission from local governments if herders can`t reach agreement themselves
Eastern steppe	Matad	No	Degraded pasture	No	Degraded pasture, conflicts with local herders	Not yet resolved	Yes	They do not allow use of their pasture	Do not know
	Bayan-Uul	No	A lot of horses come in and degrade pasture	No	Degradation of pasture	Not yet resolved	Yes	They do not allow use of their pasture	Not an issue
	Tsagaan-Ovoo	No	Degrade pasture, conflicts with local herders	No	Degradation of pasture	Not yet resolved	Yes	They do not allow use of their pasture	Seek support from local government
	Bulgan	No	Degrade pasture	No	Degradation of pasture	Not solved yet	Yes	They do not allow use of their pasture	Must have number of animals suited to soum carrying capacity and soum must have undistributed reserve pasture

Table 6b: Making moves outside the PUG areas in difficult years

Zone	Soum	Outsiders for Summer/ autumn		Outsiders move in for winter/spring			More difficult to move in future?		How to manage the problems of moving?
		Permission	Difficulties	Permission	Difficulties	How resolved	Yes No	Why	

High mountain	Tsengel	No	No	No outsiders	Pasture used by them	Argue, oral agreement	Yes	All pasture is owned/used	Talk to local herders, aimag administration should regulate
	Duut	Stopped movements, except for one soum	They destroy a lot of pasture	Agreement at soum level	Use locals' pasture, contribute to degradation in the area	Soum governments created agreements	No	Everything will be well arranged	No problem
Forest steppe	Ikh-tamir	No	Do not know	No	They make hay in my area	No solution, immigrant herders talk about human rights	Yes	Graze only our animals on our own pasture	Pay for their pasture. Authorities from aimag and soum should discuss the issue
	Telmen	No	No	No	They come when we are lacking pasture	Tell herders to move, but without success	Yes	It may be a problem in winter	Can make agreements with others
Central steppe	Undur-shireet	No	They degrade a lot of pasture and create conflicts	Authorities of aimag and city gave them permission without consulting with us	Make pasture worse. Lots of conflict	Some outsiders move back after discussions between herders, but some of them stay longer. No solution found	Yes	More conflict will occur	Will talk to local government
Desert steppe	Ulziit	No	Ruin our pasture	No	No	We try to fit in with them	Yes	All common pasture will be transferred to others	Make agreement and pay fee

Controlling livestock numbers

Controlling stocking rates and, if necessary, limiting the number of animals to match the local carrying capacity are important issues to consider when addressing the current level of pasture degradation. In order to determine stakeholders' views, we questioned those living in PUG areas, as we were particularly interested in how PUGs dealt with these issues. We asked about limiting the number of animals in situations in which improvements in pasture productivity resulting from the PUG system were not sufficient in bringing animal numbers in line with carrying capacity.

In the high mountain and forest steppe zones, the respondents generally believed that the PUG system would result in reduced animal numbers, while in the central and desert steppe zones they thought there would be an increase in animal numbers. Herders were willing to reduce the number of livestock in five of the seven Green Gold soums on the condition that they received compensation. However, herders in the desert steppe zone, where animal numbers have little bearing on pasture degradation, were unwilling to reduce numbers. This was also the case in Duut soum, in the high mountain zone, where the PUG system had only been established for nine months. In areas where herders accepted limiting animal numbers, they also expected compliance after appropriate awareness-rising was conducted. In some instances, they thought support from government and from experienced herders would be helpful.

Reducing the herd size and seasonal destocking before winter, particularly in years when there is a shortage of fodder, are two different issues. The latter is an important risk-mitigation mechanism to avoid animal fatalities during winter. Nevertheless, this kind of destocking has become problematic due to the oversupply of meat on the market and the resulting drop in prices for meat.

Conclusions

1. The acceptance of the limitation of livestock numbers is good in the areas where the PUG system is most appropriate and has been well established. This is not the case in the desert steppe.
2. Raising awareness and support from experienced herders and government are seen as being helpful in ensuring acceptance and compliance.

Table 7: Limiting the number of animals

		As consequence of the PUG system, the number of animals will	Limit animal numbers		
			Limit animals no?	Expected compliance	How to convince to accept
High mountain	Tsengel	Decrease	Yes	Agreement with herders	Government policy needed
	Duut	Decrease	No	No	Awareness
Forest steppe	Ikh-tamir	Decrease	Yes	Need to talk to herders, make them understand	Will have support from experienced herders
	Telmen	Decrease	Yes	Need to talk to herders, make them understand	Will have support from experienced herders
Central steppe	Undurshireet	Increase	Yes	Make herders understand	Awareness-raising
Desert steppe	Ulziit	Increase	No	We have a lot of land	No need to convince

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Appendix

A I. Equilibrium and non-equilibrium ecological models of pastureland vegetation dynamics

The equilibrium model of vegetation change (Clements 1936; Ellison 1960) and the classical model of plant-herbivore population dynamics (Caughley 1979) posit a tightly coupled relationship between the abundance of herbivores and the productivity and species composition of plants. This presumed relationship between grazing intensity and vegetation formed the basis of the pasture condition (RC) model of vegetation dynamics (Dyksterhuis 1949). The RC model predicts that as herbivore numbers increase, plant biomass and cover decline and species composition shifts from dominance by perennial grasses and forbs towards dominance by unpalatable forbs and weedy annuals. When grazing is decreased or removed, biomass and cover are predicted to increase and species composition shifts back toward late succession stages.

Another model is the **non-equilibrium persistent (NEP) model** of pastureland dynamics (Ellis & Swift 1988), which focuses on the effects of a-biotic factors on plant communities and herbivore population dynamics. The NEP model of pastureland dynamics proposed that many pastureland ecosystems were dominated by density-independent and a-biotic factors, rather than density dependent and biological interactions. Despite high variability in inter-annual and inter-seasonal productivity, and fluctuating livestock populations, these ecosystems and the pastoralists they support persist.

Equilibrium models work in systems where conditions for plant growth are relatively constant from one year to another, allowing herbivore populations to increase until they are stabilized by density dependent limitations. Most pasturelands, however, exhibit dramatic fluctuations in rainfall and plant productivity, as well as frequent perturbations such as extended droughts or severe winter storms. Under these conditions, changes in forage quantity are too rapid and great in magnitude to be closely tracked by animal populations. Thus plant biomass, cover and species composition are driven primarily by climatic factors, and herbivores play a small role in determining the productivity and composition of vegetation.

In **non-equilibrium pastureland ecosystems:** (i) Plant-herbivore interactions are loosely coupled; (ii) Herbivore populations are controlled by density-independent factors; (iii) Carrying capacity is too dynamic for close animal population tracking; (iv) Plant biomass is a-biotically controlled; and (v) Competition among plant species is not an important force in structuring communities. In contrast, **equilibrium pastureland ecosystems** are characterised by: (i) Tightly coupled plant-herbivore interactions; (ii) Density-dependent controls on herbivore populations; (iii) Animal populations that fluctuate in response to changing carrying capacity; (iv) Herbivore-controlled plant biomass; and (v) Competition as an important structuring force in plant communities.

Source: Maria E. Fernandez and Barbara Allen-Diaz, 1999

A II. Study soums and project interventions

Zone	Aimag	Soum	Donor Projects*
High mountains	Bayan-Ulgii	Tsengel	GG since 2005
		Ulaan Khus	SLP since 2002
	Khovd	Duut	GG since 2008
		Durgun	No intervention
Forest steppe	Zavkhan	Telmen	GG since 2005
		Ider	No intervention
	Arkhangai	Ikh tamir	GG since 2005, IFAD since 1996
		Undur-Ulaan	IFAD since 1996
Forest steppe with crop production	Selenge	Bayangol	Soum government (SGM)
		Mandal	No intervention (SGM)
Central steppe	Tuv	Undurshireet	GG since 2007
		Bayan-Unjuul	SLP since 2002; (SLMCD)
		Erdenesant	SLP since 2002
		Altanbulag	KNP since 1994
Eastern steppe with low animal pressure	Dornod	Matad	SLP since 2002
		Bayan-Uul	SLP since 2002
		Bulgan	No intervention
		Tsagaan-Ovoo	No intervention
Desert steppe	Dundgobi	Ulziit	GG since 2005
		Khuld	No intervention
		Gurvansaikhan	SLP since 2002
	Dornogobi	Dalanjargalan	SLMCD

* Based on the four main donors (WB, SDC, UNDP, IFAD) pasture-management related projects.