



Lund University Master's Programme in
International Environmental Science

MASTER OF SCIENCE THESIS

Pastoral Land Management, Local Institutions
and Environmental Changes,
a Case Study from Central Mongolia



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Abstract

Nomadic pastoralism is the way of life and basically the only income for around a third part of the Mongolian population. Pastoral lands are state property in Mongolia whereas the livestock is owned by the herding households who received it after the dismantling of the herding collectives in the beginning of the 1990s. The last fifteen years have been characterised by changes in the herders grazing practice, and changes in the pastoral land management policy as a result of the new land legislation. The problems most often related to the new grazing patterns are: reduced mobility of the herders, high concentration of livestock in some places, out-of-season grazing and trespassing. These factors are all said to lead to overgrazing and pasture degradation. The Mongolian Land Law promotes allocation of the pasture land to groups of herders' for possession and management thus trying to facilitate more sustainable grazing practises. Sustainable Grassland Management projects implemented by the Mongolian Ministry of Nature and Environment in cooperation with UNDP, works on formation of new institutions for cooperation among herders and implementation of the pasture allocation. This paper analyses the existing pasture land management legislation and the assumptions it is based upon, as well as the problems new herders institutions are supposed to deal with. The analysis is done in the framework of theories on common pool resource management and institutionalism.

The results show that the problems laws and new institutions are dealing with is partly not relevant in the investigated area. The results and arguments are based on the case study performed in Khujirt *soum* in central Mongolia. The results of the interviews with fifty local herders' families and officials show no significant trend in changes in grazing practices. Herders stress that the varying climatic conditions are the main cause of the temporary decrease of the quality of the pasture land, and that the anthropogenic influence, as emphasised and shown from other areas, probably is overestimated. The results from the interviews are combined with the analysis of climatic data and satellite based data on vegetation data and data on the number of livestock. Herders' perceptions on the existing cooperation and expectations from the proposed ownership and management system are analysed, and it is concluded that the role of existing informal institutions, local knowledge and varying local realities has been disregarded by the policy makers. Thus the paper argues that even though the pasture allocation and formation of new institutions might lead to more of economical sustainability, the existing environmental and social sustainability might be challenged.

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Local terms and abbreviations:

<i>Aimag</i>	province
<i>Bag</i>	parish – an administrative unit below district
<i>Bod</i>	livestock unit representing one cattle or horse, 0.75 camels, seven sheep or ten goats
Citizens representatives	
<i>hural</i>	local level parliament
<i>Dzud</i>	natural disaster (extremely cold winter, deep snow or ice cover on the pasture land) that usually results in losses of livestock
<i>Ger</i>	traditional Mongolian house, easily dismountable thus very practical for nomadic lifestyle
<i>Horshoo</i>	herders' cooperatives established in the beginning of the 1990s
<i>Khot ail</i>	a traditional unit of herders' households, membership is usually based on kinship or friendship ties, main aim is labor pooling to facilitate daily work
<i>Negdel</i>	herders' collectives during soviet times
<i>Soum</i>	district – an administrative unit below province
<i>Suur</i>	the basic unit for herders' cooperation during soviet times, usually includes several households
ADB	Asian Development Bank
MNE	Ministry of Nature and Environment
SGMP	Sustainable Grassland Management project
UNDP	United Nations Development Program
WWF	World Wildlife Fund

Introduction

The nomadic pastoralism has been the Mongolian way of life for many centuries, and it has survived up till nowadays and provides the only income for a third part of the present Mongolian population. Thus herders' well-being depends on the livestock, while the livestock is affected by the very changing and harsh climatic conditions. Despite the natural disasters herders usually face once in ten years, the number of livestock has not decreased significantly since the mid-20th century. On the contrary – the livestock population has been increasing rapidly, especially in the 1990s. However, the three winters between the years 1999 and 2002 brought immense losses of the livestock. It is estimated that 15% of the total Mongolian livestock died (Mongolian Statistical office). The losses were not evenly distributed and some places were affected much more severely. For instance the investigated area, Khujirt *soum* lost 45% of the livestock (Figure 1) thus the well-being of the herders was significantly affected.

It might be argued that Mongolia was facing the livestock overpopulation resulting from the “Tragedy of the commons” that inevitably led to overgrazing reducing livestock's endurance towards the harsh climatic conditions. Moreover, the increasing behavioural uncertainty among herders, may have changed the traditional grazing patterns leading to less mobility, more out-of-season grazing and trespassing that all decreased quality of the pasture land and led to high vulnerability of the livestock. It might, however, also be true that the three years of adverse climatic conditions were the causes of the losses of livestock per se, and the human caused impacts on the grassland quality are exaggerated. In this thesis I argue that the elsewhere described problems connected to the use of the pasture land, the grassland quality and the cooperation among herders, are not as significant or not present at all in the research area – Khujirt *soum*. Thus the suggested and partly implemented solutions are not entirely suitable for improving the pasture land management in the Khujirt *soum*.

The sensitivity and variability of the ecosystem is the reason why mobility of the herders is the most important precondition for the survival of the livestock. This means that availability to widely dispersed large pasture areas is essential. Because of this reason pasture land has never been a private property in Mongolia, and it is still unconstitutional. The new legislation on land, however, promotes allocation of pasture land for the possession for herders' groups as one of the main solutions of the overgrazing problem. The Sustainable Grassland Management project implemented by Mongolian Ministry of Nature and Environment in cooperation with UNDP, is working on the formation of new institutions for cooperation among herders and implementation of the pasture allocation. The securing of the rights to land are said to increase the level of responsibility over the scarce resources, providing a better management of the common pasture. The new-formed institutions having clearly set social boundaries are expected to be an integral part of the new land management system and improve herders' well-being by providing new ways of wealth accumulation.

A sustainable pasture land management should have balance between three components: in a long run non-degrading pasture land (Hussen 2004), presence of a deeply rooted social capital as not only a mean for successful cooperation within herders' community but also a precondition for trustful and understanding daily relationship (Putnam 1993, Forni 2000), and increase of herders' wellbeing (UN, 2001). A holistic approach is used in analysing the mutual relations between the sustainability components. However, the thesis concentrates on deeper analysis of the ecological sustainability; the social sustainability analysis is limited to social capital aspects but the general social well-being indicators, like education and gender rights, are outside the scope of this paper. Thesis is also only briefly touching upon purely economical considerations, and leaving more detailed analysis for the further research.

Objectives

The main goal of this thesis is to examine the present land management pattern in the investigation area in terms of use of pasture land and local institutions, the connections between them and the environmental changes, and to conclude which of the land management patterns – the existing one or the

newly established one may provide a more sustainable management of the pasture land in Khujirt *soum*, Mongolia.

The main goal is achieved through the following objectives:

- To describe the historical development of the pasture land management in Mongolia and to identify the present challenges to a sustainable management system as described elsewhere;
- To analyse the legislation on land, especially the provisions on land allocation, in order to find out how the provision of the laws can contribute to the changes in the management of common pasture land;
- To analyse the Sustainable Grassland Management project (SGMP) goals and implementation in order to find out how they contribute to the changes in the management of common pasture land;
- To detect the current land management patterns and the local problems, and to find out to what extent they correspond to the problems solved by the legislation and the SGMP through analysis of the interviews with herders and statistical data;
- To examine changes in the environment that might have caused the recent high livestock losses basing upon the statistics and interviews.

Methods, Materials and Limitations

The thesis is an interdisciplinary work including economics theory, legislation analysis, data on vegetation and climatic conditions. Further it includes people's knowledge and views as well as secondary sources from literature, mostly scientific articles on pastoral land management. The theories, data and laws are analysed concentrating on the main goals of the thesis, thus going into depth only in those matters that are closely connected to the research question. I am aware that there are many other aspects in either of the fields that I am touching upon, but the interdisciplinary approach limits my research to only those aspects that are directly involved in examining the .

The theoretical part mainly concentrates on economics theory on property rights and institutions related to the management of the common property regimes, linking them to the role of social capital and traditional institutions. The theory only gives a framework for analysis of the property rights patterns and institutional performance in the case study and I am not aiming at providing a deep analysis of the described theories. The theoretical framework part is worked out using books and scientific articles. The same is true for the historical background information on the pastoralism in Mongolia. In this part I am summarizing and discussing past and current research and findings, in order to provide a point of reference for my own results.

A primary source of the information is the legislation on land, including the 1992 Constitution of Mongolia, the 1994 Civil Law and the 2003 Land Law. The text of the Land Law is analysed to learn its main goals, vision of present situation and the future, the consistency and logics of the law and the potential problems in its implementation. The English translations of the law were acquired from the internet databases and personal contacts, however the quality of translation is not always reliable and may potentially be misleading as explained below in the legislation analysis.

The field work was done during 10 days time in which 51 herders families were by using the semi-structured type of interviews (for the locations of the interviews see the map in p 27). Semi-structured type of interviews was chosen because it can provide comparable qualitative data but at the same time allow to follow new leads which is important when studying herders' views and can help in finding out new aspects of problems. Semi-structured interviews are said to be the most suitable when there is only one chance to interview the person (Bernard, 1994). The length of each interview depended on the responsiveness of the interviewee, but usually varied between 30 minutes and an hour. The families were picked randomly from the whole *soum* area. The intentions were to interview families evenly distributed over the whole territory depending on the density of the population and the number of livestock as a wealth indicator. The information of the livestock number was acquired from the neighbouring households. For practical reasons,

however, the stratification of the households, based on the number of livestock, was done only after the fieldwork during the data analysis stage.

The overall objective of the interviews was to determine if the quality of grassland has changed during last 10 years and possibly to find out the causes behind the changes. The interviews were focused on both – factual information on herders grazing practices and also on herders' views and knowledge about the changes in the environment. The objectives of the investigation was to find variations in herders mobility pattern and grazing practices and to identify the factors that may have influenced them, as well as try to determine what could be the possible future behaviour. The possible shortcomings of the results could derive from the limited time, logistical problems and funding that could be devoted to the field work. The small geographical area of the investigation may provide valid conclusions on the circumstances only for that specific area. I am aware that the comprehensiveness and quality of the data could have benefited from longer and more detailed interviews which would have provided more specific information and deeper views of the herders. Longer “on farm” studies, participant observations and resurveying would have helped in better understanding and crosschecking the received data.

The field work also included interviews with a local scientist, local administration – *soum's* governor, *bag's* governor and two *soum's* land management officers, an official from the UNDP Sustainable Grassland Management Project that is implemented in Khujirt *soum* and an official from WWF Rural Development and Environmental Education Program that is not implemented in the research area but provided more general information on social aspects of herders' life in Mongolia.

Most of the interviews were conducted with the help of an interpreter/translator. The quality of the translation during interviews has possibly led to uncertainties and some misinterpretation of the information. Even in respect of the translator's skills, the information is inevitably distorted while translated; I was never sure if my questions were understood correctly and if the whole answer was translated to me. Therefore the communication problems might have diminished the quality of the data.

During the field research I faced problems in obtaining cartographical information. For instance I lack a good quality map of the research area – Khujirt *soum*¹. Thanks to the understanding of the local officials and help of local people a low quality copy of a map was acquired and this map was used for identification of the settlements of the visited households. Therefore the accuracy of the map presented in this paper is not high.

Statistical data on monthly precipitation and temperature during 1990-2003 were received from the Hydrometeorology Office of Mongolia. Statistical data on number and composition of herds in Khujirt *soum* during 1991-2003 and data on the number of herding households and family composition in Khujirt *soum* during 1997-2003 were received from the Statistical Office of Mongolia. The reliability of the statistical data is sometimes doubtful as explained later in the data analysis part. The statistical data on the long term changes in precipitation from two stations in Mongolia were acquired from a database constructed by Dr Mike Hulme at the Climatic Research Unit, University of East Anglia, Norwich UK. This database provides historical monthly precipitation data gridded at 2.5° latitude 3.75° longitude resolution. All the statistical data are processed and analysed using Excel. This analysis, however, is only general as it is limited by the availability of the data. A more detailed analysis of climatic conditions and vegetation changes can be a subject of further research.

The normalised difference vegetation index (NVDI) is an index used to determine vegetation cover in remotely sensed data. The data used here was acquired from the National Oceanic and Atmospheric Administration's 10 day composite scenes of 8 km resolution Advanced Very High Resolution Radiometer (NOAA AVHRR). NOAA satellites orbit the Earth in a near-polar sun-synchronous configuration carrying the AVHRR that registers radiation reflected or emitted from the Earth (Seaquist 2001). The NVDI is calculated as:

¹ Seems that detailed maps still are quite secret information in Mongolia. The only map that was used during the research was the Khujirt *soum* map that we borrowed from a *bag's* governor and that had to be returned after 3 days (fortunately, after making a copy of it).

$$(NIR - RED) / (NIR + RED)$$

where NIR stands for near infra-red and RED means red spectral reflectance. The red spectral response of the green vegetation is less than 10% whereas the reflectance of the dry soil is around 25%. The near infra-red reflectance increases up to 45% as the green vegetation increases whereas the reflectance of the dry soil rises just slightly. The calculation of the above ratio is based on these differences (Seaquist 2001). Thus the NVDI is sensitive to vegetation density and photosynthetic capacity, and the correlation between these two is high in arid and semi-arid regions. In this research NDVI is used to reflect the changes in the amount of the vegetation, however, I am aware that the NDVI reflects only the photosynthetic potential, thus estimated but not the real vegetation amount (Seaquist, Olsson et al 2003). The application of more complex models for the evaluation of the primary production was not done due to complexity of such research and limited scope of this thesis. The NDVI varies between -1 and + 1, a higher value meaning that higher density of vegetation is prevailing in the pixel (Liu et al 2003)². The data used are from the time period 1982-2000. The research site is located in a tetragon between 102°30' - 103°12'E and 46°42' - 47°6'N.

In general the quality of the investigation would have benefited from a longer time period in the case study area because the relations within the herders community, the traditions and views that are modified by history, religion and nature, cannot be completely observed and understood in a few weeks period. This thesis is more an insight into the herders' life and use of the pasture land in Khujirt *soum*, stressing the local aspects that are different from other places in Mongolia and worldwide. Because of these reasons I have been cautious in giving general recommendations on the necessary activities.



Picture 1 Adolescent herders in one of the interviewed families

² For more discussion on benefits and weaknesses of the NDVI see Seaquist 2001.

Theoretical Framework

From Open Access to Private Ownership

The historical use of the natural resources started off from the availability of the resources to anyone who was in need. The land, flora and fauna resources did not have set boundaries or limited group of users. Thus all of the resources were common pool and used under open access regime. The most common examples of present common pool resources are fish stock in the world's oceans, forests and pastures – usually large size or area resources experiencing difficulties in setting clear boundaries. The size of the resource means it is costly, but not impossible, to guard the resource in order to exclude outsiders from using it or limit the use. As the resource is limited, the use of it by one individual reduces the amount or quality of the resource that is left for use by the rest. It is said that common pool resources often are under the threat of free riding performed by unauthorized users of the resource. The term is used to describe situations when some users receive the benefits from the resource without fulfilling the set responsibilities and therefore hinder other individuals to achieve “*a sustainable, long-term utilization pattern in relationship to a resource*” (Becker and Ostrom 1995).

The problems related to the open access character of the common pool resources have contributed to the classical economists favouring the benefits of the private property. According to them an “*endogenous evolution of land rights from open access to individual property*” exists (Munoz-Pina et al 2003). It is caused by two inevitable changes in resource use – the population growth and the following scarcity of the resources, particularly the land (Boserup 1965) and the increasing market integration and commercialisation of agriculture (Munoz-Pina et al 2003). Another possible cause of resource becoming scarce could be the decreasing quality of the resource because of other external factors, like changes in rainfall pattern causing droughts thus reducing resource quality. As resource does not have all the previous qualities, more of it is necessary to satisfy the previous needs of the same amount of the people. Population growth together with decreasing quality of the resource makes the resource scarce even sooner.

Hardin (1968) used his famous “Tragedy of the Commons” to explain what happens as a result of increasing population in a finite world where everyone is trying to maximise his/her own gain. The example used to explain the tragedy is exactly the case of limited resources, like land, being challenged by the growing population. The tragedy of the commons takes places in the herders' community when the livestock is privately owned but the pasture is a common pool resource. According to Hardin each herder as a rational person, is trying to increase his own gain from the livestock by putting more and more animals on the pasture. It works well while there is enough land as the number of population and livestock do not increase significantly. However, there comes a day when the carrying capacity of pasture is reached thus adding more animals to the pasture leads to degradation of the grassland. Even knowing this, each herder decides to increase the number of livestock because he will benefit from that, whereas the costs of the degraded pasture will be born by the whole community. That is when the tragedy comes - each rational herder keeps maximising his benefits from adding new animals to the limited pasture which leads to a complete degradation of the resource. Hardin suggests that there is no way to escape from this scenario in the case the resource is accessible for everyone. Therefore the proposed solutions are a division and privatising of the resource or limiting the number of users (Hardin 1968). The solution is supposed to deal with the basic problem of the tragedy – each herder acting on his/her own, without any trust or cooperation among them.

The tragedy in itself, however, is the one of the open access, not the commons. Under the open-access regime the resources may be used anyone and “*no one has an incentive to conserve its use or invest in improvements*”, like in the tragedy, whereas common property is used by a limited group of people and members “*have a legal right to exclude non-members of that group from using a resource*”, the common property is managed and members have definite rights and obligations (Ostrom 2001).

In another words, during the time resources are sufficient for everyone, there is no need of dividing them and limiting the number of users because the costs of establishing boundaries, protecting them and controlling who is using them would be much higher than the expected outcomes (Ostrom 2001). As resources become scarce and more valuable, changes in resource management are necessary. In order to limit

the number of users and facilitate investing in the resource, property rights have to be introduced. Property rights are defined as “*actions that individuals can take in relation to other individuals regarding some “thing”*” (Ostrom 2001). Property rights are often understood as ownership rights, however they include also non-ownership types of rights, like rights derived from possession and use. One of the most common ways of classifying types of land ownership is division into three main groups – *private ownership*, *state ownership* and *group ownership*. The open access resources may be allocated to any of these property rights holders thus limiting the number of users to those who are willing to invest thus providing an increase of resource quality instead of depletion (Ostrom 1999).

Common property regime may be established under any of these legal property rights regimes, however, the private ownership usually means individual, not collective management. The common property management regime means that rules to eliminate free-riding are introduced and the co-operation among resource users should lead to better resource management. The private property option, however, might mean both – division of the property for individual users or for smaller groups that make co-operation among the users more achievable (Munoz-Pina et al 2003). Property rights school assumes that transaction costs of either of the choices – collective use or individual property – are theoretically equivalent. At the same time they agree that governance costs of common property regime are higher which makes them chose private property over collective one (Baland and Platteau 1998).

The argument goes like this. Governance costs, including negotiations in the decision making process and organising the group, tend to be higher when the group is larger or more diverse. Therefore whenever there are different levels of wealth among group members, it is hard to achieve cooperation. More complex activities are even harder to perform because of “*inefficiencies arising from collective mode of exploitation*” (Baland and Platteau 1998). This leads to an increasing value of the resource, taking place at the same as the resource becomes even more scarce because population is still growing, which increases the value of the resource even more. In order to avoid this vicious circle, the private property option should be chosen as it allows to “*internalise the externalities*”, meaning that governance costs are not present (Baland and Platteau 1998).

Some other well-known advantages of private ownership can be listed. First, it is argued that individual property rights of the land facilitate investments as individuals can be secure they will be able to enjoy their benefits. Investments may be either financial or individual’s incentive to work harder and increase productivity. Secondly, ownership can increase access to credits that may result in even more investments and therefore higher productivity. Next, property rights of the land may mean more sustainable land use (Deininger 2001) as the costs of unsustainability would have to be born by the owner. Fourth, privately owned land can serve as a mean for accumulation of wealth and can be passed over to the next generations. Therefore land ownership serves as a “self-insurance” and land can be sold or rented out if necessary. Moreover, land ownership can increase individuals bargaining power and strengthen social status (de Janvry, Platteau et al 2001). Even though in most cases these benefits of the land ownership are true, it is sometimes not possible to exercise them as efficiently as expected. At the same time some of the benefits of the private ownership can be exercised also under other types of ownership - the state or group property (Hansted and Duncan 2001), for instance, a larger group of users may pool resources for more efficient investments in the resource or infrastructure.

The negative sides of private ownership become advantages of the common property regime. A common use of a resource use means that everyone in the group has equal access to the resource, whereas the private property often leads to unequal division of the resources, thus the poor are excluded (Hansted and Duncan 2001). Even if the resource is divided equally among the private owners from the start, in a longer run more of the property concentrates in the hands of the wealthier ones because the poor ones cannot bear the land management costs and afford investments (de Janvry, Sadoulet et al 2001). At the same time it is more likely that common land use practice will provide benefits to a larger part of the population, whereas private owners tend to use the land to increase only their individual gains. This means higher social costs that have to be borne by the whole society while only the private owners enjoy the benefits. It also works the other way around – activities beneficial to the community probably will not be carried out by the private owner if that increases private costs more than the private gains (Hansted and Duncan 2001). These

conclusions, however, are just a part of the conditions that should be considered when choosing between the common and the private property. An important aspect brought up by representatives of new institutional economics is the transaction costs of negotiation, monitoring, coordination and enforcement of either of property regimes (Smyth 1998).

The property rights school acknowledge the presence of the costs of establishing, delimiting and defending private property. However, they do not explain what should be done when privatisation becomes too costly (Baland and Platteau 1998). One of such cases is pasture land in a disequilibrium ecosystem. The opposite – equilibrium ecosystem means that a certain carrying capacity of the land can be calculated, like in the Hardin's tragedy. The equilibrium of the ecosystem depends on natural conditions, usually precipitation and temperature variations during a year and over the years. When climatic conditions are stable and therefore can be predicted, it is possible to calculate how much livestock the particular pasture can support. Whereas in disequilibrium ecosystems variations of climatic conditions are so significant that herders have to have an option to move several times a year adjusting to the unpredictable changing conditions. The moving pattern can also vary over the years because of changes in weather, like droughts or very cold winters (Sneath 2003). Therefore in order to sustain their living in a disequilibrium ecosystem, herders would have to privatise widely dispersed, large land areas. The present borders of the land used by herders' households are usually not strictly set and overlapping. Therefore the costs of negotiations and enforcing the resource division as well as fencing and defending the land would be "prohibitively" high. In such cases the property rights school allows the establishing common property regime (Baland and Platteau 1998).

Munoz-Pina (2003) et al have listed the four conditions when new institutional economics considers that common property resource system should be chosen over land division for individual ownership. First, the land itself and the type of activities carried out on it. It has to be decided what kind of land use – common or private would provide more benefits. In case of large pasture lands and traditional mobility of herders it is more suitable to leave the land for common use whereas if small scale farming is usually taking place then private division of land could be a more suitable alternative. Second, the community's ability to cooperate is important. If cooperation level in the community is high and a governance structure exists, it should be maintained under common property regime. Next, the costs of division and privatisation should be considered. There might be cases when the costs of negotiations and the implementation of the division of the land are very high and therefore privatisation is not feasible. The last aspect, is the support shown to either of the land ownership choices. It may depend on viability of equal and fair division of the land and the possibilities of paying compensations. In case the resource users doubt fair division of the land, privatisation can be opposed. (Munoz-Pina et al 2003).

These concerns bring into question Hardin's suggested privatisation as the solution to the problems of open access, especially, in cases some signs of cooperation and rule observation are prevailing over open access regime in its extreme. Privatisation of the pasture land resources may hinder the existing cooperation because parties will not interdependent any more and long-term relationship among users becomes less likely as private property is easily transferable (Bardhan in Lindgren 2004). At the same time the costs of privatisation, including negotiations and border setting, fencing and protecting, would be too high to make privatisation feasible. Moreover, the disequilibrium ecosystem makes it nearly impossible to provide sustainable resource use under the private property regime. Thus the common property regime, established under a state or group ownership or lease, is usually favoured if some cooperation among the resource users exists at that time (Munoz-Pina et al 2003). According to the institutional economists, then, an important prerequisite for successful management of common pool resources is institutions that help to minimise the transaction costs.

Institutions and Social Capital

Broadly defined institutions are "*rules that underpin the functioning of society*", changing slowly and continuously over time therefore being the norms of behaviour that "*pursue collective purposes*" (Uphoff 1997). The institutions can help in overcoming the challenges of collective action by reaching the agreement, coordinating and enforcing the rules, thus decreasing the transaction costs. There are varying types of institutions; the following ones might be useful in management common property – official state institutions

as central and local government, local official institutions that are constituted from the resource users and are officially registered, and local informal institutions that are usually based on traditional cooperation among resource users.

Intervention of the state as an institution can be important in cases when a system is complex and coordination between different levels of actors is needed. In pastoral society it is sometimes necessary to coordinate herders' movements to other administrative units therefore agreements with other common property regimes have to be reached. In such cases the state as a public institution, through organisations of different levels can negotiate and coordinate them (Forni 2000). This way formal institutions can play significant role in reducing the transition costs. However situation is different when it comes down to agreements at the local level or within the community.

Institutionalism approach emphasizes the role of robust formal institutions having structured decision making process, "*representation, regularisation and formalisation*" (Clever 2000). According to institutionalism traditional institutions are usually weak and cannot provide solid ground for successful management of common pool resources (Clever 2000). Ostrom (1990 in Becker and Ostrom 1995) has developed eight principles that should characterise robust local institutions:

- (1) clearly defined boundaries of the resource, thus limiting the number of users,
- (2) proportional equivalence between benefits and costs of the resource use,
- (3) collective-choice agreements, meaning that most of the resource users are involved in the decision making process,
- (4) monitoring of the condition of the resource and behaviour of the users,
- (5) graduated sanctions that are imposed by other users and officials on those violating the rules,
- (6) local, low-cost conflict-resolution mechanisms, that would help to reach consensus on interpretation of the rules and increase common knowledge,
- (7) recognition of rights to organise, meaning that governmental or other external authorities do not question the users' rights and
- (8) for resources that are part of a larger system appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities should be organised in different levels (Ostrom 1995).

The formation of the robust institutions is performed according to these provisions. However, Ostrom also stresses that the formation of local institutions has to take into the account local conditions and the existing informal cooperation patterns. Even though the local characteristics are considered when forming the institutions, the design principles might be criticised for being just one more generalised approach to governance of common pool resources. Cleaver explains that institutions have to be embedded into social, historical and ecological relations among "*the people who shape and are shaped by a variety of institutions of varying degrees of formality and organisation*" (Clever 2000).

In the same line of argument, Cleaver shows that local institutions do not necessarily have to have Ostrom's designed features in order to provide successful resource management. An example of management of a common water source illustrates that well-marked boundaries of the resource and clearly set sanction system is not a prerequisite for the management of the common pool resources. It is even said that institutions formed according to Ostrom's rules at least partly derive their legitimacy from traditional forms of cooperation, from "*institutions that are often invisible, being located in the daily interactions of ordinary lives*". Instead of crafting formalised institutions according to the set pattern, Cleaver suggests that institutional formation should be based upon "combining both conscious and unconscious acts, unintended consequences and a large amount of borrowing of accepted patters of interaction from sanctioned social relationships" (Clever 2000).

By setting the social and spatial boundaries and introducing monitoring and sanction mechanisms, the robust institutions are trying to overcome one of the most important challenges of cooperation - the behavioural uncertainty. However, the success of cooperation at the local level does not depend only on formalised rules and decision making mechanism but also on the group's inner relationships which are usually rooted in informal social structures and experience. Therefore the presence of informal institutions, as a kind of social capital, is as important as existence of formal institutions. Social capital as defined by

Putnam (1993) is “*features of social organisation, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions*”. Social capital is norms within society that have developed over time and accumulates over generations, it is “*a web of social relations that underpins all human actions and that, together with human and physical capital, defines their outcomes*” (Forni 2000). Being an important precondition for cooperation within a group, existence of social capital can explain the success of small, remote groups in gaining benefits from resource use. Social capital mirrors the interactions within the society, it is changing as society develops and therefore promoting the “*basic level of social equilibrium*”. Moreover social capital of a particular group is influenced by other communities, forming an “*infinite chain of mutual relations*” (Forni 2000).

However, often social capital is seen as an instrument for “*embedding*” the institutions; social and cultural environment is used for driving support to decision making process (Ostrom 1990 in Cleaver 2000) but not seen as a good in itself. This view is criticised for being static in conceptualisation of culture and tradition. It is argued that deeply rooted social relations are not just an instrument for achieving economical goals, particularly access to resources, but on the contrary, economic life should be seen only as a “*sub-sector of social life*” (Cleaver 2000). The social capital being not only a valuable tool for achieving institutionalism goals, but also a significant part of the well-being, has to be taken into the account and appreciated when building up new institutions. The institutions that only utilise some aspects of the social capital and challenge the other ones by implementing contradictory goals, can confront the presence of social sustainability in the future.

In order to examine the strengths of social capital that is based upon long-lasting traditions and knowledge, and the potential challenges for such social capital as new institutions are established, the following chapters will look at the case study from Khujirt. At the same time also the promoted types of property rights and their links to traditional and new institutions, existing social norms and environmental conditions will be analysed.

Historical Background of Pastoralism

From Pre-collectivisation to De-collectivisation Period

During pre-collectivisation period that lasted up till the beginning of the 20th century, Mongolia was ruled by hereditary lords and Buddhist monasteries. Most of the wealth, including livestock, was owned by them as well. Even though the use of land was regulated by the local officials, the state did not involve much in regulating the herding activities, only taxes were collected regularly. Although the large herds were owned by comparatively small part of the nobility, a significant part of the population was involved into pastoral activities. The livestock belonging to the lords, state officials and Buddhist lamas was mostly grazed by servants and pastoral families owning few animals and receiving some for the salary. They moved for quite long distances to different seasonal pastures with the single specie herds they were grazing. The movements were coordinated by the owners of the herds. It is agreed that the mobility pattern of that time provided good use of the pasture land (Mearns 1995, Sneath 2003).

In 1921 a revolution took place in Mongolia after which the socialist times started. The livestock belonging to nobility was redistributed among small households that performed low productivity pasturing. The land became state property. The first collectivisation attempts in the 1920s and 1930s failed. A new round started in the 1950s and lead to the collectivisation of the previously privately owned herds and formation of so called *negdels* that are large collective farms employing most of the countryside population. The *negdels* started as voluntary cooperatives, but later on they were formed following the leadership initiative of the state officials. Probably both – the harsh environmental conditions of the region and a stronger leadership contributed to the faster formation of the collectives in forest/steppe region (Mearns 1995). This resulted in formation of around 250 collective farms and 30 state farms in the whole Mongolia (Sneath 2003). The collectives were divided into brigades (before and after collective period called “bags”) that constituted from teams that were subdivided into *suurs*. *Suur* was the basic herding unit that was a modification of *khot ail*, a previously existing set of herding households usually based on kinship (Mearns 1995).

During the collective period herders grazed collectively or state owned livestock as well as small a number of their private livestock because the private ownership of herds was strictly limited (usually up to 50 head). The grazing pattern was not, however, so much different from the one of the pre-collectivisation period. Herders were still moving to seasonal pastures in annual cycle, even though the distances were reduced in many cases, following the more strict administrative boundaries and smaller administrative units. The movement was restricted to the area of the *soum* where the farm was located. Still in some *soums* further movements to the less-used pastures of different *soums* or even *aimags* were arranged (Sneath 2003, Fernandez-Gimenez and Batbuyan 2004).

Belonging to the collective or state farms provided several important benefits for the herders that made easier coping with the harsh environmental conditions. Herders could use the collective trucks when they were moving, especially for longer distances. Hay was made collectively and delivered to herders (Sneath 2003). Collectives worked on building and maintaining wells which is an important source of water, especially during the dry periods. The services important for the health of the livestock, like availability of the veterinarian, were provided. And the decisions on coordination of the livestock movements were made at the collective level which provided ecologically better use of the pasture land. The centrally made decisions meant that the herds were equally distributed over the whole territory and overgrazing was mostly avoided. Significant investments in health and education of the population were also made and state subsidised products were offered in the local shops that provided higher life standards for the herders (Mearns 1995).

Even though the good sides of the collective pasture management practices are usually emphasized, there are some negative consequences as well. Some of them, as listed by Mearns (1995), are the new administrative division which did not reflect the customary mobility pattern of the herders, and this situation has not changed significantly. In many cases the administrative unit, usually *soum*, within which herder had to stay and graze was not drawn according to the physical situation and the grazing practice. This led to

decrease in herders' mobility. Another problem that emerged during socialist times is the lack of autonomous cooperation among herders. The existing cooperation within collectives was successful, but no cooperation outside the formal structures was promoted. Moreover, even internal cooperation was mediated by collective administration. Therefore customary forms of cooperation among herders were weakened (Mearns 1995). These aspects of the socialist type of pastoral management weakened the traditional practice and cooperation, still in general they did not had a significant negative impact on the quality of the resources. The dismantling of the collectives and pastoralism trying to adjust to the new order, has brought much more of negative consequences.

Privatisation

Soon after the collapse of socialist system in Mongolia, dismantling of collectives started. The land remained state property but the whole property of the collectives was divided between former employees. As observed by Mearns (1995), even though the rules on order of the privatisation were enforced, flexibility in implementation was tolerated and the rules were interpreted differently between different collectives. Still the main stages of privatisation were the same everywhere. It started with privatisation of around 30% of the livestock, winter and spring shelters, vehicles, and this privatisation was completed by 1992. The rest of the property of former collectives was given to the newly established companies and cooperatives. They were supposed to take over that the responsibilities of the collectives as well. The new cooperatives attempted to provide the herders with the services they used to get from the collectives. However, in the emerging market economy situation, services were not for free. Herders faced problems of not having money to pay for them, while the cooperatives faced problems of not being able to provide the services in time and to get paid. Therefore most of the cooperatives failed to start a successful business and collapsed during the first year of their existence. The next round of privatisation of livestock took place as the herds belonging to cooperatives were divided among their members (Mearns 1995). This second stage of privatisation happened on different time in different places depending on how long the cooperatives had existed. Some herders in the investigated *Khujirt soum* claimed that they have privatised the livestock and started herding only in 1995, 1996 or sometimes even later. happen

One of the main consequences of dismantling the collectives and dividing the herds, was changes in the composition of the herders' community. The privatisation gave a chance to all the employees of the collectives to receive livestock. Therefore even those ones, who did not work as herders, but were, for instance, truck drivers, started herding after privatisation. One of the solutions for non-herders receiving livestock, was the emerging absentee herding. Some families privatised the livestock they had rights to, but they never became herders, their herds were grazed by relatives or friends in the countryside, some of them receiving salary for it (Mearns 1995).

Absentee herding was a strategy chosen by some small part of the new livestock owners. The rest, however, chose to start herding themselves. The lack of support from the Soviet Union not only had facilitated breakdown of the collectives in the countryside but also had significantly increased unemployment in towns and cities as industries were closed. Thus people trying to sustain their living started an urban – rural migration that lasted for at least 10 years. They came from local *soum* centres as well as central towns of *aimags* and even Ulaanbaatar, and “returned” to the places their where ancestors had been living, and started grazing livestock on their pastures. It is argued elsewhere (Mearns 1995, Fernandez-Gimenez and Batbuyan 2004) that this has led to problems in pasture use.

The number of herding households increased dramatically during the 1990s and so did the number of livestock. The usual problems emerging from this situation, were higher pressure on the grassland connected to the increased number of households and livestock, the lack of herding skills among new herders that lead to wrong pasture use, and the fact that newcomers were not a part of traditional herders' groups (Mearns 1995). The rising number of livestock was related not only to the increasing number of households, but also to a reduced market of animal products, meaning that more of the products had to be produced to earn at least some income. Thus the number of livestock was constantly increasing during the period between 1991 and 1998, for instance, in Uvurkhangai *aimag* the livestock number increased by 50% during this period from 2 million to 3 million, and they were grazing in the same area as in the beginning of the 1990s

(Mongolian Statistical office). This obviously led to more pressure on the grazing areas. In a case study done by Fernandez-Gimenez and Batbuyan the out-of-season grazing and higher concentration of livestock around water sources, roads and towns has been also observed as a result of the higher density of livestock (Fernandez-Gimenez and Batbuyan, 2004). In the same case study it was found out that 73% of the surveyed households were complaining about out-of-season grazing by other herders. Moreover, herders also acknowledged that they were grazing their own reserve pastures out of season (Fernandez-Gimenez 2002). As the services provided by the former collectives were not available any more, herders chose to live closer to the infrastructure spots that might be of importance to them. The new herders, especially, were eager to stay closer to their previous dwelling place thus increasing the pressure on the pasturelands near the towns and cities (Fernandez-Gimenez and Batbuyan, 2004).

Another aspect of the lack of availability to services, was a decreased mobility of herds, especially of the long distance movements that could not be done without help in transportation (Sneath 2003). It is also true that some of the new herders did not have the same quality pasturing skills, and therefore they were blamed for most of the free-riding, including grazing in the wrong time and place, and for becoming more sedentary (Mearns 1995). Fernandez-Gimenez and Batbuyan (2004) have even connected decreasing mobility of the more wealthy “old” herders’ households to the increased free-riding of the poor or new households – as the wealthier ones needed to make sure that their pastures were not misused they chose to stay close to them thus becoming more sedentary. At the same time Fernandez-Gimenez (2002) argues that poorer herders tend to move less because they do not have means for transportation and necessary labour. However the following surveys show different results – increased mobility of poorer herders as a result of that they have to go further distances to more marginal pastures. Still there is a tendency for the wealthier herders to remain close to winter and spring pastures to protect them from trespassing, which leads to negative ecological impacts mainly connected to overgrazing.

Cooperation after De-collectivisation

One of the weaknesses of the collective times mentioned above, was the loss of traditional institutions providing informal cooperation among the herders. This became a significant problem after collectives were dismantled and no official cooperation existed thereof. The above described problems connected to free-riding, are closely linked to the weak cooperation and lack of collective action and mutual trust among the herders. Finke (2000), describing a case study from western Mongolia, concludes that the problems that are present there, are the ones resembling the *tragedy of the commons*. The changes in pasture use and the small incentive of the herders to follow the rules to preserve the common good, are the problems of open access regime that are present in the particular area. The situation is more complicated there, though, because of high migration of both Mongolian and Kazakh herders. Thus no or very weak social bindings exist among the herders and they do not have an incentive to invest in social relations as they will migrate away soon. Because of this, the west-Mongolia case seems more extreme in non-cooperation than the rest of Mongolia where some informal structures emerged quite soon after the dismantling of the collectives.

Humphrey and Sneath (1996) argue that the socio-economic webs in which pastoral communities have been before collectivisation, successfully survived the collective times and strengthened again after the end of the formal structures of collectives. It is generally agreed that the re-emergence of cooperation within khot-ail structures took place soon after de-collectivisation. Mearns (1995) lists several reasons explaining the fast formation of khot-ails. Cooperation is a way of labour pooling which is necessary as the mixed species herds require different treatment of each group of animals, therefore more of labour is crucial to do the herding. Mutual help during moving to other pastures and during any other work that has to be done is useful as well. Living and working together with other families not only makes everyday easier but also helps a lot in case of natural disasters. This is especially important for poorer families who are usually more affected. The poorer families were therefore interested to “attach” themselves to more wealthy households, providing some services in return. Mearns (1995) even mentions cases when cooperation among herders did not confine with the above, but herders pooled resources for buying necessary equipment, like trucks. However, the problems described above seem to show that problems related to lack of cooperation are present throughout the Mongolia. Fernandez-Gimenez and Batbuyan (2004) also stress that customary forms

of cooperation are not strong enough to fill the cooperation gap, and claim that new institutions are necessary for pasture management.

Thus it is agreed that quality of the pasture land is degrading in general. The main causes are said to be both – high number of livestock and irresponsible grazing practices. The latter includes decreased mobility, and even sedentarisation especially of the more wealthy herders, linked to emergence of the new herders who do not follow the grazing rules, perform out-of-season grazing and trespassing. The lack of transportation and other support that was received from former collectives also challenges mobility. The concentration of herders in some places, especially close to infrastructure and water sources leads to escalating overgrazing in some places while the other areas might be left under-grazed. These problems are closely related to lack of cooperation among herders that have led to behavioural uncertainty making herders chose to strive for their own good rather than the common good. The lack of institutions that might coordinate the actions and strengthen cooperation are said to be essential. At the same time legislation is aiming to solve directly some of the problems, like trespassing and out-of-season grazing by inflicting fines, or promote more responsible pasture land management by giving herders exclusive rights over pasture lands. More explicit analysis of the Land law as a tool for improving pasture land management is shown in the next part that is followed by an insight into newly promoted institutions.

Legal Framework

Legal acts regulating land related issues provide the basic rules pasture land management should comply with. They have been a significant source in reflecting the traditional land management practice and its changes towards the new forms of land management. The laws, at the same time, are also showing an image of the future, and, therefore, they are important to be analysed in order to foresee the development of the usage of the pasture land. The legal framework relating to land tenure issues in Mongolia constitutes of the Constitution of Mongolia, the Civil Code and the Land Law. The other laws dealing with land management issues are not directly related to the research question and will not be analysed in the following chapter. This chapter deals, firstly, with showing the basic provisions in it related to pasture land management in Mongolia, as set in the general legal acts. Secondly, it analyses the Land Law and the fuzziness of some of the provisions in it. Thirdly, it is aimed to understand what are the main goals and the future vision of this law.

General provisions in the Constitution and the Civil Law

The basic provision regarding pasture land use is stated in the 1992 Constitution of Mongolia, according to which pasture land is a state property and it cannot be privately owned (Article 6). This provision reflects the Mongolian historical experience in which private ownership of the pasture land has not existed and herders have been allowed to move their livestock freely. In the beginning of the 1990s Mongolia received international advice on securing land use rights by privatising whole land including the pastures³. After several years of long debate Mongolian parliament agreed upon preserving the existing practice. As it was acknowledged by Asian Development Bank later, it should have agreed upon a milder way of securing land use rights from the beginning (ADB 2002b). One step towards a milder type of regulation as advised came years later as an introduction of land possession rights.

The Part Two of the 1994 Civil Code of Mongolia deals with property rights issues including a separate chapter on land ownership and property rights relating to the land. The fifth part of the Article 87 exactly restates the constitutional provision prohibiting private ownership of pastoral land. The next article lists types of non-owners rights to land, namely possession and use, and also lease rights (Article 281) and servitude rights (Article 108) are acknowledged.

The present Mongolian Land Law was worked out on the basis of the 1994 Land Law and it came into effect in 2003. The Land Law deals with the general rules of land management, like listing the cases when the land possession and use are allowed, thus creating a general picture of land management. It also regulates the more practical issues, like the order of acquiring possession and use rights. The Land Law has been a source of tense discussions whenever it has been worked out or amended. The results are therefore, sometimes not consequent provisions or vagueness, however, the law provides some vision of the future land management.

Land Possession and Use – Definitions and Inconsistency

There are two versions of the English translation of the 2003 Land Law available and both of them have been used in previous analysis of the law elsewhere. However the problems might emerge because the two versions state significantly different things regarding some matters, including pasture possession, as it will be illustrated later on. It seems that the “second version” reflects more of what is stated in the Mongolian version of the law⁴, and therefore it will be used as the main source of my analysis. The

³ more discussed in Sneath 2003

⁴ I am referring to the versions of the translation as to the “first version” and the “second version” reflecting the order I acquired the translations. However it might also be argued that the “first version” is the draft version of the law and the “second version” is the final version thus explaining why the second one is more similar to the Mongolian version of the law. Nevertheless, it has to be noted that the “first” – the “less right” version is circulating more and therefore often used among the English speaking researchers, for instance, Mearns 2004.

enumeration of the articles vary a little between the two translations, here the numeration of the “second version” will be used.

The law defines land possession and land easement; land possession includes broader rights - legitimate control over land in accordance with purpose of its use, whereas land easement means making “use of some of the profitable features of land within the limits of the Law” (Article 3) meaning that only some activities agreed on in the contract can be performed on the definite land. It, however, might be argued that land easement (or servitude) is not the most appropriate term for the activities mentioned above, but the term “land use” would be more suitable. According to the theory of the civil law, land easement is a “right attached to one piece of land entitling the owner thereof to some right over adjacent land but not to take any part or produce thereof” (TTC 2004) which means that an owner of a piece of land can exercise some rights over another piece of land next to it. The most common example is the “right of way” used when an owner of the land needs to cross the neighbouring land in order to reach his/her land. The neighbour is usually bound to provide the “right of way” but the person exercising the right is allowed to use it only for the set purpose. The land use rights are much broader than these. According to the Ostrom’s (2001) classification of different aspects of property rights, the land easement rights could be a basic form of access to land, whereas land use includes not only access but also withdrawal of products of the resource system, land management rights and duties, such as regulating the use and making improvements, as well as rights to exclude the ones that do not have the use right. All these listed rights can be exercised under land easement as set in the law (Articles 45, 35.1.1 – 2, 35.1.5, 35.3.1 – 5). Therefore it might be argued that the law actually meant land use, not easement, which is also supported by the fact that under land easement, the “land use certificate” is issued.

The land possession rights, however, are broader than the use rights, including land alienation rights as well (Articles 35.1.4, 35.1.6). Land may be possessed by Mongolian citizens and organisations only, but land easement rights may be exercised by foreign and international organisations and also Mongolian citizens and entities in some cases. Even though this law does not deal with land ownership, the Article 3.1.7 defines “land ownership certificate”; this seems to be a translation mistake because further in the law it is referred to as “land possession certificate”.

Types of Land for Possession and Use

The two main cases when land can be possessed are: fenced land up to 700m² under and around gers and houses and land up to 1000 m² for vegetable, fruit and fodder cultivation (Article 29)⁵. These provisions are quite clear but the situation becomes more complicated when getting to the regulation of possession and use of the pasture land and hay fields. Reflecting the local ecological conditions that require different pasturing practice for winter and spring pastures than the one exercised on summer and autumn pastures, Land Law provisions regarding both kinds of pastures are different. The Land Law states that summer and spring pastures have to be allocated to *bags* and *khot ails* for “shared use” (Article 52), or “used commonly” according to the first version of the translation. The law does not explain the allocation process and the rights of herders who are exercising the “shared use” of the pastures and settlements. The “shared use” might be interpreted as use by the members of a *khot ail* or herders of a *bag*, and therefore as a common property regime, but it could be also understood as an open access resource for undefined group of herders as argued by Fernandez-Gimenez. As herders do not need a developed campsite, the place of summer and autumn pastures vary each year, so, it is argued that these pastures usually are open access resources for at least the herders of the particular *soum* (Fernandez-Gimenez, 2002). Nevertheless open access regimes mean that no restrictions or rules on pasture use are enforced or fulfilled by the resource users either. The presence of this aspect of open access resources is debatable. Even in case the rules are poorly enforced by the formal institutions, the traditional forms of pasture use include observance of quite some non-formalised rules. Still Fernandez-Gimenez and Batbuyan are explaining that “shared use” of summer and autumn pastures restricts the option of allocation of all four seasonal pastures to formalised herders’ groups (formed within SGMP)

⁵ The area for a *ger* has increased for 200 m² since the old Land Law which is a positive change according to local officials met during my research - they had faced problems before because the real areas usually are bigger than 500 m²

(Fernandez-Gimenez and Batbuyan, 2004). According to the SGMP officials, however, summer and autumn pastures (as well as winter and spring pastures) can be and are allocated to the formed herders' groups. The interpretation of law in this case may lead to the conclusion that "shared use" of summer and autumn pastures means use of pasture land under common property regime by a limited group of herders that could be *khot ail* or a larger group, like those formed within the framework of the project.

Unlike quite free movement and use of pastureland during summer and autumn, in winter and spring time herders tend to go to the same places every year. Herders acquire their grazing rights in winter and spring pastures usually by inheriting them, and each *khot ail* or household have a set place for winter and spring grazing. This situation has been reflected in the land legislation since the beginning of the 1990s. Winter and spring shelters have been privately owned since 1992. According to the present Land Law also the land under winter and spring settlements can be jointly possessed by herders *khot ails*. The possession of the campsites and the shelters provide the herders informal rights or influence over the pastures that are close to their shelters (Fernandez-Gimenez, 2002). Even though these informal rights over winter and spring pastures are respected by other herders in most cases, the above listed problems of trespassing and grazing in wrong places are also faced. The law is trying to deal them by formal allocation of the pasture land for herders.

According to the "first version" of the English translation of the Land Law, possession of any type of pastures is not allowed. The Article 54.2 which is the same Article 52.2 of the "second version" of translation, says the following: "*... Winter and spring pastures shall be prevented from livestock grazing during summer and autumn, and shall be carefully protected with public efforts*", thus saying nothing about possession of the pasture land. The same article in the other translation states: "*... The governors of soums or districts shall determine time for vacating pastureland for winter and spring settlements from grazing by livestock and animals and a time for allowing to use for grazing taking into account annual yield of vegetation. The governors of bags and khoroo shall pursue this table-table. The governors of soums may give to herders upon certain terms and conditions for use in order to prevent from overgrazing of pastureland and restore the certain part of winter and spring pastures taking into account traditional way of pasture use and peculiarities of regions, pasture yield and capacity on the basis of the Citizen's Public Hural of Bags*". Besides being quite a glaring example of the quality of the translation of the Land Law, the "second version" also provides many more rulings on the utilisation of the pastureland and the responsibilities of the governors.

Even though the missing sentences in the "first version" of the translation do not make that much difference when it comes to further shown real-life situation, in the analysis of the legal framework they are very significant. Although the content of the cited article is not very clear, it seems, that article allows allocation of the pasture land to herders for use. This assumption is supported by the SGMP document (UN 2001) stating that Article 52 "provides legal basis for herders' groups possess winter and spring pastures". Also Article 29.3 of the "second version" of the translation contains a provision that may be applied in this case. It states: "*Agricultural land may be given to a citizen and his/her family who worked in agricultural sector for a long time and have pre-emptive rights to have land for possession upon the decision of the Citizen's Representative Hural in accordance with regulations issued by the government on the basis of pre-emptive rights*". It has to be noted that agricultural land is defined in the Article 11.1 and includes pastureland and hay fields among other types of land. It also has to be noted that the pre-emptive rights are defined in the law and basically mean the rights born by individuals who have made investments in the particular land or have been using this land for grazing animals (Article 27.6). The land given to possession on the basis of the Article 29, shall not exceed 100 ha for a family, still the size can be changed depending on the population density and available land resources in the particular district. Even though Article 52.2 is not very clear, it may be concluded that either possession or use of the pasture land is allowed but the inconsistency in the used terms ("possession" in Article 29 and "use" in Article 52) complicates the clear defining of the rights the herders have in case land is allocated. It is, however, clear that unlike traditional use of often partly overlapping pastures, the allocation means that pastureland is divided, delineated and used by only one definite group of herders. Clearly set boundaries of the pastureland means that the users will more likely try to exclude outsiders from using it, that might lead to conflicts over pastureland during the

allocation process and after that. It can, however, also be expected that the secure attachment to the definite pasture will lead at least to some of the benefits of the “private property” listed above, like willingness to invest and take better care of the land. These expectations are debatable and will be analysed later on.

Further in the law it is set that hay fields may be given for possession to the herders (Article 53). Again, there is a difference between the two versions of the translation. The “first version” states that “*land improved for the haying purposes and land where hay has been grown may be given for possession to citizens, companies and organisations*”, thus any land that has been used as hay field may be allocated for possession. According to the “second version”, however, only the land that has been improved can be given for the possession to the herders who had done this job, moreover, the improvements have to be “*on a stable basis*” and have to cover one of the following types: “*provide that land plot with irrigation system, protection, fertilisation*” or “*replanting trees*” (Article 53.5). Fencing of the hay field, being the only type of the investments observed during field research, could be a kind of “protection” of hayfield that would give herders an option to apply for possession of the particular plot.

Moreover, the pastureland that is “*fenced for purposes of running intensified cattle breeding or raising domesticated animals*” (Article 52.5) can also be given for use to herders, thus possibly stimulating new forms of cattle breeding. As a result the nomadic practice of livestock grazing might be replaced by much more intensive sedentary practice leading to ecological and social changes in the area.

Emerging Land Market

As it is explained by Mearns (2004) one of the reasons of reviewing the old Land Law and adopting the new one was the plan to start introduction of land market in Mongolia. In the 1994 Land Law the possibilities of transferring possession certificate were quite limited – land possessor could transfer only use rights after approval received from the body that granted the possession contract and also transfer by inheritance was possible⁶. On the top of transferring certificate by inheritance, the new Land Law also allows other types of transferring rights and using certificate as a collateral if received approval from the body that issued the certificate; it is also allowed to give the land to others for use (Article 35). The possession certificate is valid for up to 60 years and may be extended for 40 more years. None of the listed types of transfer are allowed under land use, and the term of validity of land use certificate is not set in the law but is decided in each case.

It is argued by Mearns (2004) that, even though the Land Law promotes land allocation and land market, at the same time it still tries to keep the open access regime in the allocated land. According to the law, pasturelands, water points in pasturelands, wells and salt licks have to be “*used for common tenure*”. In the “first version” of the translation, the article goes on saying that common use is allowed “*regardless of whether they [the listed types of land] are given into possession or use*” (Article 6). In the “second version” these words have been taken out that could probably mean that the “common tenure” is meant only for the land that is not allocated to individual or collective users. The concept of “common tenure”, however, is not defined in the law. It could be argued that similarly to the urban “common tenure land”, defined in the law, also the rural common tenure land includes the state owned land is open to everyone for use and it is managed by state authorities. The fact that “common tenure” land is open to everyone for use, does not necessarily mean that it is an open access regime because the traditional forms of pasture management combined with the management performed by responsible authorities, may ensure a common property regime. Still this land and also the rest of the land that is allocated for possession or use can be entered and crossed unless it is fenced or has warning signs prohibiting entering or crossing (Article 48.1). In the field it was observed that fences are used only to protect hay fields from animals but herders’ settlements or pastures are not fenced. Hanstad and Duncan (2001) suggest this situation is caused by herders’ opposition to fencing which might be connected to herders’ notion of pastureland as open for everyone. However, lack of fences might as well be explained by the fact that there are no (or very rare) forests in steppe regions that means building of a fence around the large pasture area is complicated and expensive.

⁶ more discussion in Hanstad and Duncan 2001

Going back to the provisions of Article 52, it is important to note that governors have quite a significant role in allocation of the pastures as well as pasture management. *Soum*'s governor is responsible for separation of pastures for winter, spring, autumn and summer settlements and reserve pastures, and protection of the pastureland (Article 52). To perform this duty, governors design the timetable of the movement of herders depending on the quality of the vegetation in particular year. Governors are also responsible for annual allocation of hayfields and they have to take measures on hay field protection (Article 53). Any other more concrete activities are not clarified and usually they depend on the willingness of the governor. Although all pastures may be "used for common tenure" and crossed at any time, grazing is allowed only on the right time and *soum*'s governor can inflict fine on trespassers. It is not allowed to graze in hayfields starting from May 14 up till the end of the hay gathering season (Article 53) and winter and spring pastures have to be protected from grazing in summer and autumn (Article 52). Still even higher fines may be inflicted in case land possessor has not registered the land possession certificate or the transfer of the certificate within the national registry (Article 63.1.5).

As was explained by a *soum*'s governor and several other herders, the governors' most important responsibilities are fulfilled during the *dzud* or droughts. In these cases governors have to reach agreements on evacuation of herders to other *soum*'s pasturelands (as set in the Article 52). Nowadays herders usually do not wait for any decisions but leave for other pastures, also in other *soums*, when necessary. However this practice will not be possible in case the Land Law is implemented successfully. As a result, most of the pastureland will be either allocated for "shared use" to *bags* and *khot ails* (summer and autumn pastures) or given to possession or use to herders (winter and spring pastures), and there will not be much of the "common tenure" land left. Therefore formal agreements will be essential before herders may actually go anywhere, and the role of governors might increase thereof.

The emergence of the land market therefore depends on the local interpretation of sometimes fuzzy norms set in the law and the effort put into actual allocation of the land. The provisions of the law in general are quite in favour of developing land market and the success of implementation of the law is the factor challenging emerging of land market. It is, however, important to note that not only provisions of the law and their interpretation are important in the implementation process but also the interaction between them and the traditional grazing practice and existing norms.

Future Perspective

It may be argued that the provisions of the Land Law are aiming at promoting development of common property regime in pasture management thus trying to combat the problems that are related to some open access aspects of the present grazing practice. The division of the whole pastureland for shared use of summer and autumn pastures within larger herders groups, and use or possession of winter and spring pastures within probably smaller groups, are meant to lead to more efficient pasture management. As shown above, the division and delineation of pastureland into smaller pastures with more secure, registered property rights, is promoted. The emergence of clearly defined groups that graze in a clearly set area of pastureland, is believed to be one of the prerequisites for more successful pasture management. It also means elimination of trespassing by strict fines, increasing investments in the necessary infrastructure and decreasing possibilities of free-ride. These aims and expectations, however, do not give the answer to several questions, how to set borders of overlapping pastures and decide on its users, how all the herders will be convinced to participate, or what will happen to those who do not. These, and many others, are all transaction costs inevitably related to changes in property regime. As shown above, the new institutionalism suggests that institutions are prerequisites in overcoming the transaction costs and making the implementation of the law feasible.

There are no local herders' institutions promoted within the law. It might mean that secure property rights are expected to be sufficient in reaching the set goals. This might as well be not true as property rights are just prerequisites, rules that need to be enforced and monitored somehow. Even the reliance solely on the local state administration as an implementation body, is not enough. Institutions involving resource users in the decision making and monitoring process, local conflict resolution mechanisms and cooperation with other institutions on different levels are necessary. The law has referred to traditional ways of pasturing, and allows pasture allocation to *khot ails*, that could probably mean that the existing social capital and traditional

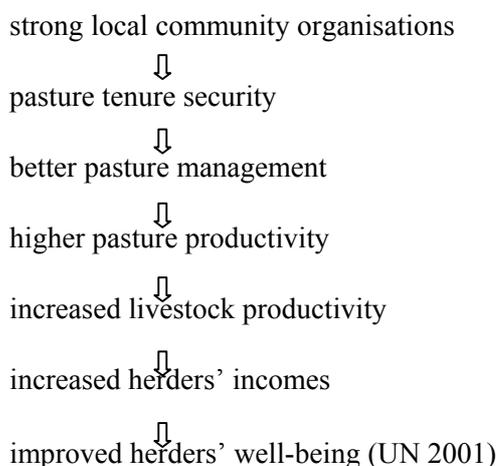
informal institutions are expected to help in establishing common property regime. Still the reliance on the informal institutions as an implementation mechanism of the law, is not reasonable. Anyhow, the question which institutions, either formal or informal, and how will provide cooperation within common property regime, has to be answered before the success of the implementation of the law can be predicted. The SGMP might be one of the ways of establishing institutions for the pasture land management. The goals of the SGMP are analysed in the next part to conclude what kind of common property management regime it is promoting.

Sustainable Grassland Management project

Another way of trying to overcome the constraints of pasture management listed above is formation of institutions for herders' cooperation under Sustainable Grassland Management project undertaken the Ministry of Nature and Environment (MNE) in cooperation with UNDP. Carrying out this project is probably filling the institutional gap of the Land Law as the institutions created within the project could be a significant tool of implementation of the Land Law. This is a pilot project and therefore, in case of a success, something similar will very likely be performed in the whole Mongolia.

By now the project has been started in three *aimags*, choosing three *soums* in each, altogether nine *soums* and with several herders' grazing associations in each. The project areas were chosen to reflect the different ecological conditions and levels of access to markets in the diverse Mongolia. The project is carried out also in Khujirt *soum*, where five herders' associations are established or under formation process. Khujirt *soum* represents the area of comparatively good grassland and good access to markets as the capital city in Mongolian scale is not far from Khujirt. The project was started in spring 2003 and therefore the results and success of it are not evident yet. However the goals of the project and the assumptions it is based upon can be analysed in context of the local situation.

The project will try to find ways of rebalancing "*pasture and grazing animals in space and time, in order to increase livestock productivity and herder well-being*" (UN 2001). The project refers to all three sustainability aspects, linking welfare of herders to quality of natural resources as a precondition, and vice versa – relating pasture land quality to herders wealth as "*poor herders are often by force bad herders*" (UN 2001). All of it is based on the existing social relations among herders which is an important precondition for cooperation and therefore will be kept and sustained. Even though pasture land quality is concerned within sustainability framework, the project mainly concentrates on increasing herders' wealth, pasture quality issues are rather means for achieving the well-being goals. The main tools used, as explained in the project document, are strengthening the existing cooperation by formation of institutions, and facilitating cooperation between herders' institutions and local government and even private sector. The main line of argument showing the preconditions for the success and potential challenges (if some of the arrows are not true), goes like this:



The truth and feasibility of the arrows are examined in the project document. They call the arrows “assumptions” and show that each of them is true under certain conditions. All of them will not be listed here, only the conditions for the first arrow, having the most connections with this study, will be shown. It is stated that strong local communities are necessary to increase the tenure security. The needed preconditions are said to be already existing cooperation among herders, the appropriate legislation in force and herders have to be informed and motivated to use the possibilities of strengthening land tenure. The first two of them are true as shown above, however the third one is questionable and will be analysed later one.

If analysing the shown connections in the framework of Ostrom’s eight design principles (Ostrom 1995), it seems that the cooperation established in case project is implemented successfully, would be quite close to the “robust institutions”. A brief evaluation of the coherence between institutions promoted by the project and the underlying principles of the robust institutions is reflected in the next table (Table 1).

Clearly defined boundaries	Yes - the pastures will be allocated to definite groups of herders thus social and spatial boundaries of the resource will be set
Equivalence between benefits and costs	Yes/maybe – will be fulfilled if the allocated pastures will be able to sustain the needs of livestock; could meet some maintenance problems (shelters etc) once the financial support from the project will not be available anymore (Mearns 2004)
Collective-choice agreements	Yes – most individuals affected are in the group that make the decisions; project works also on promoting gender equality
Monitoring	Yes – herders will be trained to monitor pasture resources;
Graduated sanctions	Yes – sanctions are set in the Land Law, they cannot be inflicted by herders themselves but that is a duty of <i>soum</i> ’s governor.
Conflict – resolution mechanisms	Yes – local conflict resolution mechanisms set in the law
Recognition of rights to organise	Yes – herders communities are established as legal bodies thus being able to involve with formal relationships with local and regional government; tenure rights up to 100 years
Nested enterprises	Yes - cooperation and joint decision making with other herders associations and local government

Table 1 The coherence between the design principles for building a robust institution (Ostrom 1995) and the institutions promoted by the SGMP

The formation of these robust institutions, however, is already facing some significant problems. The project officials acknowledge that delineation of the pastures is very complicated because of the overlapping grazing by different households, especially during summer and autumn, and overlapping borders of winter and spring pastures too. It is connected as well to the fact that often all the seasonal pastures in a *bag* are not large enough to provide non-overlapping pastures for all the herders. At present this problem is solved by using pastures in turns or using partly overlapping pastures. This practice would not be possible after delineation of the pastures and the setting of the users’ groups. Because of this the project officers have even had difficulties with deciding general borders when discussing them with herders.

Also the formation of the herders’ groups might be complicated because each family has its own migration pattern. One of the requirements when choosing the participants of the associations, is their migration pattern. The projects tries to group herders according to the pastures they usually go, in order to avoid necessity of changing migration patter. However, some part of the herders’ still have to adjust the majority and give up their usual pastures. A project official explained that places of winter and spring settlements are more important and they are trying to find participants having these shelters in the same area, but summer and autumn pastures are more commonly used and therefore can be changed more easily. Obviously the project does not involve all the herders living in Khujirt *soum*, therefore, it is important also to

understand how the rest will be affected by the exclusion from the benefits received by the participants, and to assure that they will not be left out of their usual pastures or forced to marginal or lower quality grassland.

Decreasing quality of pasture land because of human activities is one of the underlying assumptions of the project strategy. It is said to be caused by increasing number of new herders and weak obedience of the grazing rules, including declining mobility of the herders and out-of-season grazing. Overgrazing of some pastures is connected to high density of herding households near to towns, roads and water sources. The project aims to deal with these problems including facilitating seasonal movement, restoring wells to make it possible to graze in more remote areas and prevent out-of-season grazing. One of the tools in dealing with pasture use problems within the project is encouraging herders to decrease amount of livestock by teaching them how to receive higher income from higher quality but lower quantity herds. Nowadays herders do not sell much variety of animal products but mainly receive income from selling cheap raw material. If herders are taught some basic manufacturing skills, they can participate in higher value product markets, and the pasture land would benefit from lower pressure of the livestock (UN 2001).

Even though decreasing of the number of livestock can reduce overgrazing problems, it is argued elsewhere that not the stock of the herders but the mobility pattern is a major cause of pasture degradation (Humphrey and Sneath 1996) Although project aims at facilitating mobility, some of the activities carried out within the project, can potentially decrease the mobility. For instance, the herders have chosen to cooperate in making vegetable plots and establish small shops within the framework of the project, that in longer run may facilitate settling down near to these places because they need to be taken care of for longer time than just one season. Moreover the division of pastures can decrease the options to choose to go to other non-occupied pastures in case the pasture quality in particular spot is not sufficient for grazing. Facilitating herders' mobility that is one of the most important tools in providing high pasture quality, however this way it can be challenged by other activities performed as a part of implementation of the project.

It is very likely that the land that will be allocated to each herders' association will be just enough for the existing members' annual grazing cycle and reserve pastures for *dzud* cases. The high transaction costs connected to negotiation and delineation of the pastures, might mean that not much of extra land can be allocated to the associations because land had to be left also for the ones that do not participate. Therefore another question that needs to be answered is what will happen if the number of users within each herders' association increases. The associations are constituted of herders' households that might lead to increase in the size as next generations start herding their own livestock. Even if the number of animals is limited to certain amount for each household, adding new households within the same association might lead to increase of the total herd that needs to be grazed on the same limited pasture. As all available land will eventually be divided, migration to other pastures will not be an option. This way herders will be bound to stay in the same pasture which may lead to overgrazing.

The SGMP can be a tool of implementation of the Land Law as this project is dealing with allocation of the land. At the same time it contributes to increasing some aspects of the herders' wellbeing. However, the above shown existing or potential problems of implementation of the SGMP might indicate that sometimes probably not the right problems are fought with or not the right tools are chosen to achieve to goals of the project. In order to examine which of the problems connected to the pasture use are present in Khujirt *soum*, out of those found to exist in other case studies carried out in Mongolia and upon which SGMP basis its strategies, the local situation will be analysed further. The applicability of the SGMP to the local circumstances of Khujirt and the feasibility of introduction of the new property rights systems and cooperation patterns under the existing traditional forms of cooperation, will also be studied.

Description of the Case Study Area

The total territory of Mongolia is around 1.565 million km² which is divided into 21 *aimags* (provinces) each of them subdivided into 12-22 *soums* (districts). The case study was done in Khujirt *soum* approximately 370 km from Ulaanbaatar, the capital of Mongolia. Khujirt *soum* is one of 19 *soums* located in Uvurhangai *aimag*. This *aimag* stretches in north – south direction covering 3 ecological zones – mountain steppe, steppe and desert steppe in the southern part. Khujirt *soum* is situated in the northern part of the *aimag* in steppe and mountain steppe region, close to the border of Arkhangay *aimag*. Khujirt *soum* is divided into 6 *bags* (parishes) that considerably vary in size and number of inhabitants (Mongoljskaya Narodnaya Respubljika. Nacionaljny Atlas 1990).

There are two major rivers flowing through Khujirt *soum* – Orhon river and Khujirt river, and there are numerous smaller rivers and streams all of them being the main source of water for the local population and the livestock. Comparing to other places in Mongolia, there are many water sources in Khujirt area. The average elevation in this area is around 1500 m, reaching up to 2000 in some spots. The relief is hilly having average slope steepness of 10° - 20°. This steppe region has a typical chestnut sandy loam soil. Around 10% of the Khujirt *soum* area is covered with forest, most of which is located in the eastern part of the *soum* (Mongoljskaya Narodnaya Respubljika. Nacionaljny Atlas 1990).

The continental climate of Mongolia means that the climate is dry and windy, the number of sunny days reaches up to 300 a year, therefore Mongolians call it “the land of the blue skies”. The temperature varies greatly between summer and winter in Mongolia in general, reaching down to – 40° in a normal winter and up to + 30° in a normal summer. The average temperature in Khujirt is milder than that, it is around -20° in winter and around + 16° in summer, however the extremes may be considerable, especially in winter. Winter starts in October and lasts till early April. Usually there is not much snow in winter in the Khujirt area, the majority of the precipitation is rain usually falling in July, less in June and August, significantly less but still some rain comes also in other spring and autumn month (Hydrometeorology office of Mongolia).

Khujirt *soum* covers 1710 km² and is inhabited by members of 2100 households of which 1630 families own livestock and are registered as full time herders (Mongolian Statistical office). The rest of the families live in *soum* centre, a town having the same name – Khujirt. Khujirt *soum* has the highest population density in Uvurhkangai *aimag*. *Soum* centre is the only urban area in the whole territory of the *soum*. Khujirt is a small town with no significant industries developed, probably known mostly because of a hot spa and a sanatorium next to it. There are a couple tourist camps as well. Besides that there is a school that is, in theory, attended by all the children living in Khujirt *soum*, other social facilities and local government offices.

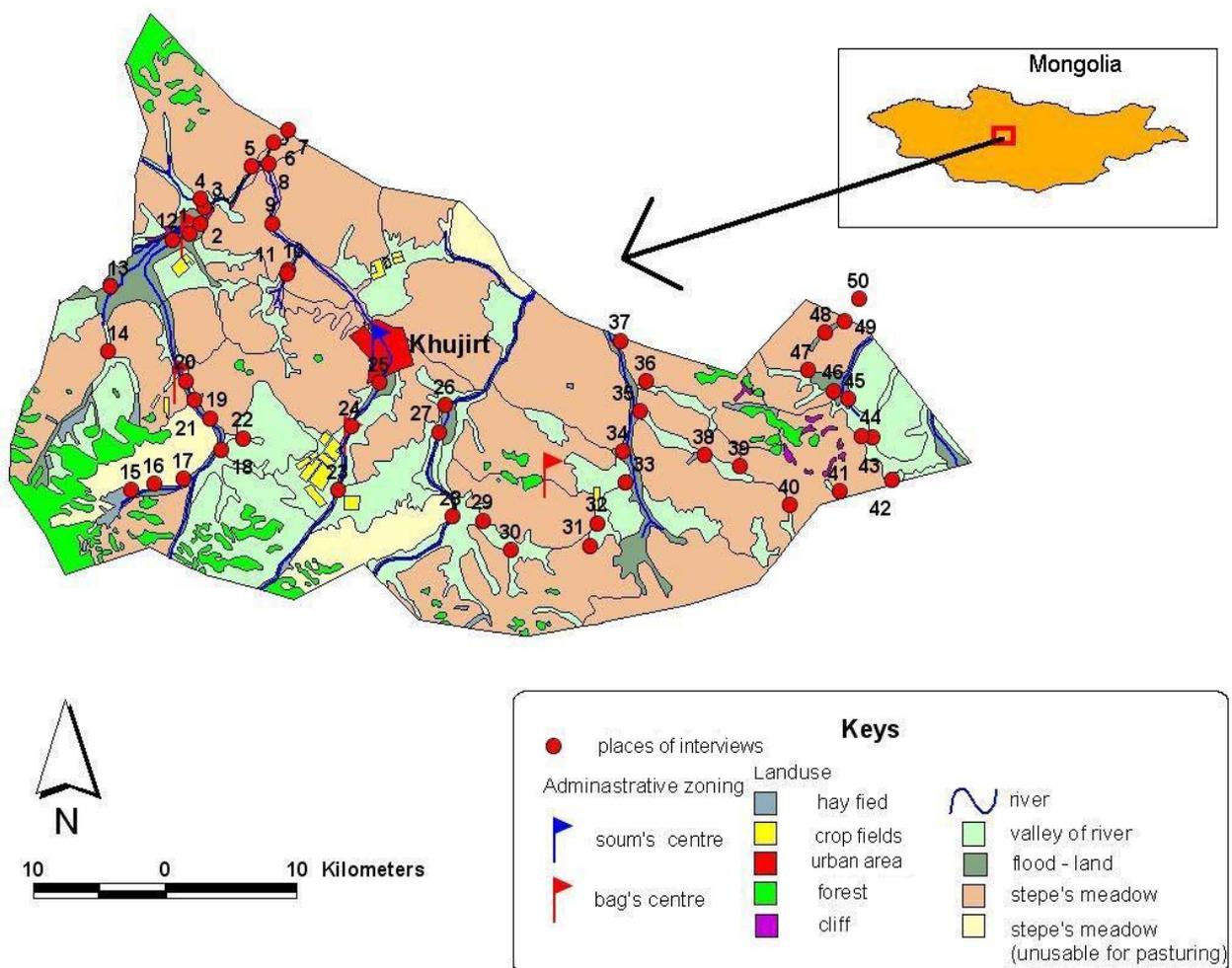
Livestock is the main source of food and income for the most part of the population. Even the people living in the *soum* centre sometimes own livestock that is herded by relatives in the countryside. The total number of livestock in Khujirt *soum* constitutes around 111 000 head. The number has decreased for around 30% during weather extremes in winters of 1999 and 2000 (Mongolian Statistical office). Not all the herders' families were affected the same, some of them lost 50-90% of the livestock or even the whole herd. Most of the herders' families produce the same products for their own consumption and not much of that can be or is sold. Felt made out of sheep's wool and used for making walls of a *ger* as well as mattress and carpets, is probably one of the few products that can be sold. Another product that could potentially be sold in *soum* centre is airag – fermented mare's milk that is the most popular drink in Mongolia. In the countryside a person consumes five to ten litres of airag a day during summer.

Herders are traditionally moving to different pastures four times a year. Usually they live in their *gers* close to a river, stream or other water source in a flat land during summer. Herders move closer to the foot of a mountain in autumn⁷. Most of herders' households have permanent winter and spring shelters in the mountains. The shelter is usually a shed or fenced shelter for animals, supplied with hay already during

⁷ For different movement patterns characteristic to other areas in Mongolia see Bazargur 1998

summer. Herders' families live in the gers also during the cold season. The traditional movement patterns is sometimes challenged by different circumstances, explained and analysed later on.

The institutions dealing with land management issues have several levels. The top level is the Government that has some specific authorities regarding the matters set in the Land Law. The Ministry of Nature and Environment is dealing with most parts of environmental policy issues. The *aimag*, *soum* and *bag* governors are elected by the respective level Citizen's Representatives Khural which is a local level parliament, and approved by a higher-level governor. The *aimag* governor has more general responsibilities regarding land management. The most responsibilities are assigned to the *soum's* governor and the land inspector subordinated to him (Land Law 2003). However, the *bag's* governor who does not have so many responsibilities according to the laws, in day-to-day matter interacts with the herders, discusses and helps in solving problems. As size of a *bag* varies significantly, some of them might be constituted of very few households. The next bigger unit after a single household, is a *khot ail* which is usually constituted of several households, most commonly on kinship basis. The responsibilities of the members of a *khot ail* vary, but usually they do their daily work together and also move together the whole year round.



Fieldwork Observations

In the following chapter the specific circumstances and grazing problems in Khujirt *soum* are shown and analysed. It is aimed at finding the main causes of the problems and to conclude whether the human causes or the diverse climatic conditions are the main factors behind the recent losses of the livestock. The analysis is based upon the local herders' knowledge, views and perceptions that was inquired through interviews. Besides finding out the local problems within use of the pasture land, the chapter also aims to analyse the feasibility of the implementation of some provisions of the Land Law and the appropriateness of the SGMP tools in overcoming the local problems and achieving more sustainable pasture land management.

The Number of Herders and Livestock, and Their Prospective Changes

The total population of Mongolia is 2.7 million and is estimated to have a 2.8% annual increase (UNDP Mongolia 2004). Even though Mongolia has one of the lowest density of the population in the world (1.8 people/km²), population increase is a factor that cannot be left out when considering the pasture land management perspectives. According to the statistics there were 1630 herders' families living in Khujirt *soum* in the year 2003. The statistics show that the number of nomadic families in Khujirt *soum* changes significantly every year – the usual changes vary between 40 to 250 families a year. For instance, between the year 2001 and 2002 the number decreased for 50 families, but during the next year it increased again (Mongolian Statistical office). According to the local land management officers, however, the changes are not that rapid, rather only five to seven families move to Khujirt *soum* every year and the youngsters not always stay in the countryside. Moreover, very few of the interviewed families reported moving in from other *soum* during the last years; most of the increase of the number of herding households was told to have happened during the beginning of the 1990s. Out of the 51 interviewed families, 13 started herding in the beginning of the 1990s or later on, most of them were drivers for the *negdels*, some, however, have moved from the *soum* centre or even Ulaanbaatar. In most cases the reasons for starting herding were the same as described elsewhere – unemployment in towns and cities and division of the livestock in the countryside that opened opportunities for becoming herders. Thus according to the statistics the number of the herders in the *soum* is highly variable but does not show a general trend to increase, however, according to the local sources, there might be a very slight increase in the number of the herding households due to migration and natural increase of the population.

The main source of income of the herding households is livestock. Since 1990 the number of livestock has been decreasing for a few years reaching 105 579 head in 1992 when a sharp increase started. The number of livestock peaked in 1999 reaching 176 953 animals. The natural disasters during that and next years killed large part of animals thus only 97 901 were left in 2002 (Mongolian Statistical office). Since then the number has started to increase again. Thus according to the statistics the total losses between the years 1999 and 2002 comprise 45% of the total livestock. This, however, is a considerably higher figure than the total losses of livestock in Mongolia that was around 15%. It can be explained by both – the fact that Uvurkhangai *aimag* was among the most severely affected ones and the possible statistical mistakes as explained below. However, all the families (except one) I interviewed during the field research had experienced some loss of the animals belonging to their household. The changes in the number of the livestock and the composition of the herds in Khujirt *soum* are shown in the next graph (Figure 1).

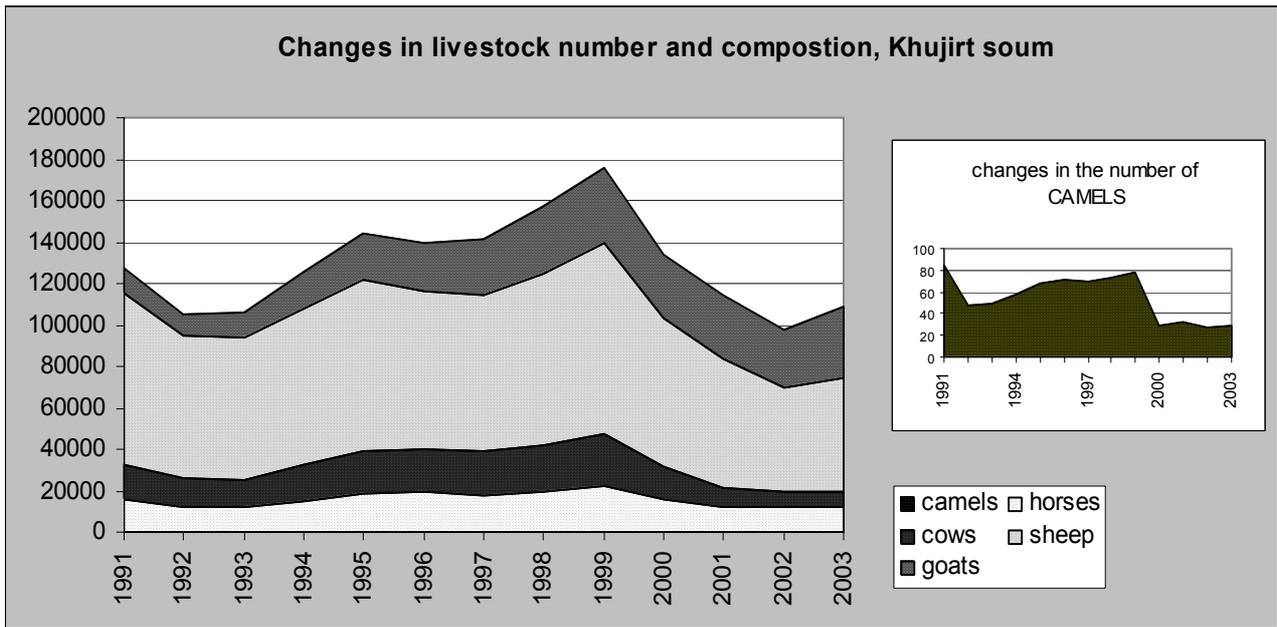


Figure 1 Changes in the livestock number and composition in Khujirt *soum*, separately shown changes in the number of camels that due to the scale cannot be seen in the main graph (data from Mongolian Statistical Office 2004)

The changes in livestock number calculated in *bods* show the same trends. A *bod* is the traditional Mongolian livestock unit which is equivalent to one horse or cattle, seven sheep, ten goats or 0.75 camels (Fernandez-Gimenez 2002). According to the statistics on Khujirt *soum*, an average holding of livestock per family in 2003 was only 19 *bods*. 19 *bods* is a very small number comparing to the number of livestock counted in other case studies. For instance, in Jinst and Bayan-Ovoo *bags* that were researched by Fernandez-Gimenez, the average livestock holding was between 60 and 80 *bod* and even the poor families owned 29 *bod* (Fernandez-Gimenez 2002). Even though the case study was done before the *dzud* years, the differences in the number of the livestock between the two *soums* and Khujirt seem too high. The official 19 *bod* in Khujirt *soum* is equal to 67 animals in total according to the statistics. The situation, however, appeared different when the herders' families were interviewed. According to what herders said, around half of them had 100-200 animals, very few had less than 50 or more than 400. The total results are shown in the Table 2.

Nr of livestock	Nr of households	%
Less than 50	2	3.9
50-100	10	19.6
100-200	27	53.0
200-400	7	13.7
more than 400	5	9.8

Table 2 The number of livestock owned by the families interviewed in Khujirt *soum*

Even though the interview sample was chosen randomly, the results reflect general trends in the area - the herders own more livestock than shown in statistics, thus the poverty level is lower, but there is potentially higher grazing pressure on grassland. As the taxes herders pay depend on the number of livestock, it is possible that a part of the livestock is not registered in order to avoid payments, and the wrong numbers are reflected in the statistics. However, in general statistics reflect the same trends of changes in

livestock number and composition as the results from the interviews illustrate. The herders reported that cattle is generally the most vulnerable to *dzud* events which is reflected in the statistics too. The above graph (Figure 1) shows that cattle was the group that showed the biggest reduction thus making the losses for the herders even higher.

Interviews show that the poor herders were the most affected as they lost a comparatively large part of their herds, often including cattle and horses. Even some of the owners of large herds experienced significant losses. Several families now having around 100 animals, reported loss of 300-400 animals during numerous *dzud* occasions. One family even had lost 1000 animals and is now left with only 100. This reflects the difficulties of grazing large herds that are connected to insufficiently high pasture quality, difficulties in making enough hay or lack of labour to separate herd for grazing in places that are more suitable for each category. However, a herder whose grazing knowledge is well-known, and he has received the Mongolian best herder's title, did not lose a single of his 500 animals showing the importance of the good grazing knowledge. Most of the other herders belonging to the wealthier part, have not experienced as high losses of livestock as the ones who own around 100 animals at the moment, meaning that quite a proportion of the average herd owners have belonged to the wealthier group a few years ago.

Probably learning from the experience that too high number of livestock means not only higher income but also more risk, most of the large herd owners have answered that they do not intend to increase the present size of the herd. Even quite a large part of average size herd owners replied that they would not like to have larger herds in the future. Answers were the opposite when the same question was asked to small herd holders. All of them, and slightly more than a half of the average size herd owners, said that the present amount of livestock was not enough to support their wellbeing.

Mobility Pattern

Even though one of the problems needed to be dealt with, as seen by the officials of the SGMP, is the considerably decreased mobility of the herders, mobility pattern in Khujirt *soums* has not significantly changed according to what herders are reporting - 76% of the families use four seasonal pastures. The places of winter and spring pasturing are usually the same every year. Most of the families have their own winter and spring shelters or they share them with another family. Only very few families told they did not have a set winter or spring shelter but they rather join another family during winter or spring time and these families can change every few years. As for autumn and spring pastures, a part of the herders go to either set places or to approximate area and then chose the place depending on the quality of grassland and presence of other herders. There are some families who use varying summer and autumn pastures every year.

Most of the families, who move less than four times, claim that this has been their usual pattern of movement for many years. Even though these ten families, who move two or three times a year, come from all the wealth groups except the richest one, there is a slight tendency for the poorer households to move less. That is explained by two factors – only one shelter for both – winter and spring time, and a limited number of animals that can be fed on the same pasture for longer time thus larger herd owners are required to move more. However, there are some families who do have decreased frequency of movement during the last years. A couple of herders explained their lower mobility by the fact that they do not possess a vehicle hence moving for long distances is not possible any more. One family has started a shop business and therefore had to settle down. They justified their choice by explaining that herding could not provide enough income, and they felt they could have a better life if they started their business. This family had not tried the herding without any movement yet, but they were expecting it would not cause much of overgrazing problems or shortage of food for their livestock, and they claimed they were ready to take the livestock to further pastures if necessary. In general the mobility pattern does not seem to have changed significantly since the privatisation of livestock. Families are going to the same pastures their ancestors used to graze. There are no clear connections between the length of the period a family has been herding and the number of pastures they use within annual cycle. Thus Khujirt case does not show problems connected to the sedentarisation of the new herders that have been experienced in other places.

Only three of all the interviewed families claimed to move more than four times a year. These families are belonging to the three wealthier groups thus again illustrating a tendency of the wealthier herders to move more. The herders explained their movement pattern by two main factors. Firstly, it is more likely that wealthy families have more than one winter shelter than that the poorer ones do. A family is not supposed to have two shelters for one season according to the law, but wealthy herders probably have more influence and power to facilitate decisions that favour them. Two shelters might be important in the different climatic conditions as then the herders can choose which one to use depending on winter temperature, presence of snow and grassland quality. Second factor explaining more movements within a year, is the need for higher quality and larger area pasture for a larger herd to survive. As the results from the losses in *dzud* cases show, herders having more livestock can sometimes be more vulnerable to harsh conditions than medium herd holders, therefore more effort have to be put into feeding the livestock. One of the wealthiest herders, I interviewed, usually moves eight to ten times a year and goes to the territories of other *soums* if necessary. He stressed he really needed to take much care of the food for the livestock, and he did not mind moving more. In general, the more wealthy herders tend to do more of the long distance movements in case of *dzud* and they show more willingness to do these movements in the future if necessary. Also their need to move to feed the livestock is not challenged by the transportation and labour problems as much as it is for the small or medium herd owners.

The frequency of the movement is not, however, the only indicator of an ecologically better use of pasture land. The movements has to be done on the right time and place, the grazing on the pastures other herders use in other seasons should be avoided. Trespassing and out-of-season grazing is shown to be a significant challenge to an environmentally sustainable pasturing in other places in Mongolia. Most of the Khujirt *soum* herders, however, do not seem to have experienced much of these problems. They state that the occasions when other herders graze in their pastures or use their shelters are very rare, most of the herders had not experienced these problems at all.

Another problem discussed in current research (Fernandez-Gimenez and Batbuyan 2004) is the administrative borders which are not set according to the customary mobility patterns of the herders and that do not provide all the necessary types of pastures within the territory of one *soum* or *bag*. Thus if herders try to follow their usual routes, they might get into arguments with the governing institutions of other *soums*. There are some uncertainties regarding the exact borders of Khujirt *soum*. According to the herders each of the governors claims that more of the land belongs to his *soum*. As the borders are not exactly set, the herders that are registered in one of the *soums* but graze in the other one during some periods, do not face any problems. If they graze on the pastures they used to before the new administrative division, neither local governors nor herders object. Most of the herders who have been grazing in other *soums* during *dzud*, told that the local herders have helped them, and very few cases of objections have been experienced. The less strict observance of the administrative borders and the understanding of local governors make the long distance mobility during *dzud* times more feasible.

Quality of the Pasture Land

In order to find out if the quality of pastureland is considered to be one of the causes of the loss of animals during *dzud*, herders were asked about their perception of changes in the quality of the pasture-land. Nearly half of the herders interviewed in Khujirt *soum* stated that pasture quality is decreasing, other ones acknowledged that even though in general the quality is decreasing during the last years situation has improved; around 20% of herders said that pasture quality is normal, suitable for grazing their livestock; only six herders thought that pasture quality is in general increasing. More explicit results are shown in the table below (Table 3).

Even though no clear correlations are obvious from this table, it could be concluded that the herders having the medium size herds are more satisfied with the quality of the pasture land as all together 74% of them think that pasture quality is either satisfactory or at least that the quality has been slightly increasing during the last years. As for the other groups, the largest part of both – poorer and wealthier herders consider that pasture quality is decreasing in general. It is quite understandable that herders owning larger number of livestock are facing more of bad pasture quality problems as their requirements are higher. They need both –

larger areas of the pasture and better quality vegetation in order to feed the herds. The poorer herders are usually the ones who have lost a significant part of their livestock during last years and bad pasture quality is one of the most likely reasons for that. Having faced the vegetation quality problems during last years, the herders are reflecting their experience in the answers.

No of livestock per household \ Views on pasture quality	Decreasing	In general decreasing but slightly increasing during last years	Normal	Increasing
Less than 50 (n=2)	1 (50)	1 (50)	0	0
50 – 100 (n=10)	6 (60)	3 (30)	1 (10)	0
100 – 200 (n=26)	7 (26)	9 (37)	5 (18.5)	5 (18.5)
200 – 400 (n=7)	4 (57)	1 (14)	2 (29)	0
Over 400 (n=5)	3 (60)	1 (20)	0	1 (20)

Table 3 Herders views on the quality of the pasture land, herders grouped according to the number of livestock they own. The numbers in brackets show the percentage of the herders of the specified group giving this particular answer.

The reported negative changes in the quality of the pasture land have several causes as reported by herders. Even though 80% of the herders said to have observed overgrazing of the pasture land at some point, the general feeling was that human activities play only a partial role in decreasing pasture quality. A strong emphasis was put on the climatic conditions that are responsible for less or different vegetation on the fields. Insufficient rain during the growing season or delay of the first stronger rainfalls in spring was the most common reasons blamed for changes of the grassland. The next most frequently mentioned reason was too high cattle density on the limited pastureland of the *soum* that clearly depletes the quality of the vegetation. The cattle density was usually attributed to high concentration of herders' households near the water sources. Then extraordinarily hot summers and too cold winters were mentioned as a cause of changes in vegetation. The other reasons herders talked about were rodents destroying roots of the plants and the high amount of grasshoppers attacking the fields. Also global warming was blamed going together with other human activities like illegal mining and logging. The causes of decreasing pasture quality commonly mentioned by other researchers (for instance Fernandez-Gimenez and Batbuyan 2004), like practice of grazing livestock in wrong time or place (trespassing) or bad coordination of herders' movement were mentioned only by couple families; decreased mobility or living the whole year round in one place, was not reported as a cause of decreasing pasture quality in Khujirt *soum* at all (maybe make a table or sth).

The *soum* governor and the land management officers explained that the decreasing pasture quality is connected to high density of livestock in the area of the *soum* and the frequent *dzud* occasions. As the number of livestock has decreased during the last years, the overgrazing problems are not the main issue anymore. However, in general they appear because of the climatic conditions - the dry summers lead to shortage of water that contributes to high concentration of herders around water sources thus causing overgrazing in these spots; it works the same in case of cold winters or a thick snow coverage that makes people leave the affected places and search for better pastures thus overgrazing them if the density of the livestock is too high. Land management officers admit that decreasing or limiting the density of the livestock could be a partial solution of the overgrazing problems, but many other factors that are influencing the grazing pattern, like precipitation and availability of water, natural disasters, damage of the soil by rodents, migration pattern and others should be taken into account as well. *Soum's* governor, however, says that pasture quality problems are caused by the droughts experienced during last years, and the situation will improve when better years come. More precipitation would lead to better pasture quality that would be able to provide enough food for more livestock; the number of livestock then would increase and the herders' wellbeing along with it. Thus *soum* governor does not see the number of livestock as a problem that need to be solved, but as rather a significant mean in strengthening the herders' wellbeing.

The same officials also explained that the mobility pattern in Khujirt is well-developed and there are not much problems connected to it. The herders are said to have good pasturing knowledge and they do observe the informal norms regulating the pasture use. Land management officers have the rights to coordinate herders' movements, to inform herders about the time and the places they should move, and herders usually move when they are told to. According to *soums* governor, not having a vehicle for moving is not a problem, the territory of the *soum* is small enough to move by a horse and carriage. The observations of the *bags* governor, who actually implements the decisions of *soum*'s governor and land management officers' in some cases, are slightly different. He has faced problems with herders not moving when they have been told to and they are explaining this disobedience by not having the means for moving. Thus, even though significant changes in migration pattern are not observed in Khujirt *soum*, the governors admit presence of some minor problems with out-of-season grazing or overuse of the pastures.

Access to Water

The decrease of precipitation and the resulting shortage of water and lower quality of the pasture land is a connection mentioned by nearly every herder. Herders also say that the improvements of the quality of the pasture land during the last two years are closely related to higher precipitation. However, the dry years before have led to both – a decreasing vegetation biomass and the extinction of some of the plants that were important source of nutrients for the livestock. At the same time lower water level in rivers and streams or even desiccation of some of the streams and springs, have caused increase of livestock density close to the places where water is still available in the necessary amount.

During the collectives' times water problems in dry years were solved by constructing and using wells. After the collapse of collectives, much of their property was divided or stolen, the same was true for motors for pumping water from wells. Thus most of the wells are not usable anymore. According to the statistics of average number of wells in the whole Mongolia, there should be around 24 wells in Khujirt *soum* (Mongolian Statistical Yearbook 2000 in ADB 2002a). The reality seems quite different from that though. I noticed one well while travelling through the whole Khujirt *soum*, and only two out of 51 interviewed herders said to use a well as a water source. Moreover, one of them had built the well himself which is a significant investment for a herder. The others use running water from the rivers and streams that often means carrying the water from several kilometres away.

Only around one third of the interviewed herders said that access to water is not a problem for them. The rest told that either they face water problems in some of the pastures they are using or there is no water source nearby any of their pastures. Access to water is usually more significant problem during winter time than it is in summers when the pastures down in the flat lands are used. The people who reported problems in accessing water usually have to bring it from two to five or sometimes more kilometres away river or stream. In these cases also livestock has to walk down to the river every other day. Herders explain that livestock spends much energy on these long walks hence does not fatten. Therefore herders prefer to feed livestock with snow or bring ice from rivers during winter. The problems in access to water is one of the reasons why herders do not go to marginal undergrazed pastures; building new wells or repairing the old ones would be a way to solve the high livestock density problems in some other places. At the same time good access to water sources all the year round would contribute to livestock health and better preparedness for winters as more fat could be accumulated.

Cooperation and Local Officials

There are two types of cooperation present in Khujirt *soum*. One is the traditional cooperation within *khot ails* and in general among herders usually are bound by kinship or friendship ties. The other one is the cooperation within the framework of the SGMP that is implemented in several places in Khujirt *soum*.

Most of the Khujirt *soum* families do not live on their own but share their daily work between several families in the *khot ail* communities. *Khot ails* can be either formed on kinship basis or not. Some of the households have extended families as their basic cooperation unit, others team up with their friend or neighbouring households. The composition of *khot ail* communities, especially the ones without kinship ties,

is fairly variable. They are usually formed from two or three but sometimes up to eight households, most of which have joined in different times. The length of staying together depends mostly on mutual understanding and success in cooperation, but also on inner dynamics and future plans of each family. Families can live together for the whole year round or just for a few seasons, that can be summer or autumn seasons because then it is easier find pastures that are large enough for the joint herds, as well as harsh winter and spring seasons when they share shelters and the before prepared hay. There were no clear cooperation patterns among the herders in Khujirt *soum* – some families reported staying in their *khot ail* communities for already ten years, while others have just started a new cooperation and will see how it goes. There were also quite a few families that work together only a couple seasons a year.

The reasons for joining *khot ail* communities is usually the shared duties and divided tasks among the members. The women always stay at home and do the household jobs, they are responsible for bringing the water from the water source that is not necessarily very close to the *ger* and for preparing dried animals' droppings to be used as fuel for the fire as well as do the milking of cattle and mares. Sharing the work among several women and children make it much more doable. The men and adolescent boys do the herding activities. The various species herds require more labour because each of them needs to be taken to different pastures every day. As the water sources can be quite far from the pastures, taking the cattle there takes long time as well. An extra labour is especially crucial when moving or gathering hay. Thus pooling the labour makes everyday work more efficient. Few of the families who were not a part of a *khot ail* but were rather living on themselves, complained about not sufficient labour for completing both – everyday jobs and the moving.

Another traditional form of herders' cooperation is the support that has to be shown to the others who are experiencing difficulties. Herders say that even if other families come to their pastures, they would never send them away because they understand that the other family needs to feed their livestock as well, and they know that in case they need help some day, they would receive it from other herders wherever they go. The unreliable character of the changing climatic conditions requires continuous cooperation and mutual support among herders that often could be the only way to survive. Therefore the sense of duty towards other herders' families, who are experiencing difficulties, makes the herders not to care so much about their own good. They always claim that even the pastures they are using are not enough for feeding another family's livestock, they would allow the livestock to graze there and bear the problems of lack of food together with the other family. This makes possible the long moves away from the traditional pastures to find a better one in case of *dzud* or droughts. At the same time this tradition could lead to overgrazing in some cases when too much livestock is brought to the limited pasture. But these ecological costs that could appear in some spots, are considered to be lower than the social gains.

The SGMP is perceived by herders in much more positive way than the activities of the local governors. The governors are often blamed for not paying enough attention to herders' problems, not helping in solving them and not being supportive. Some of the herders did not even know who the *soum*'s governor is and many more had never seen him. *Bag*'s governor was sometimes said to come only for counting the livestock, collecting taxes and before the elections. More often herders just did not care about the governors and did not know what they were doing or supposed to do. In other cases governors' work was described as acceptable but not particularly well. Some herders were very satisfied with their governors, told that *bag*'s governor especially is understanding and supportive. The answers depend very much on the *bag*, as each of them has a different governor. The personalities are important because the work they do depends rather on their own willingness than on the prescriptions of the law. The *bag* number I, which is the largest *bag* in Khujirt *soum*, covering nearly half of its territory, had not had a governor for a half a year already. In general the work of the governors is not appraised highly and herders are listing many kinds of support they would like to receive from the governors.

The situation is quite opposite when talking about the SGMP officers. The people who have already joined the associations appreciate the work of the officers very much. They are said to be the ones who listen to herders, ask their opinion and support in the activities they would like to have. The officers offer trainings and sharing the experience events for the herders. The support in activities like engaging in vegetable growing, breeding high quality livestock, opening shops or manufacturing the raw materials, is appreciated.

Herders do feel that with the help of the knowledge they receive within the project, they can really improve their wellbeing. The herders who have not joined the associations usually do not know much about them. However, most of the herders asked if they would join an association if they had a chance, gave a positive answer. The herders who were not in favour of joining an association explained it by the potential difficulties in understanding within the newly formed community, joint decision making and cooperation. Some of the herders have even left the associations because of these shortcomings.

The goals of the project stated in the documents and the herders' perceptions of the project vary quite a lot. Even though the SGMP says to base its promoted cooperation upon the existing forms of cooperation among herders, it seems that there are not so much connection between the unofficial cooperation in *khot ail* communities and the official associations. The families who have joined the herders' associations still have the cooperation within *khot ail* communities as an alternative or different level cooperation. Quite often not all the families belonging to one *khot ail* have joined the association. Thus the association members and non-members are closely linked in their daily lives. This might be one of the problems when trying to set the clear social and spatial boundaries of the associations.

Herders perceive project as a mean for pooling labour for the daily work or hardest work occasions or for some new initiatives. Quite a few herders think that the associations are meant for labour pooling and labour sharing on a daily basis which is possible according to project officials but it is not an important part of the project. Herders are very interested to receive support in renovating wells and shelters as well. At the same time herders do not talk about the pasture delineation and allocation at all, and they are not concerned about better pasture management that is supposed to be one of the main tools for the implementation of the project. Thus it seems that herders see their participation in the association as a mean for receiving advice and support, but they are not aware that they might have to change their migration pattern, stick to strictly set places and avoid letting herders from outside the association to graze there, thus working against the tradition to help.

Local Conclusions

The field observations have led to some conclusions regarding pasture use and cooperation within traditional herders' groups. The mobility pattern of most of the herders has not changed significantly, most of them report having four seasonal pastures, and using the same pasture as they ancestors did. Also the local officials do not see any problems with decreasing mobility or sedentarisation of the herders. The mobility in Khujirt *soum* does not face the elsewhere observed problems of lack of transportation, limitations of administrative borders and conflicts over pastures. The situation seems to be reflected differently when talking to higher level officials who assume that the mobility and overgrazing problems are present everywhere and try to deal with them without taking into account some of the local conditions.

The opinions of the higher level officials are strongly based upon the significant losses of the livestock. Most of the herders reported high losses of livestock, in general a third of the total livestock of the *soum* died during the three *dzud* years. Many of the wealthier herders, however, do not intend to increase their herds. As the mobility pattern in general is appropriate for the local conditions, there should be some other circumstances that could have caused the immense death rate of the livestock.

The pasture quality has been said to decrease in general, however, a large part of the herders have also observed slight increase in the quality during the last two years. The changes of the grassland are connected to lack of precipitation which cause both – lower quality and quantity of vegetation and decrease the availability of the fresh water sources, making herders to concentrate around the available rivers and streams. The higher summer temperature affects the vegetation quality and the colder winters increase the vulnerability of the livestock. At the same time also the high livestock density around water sources worsens overgrazing in some places. A better coordination of the mobility of herders is therefore necessary in order to make use of all the pasture land, provided that more water sources, like wells, are available in the marginal areas. The coordination is, however, hard to achieve within the framework of the existing cooperation among the herders.

The present cooperation in general is based upon the informal *khot ail* communities most of the herders belong to. The composition and size of the communities, as well as the work that is shared, vary between households and over time. The cooperation in both – everyday life within *khot ail* communities, and the always present support in *dzud* cases, show the presence of strong social capital that is based upon the traditions and the harsh environmental conditions. Thus the informal institutions provide cooperation that is based upon the social capital rather than deriving their success from being a robust institution according to the Ostrom's design principles (Ostrom 1995).

The promotion of coordinated movements of the herders and making use of all the pasture land, is one of the strongest points of the SGMP. Most of the herders show support to the implementation of the SGMP. However, it seems, that herders assume the cooperation within the project would be similar to the *khot ail* cooperation and they do not think so much of the potential consequences of delineation and allocation of the pasture land. This issue might be a significant challenge later on when project will be partly implemented, and the differentiation in access to the pastures and water sources among the members and non-members might occur. Thus the social capital, traditions in general and traditional cooperation might be in danger.

The division and allocation of the pasture land under the present situation seems not very feasible because of the present movement pattern, including journeys to neighbouring *soums* and the changing places for the summer and autumn pastures. Another reason is the above discussed overlapping nature of the pastures that significantly complicates the pasture allocation. Moreover, herders have little knowledge and willingness to follow such practice; herders' justifiably assume that their grazing knowledge is good enough to decide on the right way of grazing. However, a better coordination of pasture land use among the herders might contribute to a more efficient use of the whole land, avoiding overuse in some places.

The Climatic and Vegetation Data

As explained above *dzuds* are natural disasters that are characteristic to the local harsh ecosystem. The different types of *dzud* are – white *dzud* when the vegetation of the pasture cannot be reached because of the snow cover; the iron *dzud* meaning the ice cover on the top of vegetation thus also making grazing impossible; and black *dzud* – lack of precipitation and the resulting lack of ice in freshwater sources meaning there are no frozen water supplies for the livestock. The three *dzud* years between 1999 and 2002 were so called “multiple *dzuds*” because the natural disasters included more than one of the above described (UNDMT 2000). The losses of livestock are even higher if *dzud* is accompanied by other factors like poor health of the livestock. The latest disasters were preceded by drought during summers preventing vegetation growth thus meaning that the livestock could not accumulate enough fat to cope with winter cold and starvation. As it was argued by herders, the vulnerability of the livestock during last years was connected to lack of food for the animals and their preparation for the winter. The issue that needs to be examined is whether the low pasture quality is a result of permanent overgrazing or rather it is a temporal effect of decreased precipitation.

In disequilibrium ecosystems it is harder to recognise permanent, human caused land degradation because the varying amount of precipitation may as well cause a temporal decline of vegetation amount and quality. Thus the changes in productivity of grassland do not necessarily mean general decrease of the productivity as it might recover from the temporal disturbances (Brogaard 2003). There are several indicators that could help in assessing the long term degradation of the grassland. Behnke and Scoones (in Brogaard 2003) list three changes that indicate degradation: changes in soil fertility and water-holding capacity, changes in vegetation and changes in livestock production. The parameters of the soil that indicate degradation are: changes in vegetation productivity that is unrelated to the changes in the rainfall pattern; changes in vegetation cover; changes in plant species composition and decreased fodder from the vegetation (Behnke and Scoones 1993 in Brogaard 2003). Several of these parameters are analysed in the following part. The climatic parameters, precipitation and temperature that are important in determining the vegetation growth, nomadic grazing patterns and livestock health are illustrated. The connections between them are demonstrated and the changes of quality of the grassland are analysed.

Precipitation

One of the main conditions characterising disequilibrium ecosystems is spatially and temporally varying rainfalls. The meteorological droughts that might occur in such ecosystems have to be differentiated from human induced droughts. Meteorological droughts are naturally occurring and the ecosystems as well as the society have adapted to them. On the contrary, the human induced droughts occur because of the land degradation that is resulting in changes in rainfall partitioning and the disability of the soil to root the moisture (Falkenmark and Rockstrom 2004). The meteorological droughts may last for several years but most likely they would end at some point⁸ whereas the human induced drought means that the vegetation will keep degrading even if enough precipitation is received. Thus in case of human induced droughts the decrease of the vegetation amount and quality are not linked to the amount of the precipitation as much as it is in case of meteorological droughts.

The recent data (starting from the year 1990) on precipitation in Khujirt *soum* were obtained from a station that is located within the *soum*. However, the older data of the period between years 1931 and 1990 were collected from a station (further referred to as station 1) that is located around 100km north west from the border of Khujirt *soum*. The precipitation of the years 1990-1995 were correlated between Khujirt data and the data from the other station. The r^2 of the monthly precipitation over the years was very high, varying between 0.8 and 0.95. Even though the total annual precipitation correlation coefficient was 0.7, the differences in absolute numbers of the total annual precipitation between the two stations vary between +100 and -100. The data from another station (further referred to as station 2) that is located around 150 km north

⁸ For the discussion on the reinforcing loop between the long lasting meteorological droughts and land degradation see for instance Shinoda 2000.

east of the border of Khujirt *soum* were also analysed. The correlations of the annual total precipitation between the station 1 and station 2 is very low, around $r^2=0.15$, even though the stations are the same latitude and only about 200-250 km from each other, and the general climatic conditions are similar. The high spatial and temporal variations of the rainfall are reflected in the following graph (Figure 2).

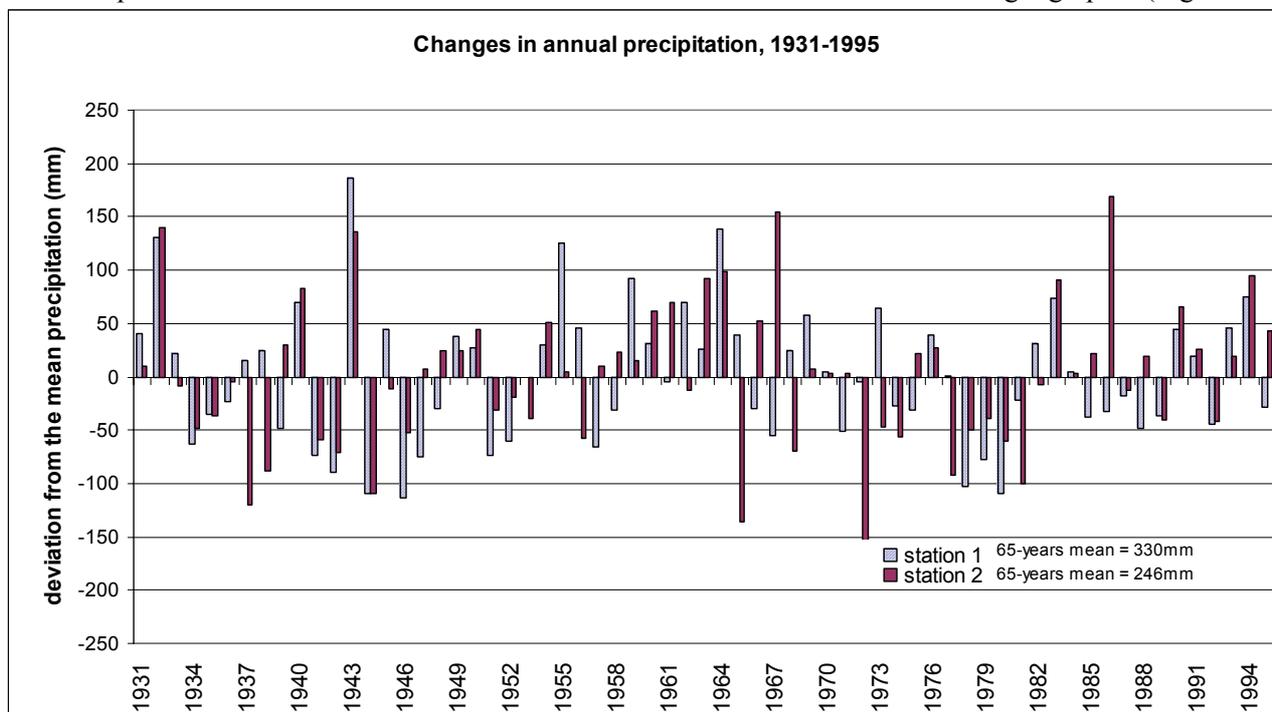


Figure 2 Changes in annual precipitation in two stations 100-200 km from Khujirt *soum* (data from database constructed by Dr Mike Hulme at the Climatic Research Unit, University of East Anglia, Norwich UK)

The graph shows deviations from the calculated 65-years mean precipitation. It reflects high variability of the rainfall between the years, in wet years it can reach up to 480mm in one area and over 350 in the other whereas it declines down to 200mm in one area and 100mm in the other in dry or average years. The extremely dry or wet years come once in 10 to 20 years, however the variability in some decades is higher than in the others; it seems there have not been any significant extremes during the last decade shown in the graph thus the occasions of the extreme weather at least precipitation-wise has declined during then. The general trend shows a slight increase of the total annual precipitation in station 2 and slight decrease in station 1. The illustrated high local differences of the rainfalls restrain from making conclusions on the general long term precipitation trend in Khujirt area situated in the middle between the two stations.

The total annual precipitation in Khujirt *soum* area has been varying between 150mm to 550mm in the extremes during the last 14 years, but the mean precipitation of last 14 years is 280mm. Most of the annual rainfall in this semi-arid region is concentrated during the growing season between June and August when falls 70% to 85% of the annual precipitation. The annual rainfall pattern is illustrated in the Figure 3. Year 1994 represents an extremely wet year when the total precipitation was twice higher than the 14 years mean. The year 1999 was only slightly dryer than a normal year, still the next winter brought the tremendously high losses of livestock. The year 2003 represents a normal year that provides enough precipitation for good quality vegetation, thus also enough forage for the livestock to survive and breed.

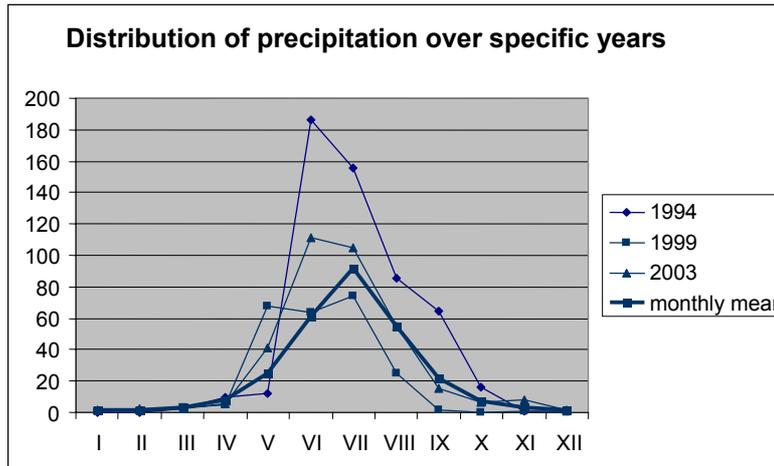


Figure 3
Distribution of precipitation over years 1994, 1999, 2003 and an average of 14 years, Khujirt *soum* station (data obtained from Hydrometeorology Office of Mongolia 2004)

The Figure 3 shows the annual monthly distribution of precipitation during three years and a mean of 14 years.

The total winter snow cover is thin as the precipitation amount is varying between 5 and 30mm a winter (mean: 17mm) and usually makes it possible to graze livestock also during the winter. The statistics of snow cover during the last 14 years does not show any extreme high snow cover, however a few herders reported cleaning pastures for the livestock, thus a slightly deeper snow cover might have been present in some places.

Temperature

The spatial and temporal variations of the temperature are not as significant as the changes in precipitation. The mean temperature of the coldest winter month – December to February varies between -16° and -22°. The livestock is mostly affected by extreme cold weather. The available monthly mean values do not show temporal extreme coldness, however, the mean temperature of some month suggest that the extremes might have been harming. The coldest month usually is January when the monthly mean temperature may drop down to minus 26°. The annual mean temperature varies between -2° and + 0.5° and shows a slight increase during last 14 years. The increase, however, might be either temporal or long term and thus show presence of the effects of global warming. it is important in respect of the time scale of increase of the temperature, because a higher summer temperature, especially if it tops over +30° degrees, means higher evaporation of the soil moisture thus contributing to drying and lower vegetation quality (Erdenetsetseg, Shinoda et al 2004).

Vegetation

The changes in the amount of vegetation cover are shown using the normalised difference vegetation index (NDVI) that reflects the relative vegetation amount (Seaquist, Olsson et al 2003). The variations of the vegetation cover are reflected in Figure 4. The vegetation cover reaches 0.5 to 0.6 expressed in NDVI during its peak time which means that vegetation cover is moderate to dense according to NDVI classification by Runnstrom (2003). As noted by Seaquist (2001), the NDVI does not have a linear character as it does not show linear sensitivity to the vegetation cover over 0.6 NDVI thus an increase of vegetation cover over 0.6 NDVI are not reflected. The NDVI between 0.4 and 0.2 represents a sparse vegetation cover, and the NDVI below 0.2 means non-vegetated sand (Runnstrom 2003). A low vegetation index during winter time may as well mean the presence of snow cover because bright targets give low vegetation index (Seaquist 2001).

Vegetation changes over years 1982-2000, Khujirt area

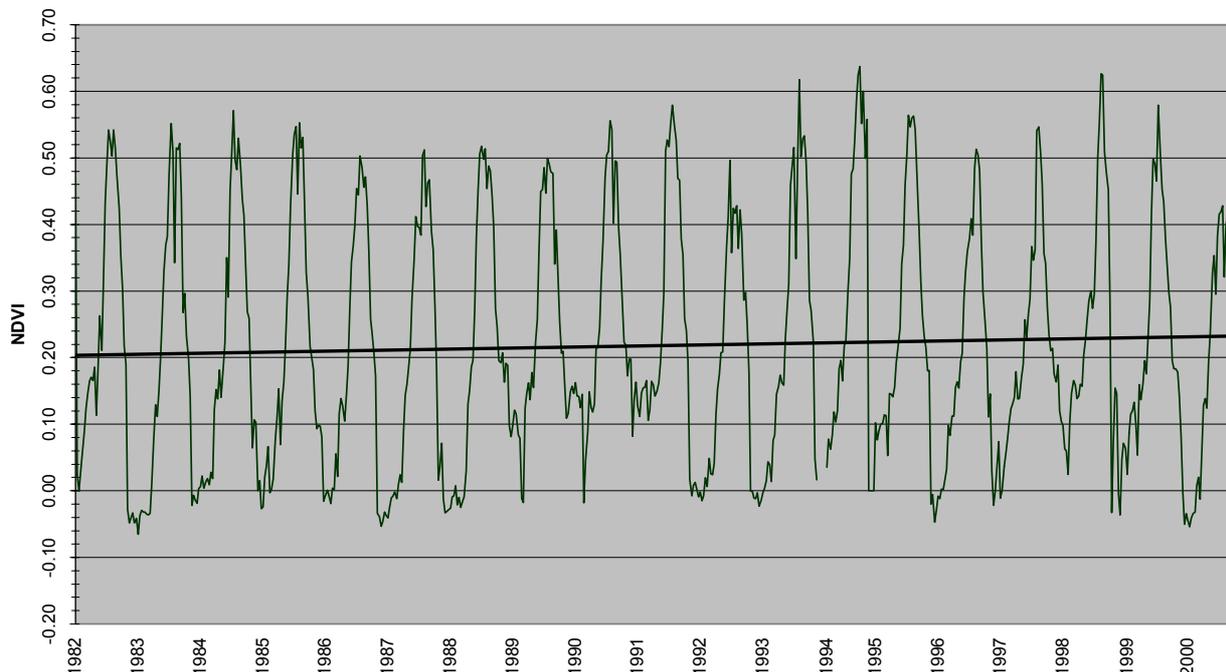


Figure 4 Changes in vegetation cover over years 1982-2000 in Khujirt area as reflected in NDVI (data from National Oceanic and Atmospheric Administration's 10 day composite 8 km Advanced Very High Resolution Radiometer)

The linear trend line of the NDVI shows slight increase of the vegetation amount over the 19 years (Figure 4). The same is true for the maximal values of each year's NDVI, but the average NDVI of the peak growing season – July and August shows slight decrease. The short time span, however, cannot provide representative results of a general trend. The limitations of this study also restrain from making explicit conclusions from the above data. However, quite obvious is the sharp decrease of the NDVI in the year 2000⁹, that might be explained by a lower precipitation. The connections between precipitation and vegetation cover over a 10 years period are assessed in Figure 5.

An annual vegetation growth rate, used in the next graph, is calculated by averaging six 10-day intervals, three in July and three in August, representing the main growing season in the area (this method was adjusted from Runnstrom 2003). As the peak growing season varies from the first decade of July in some years up till second decade of August in the others, the NDVI of all the six decades of the two month were used for calculating the average NDVI. In semi-arid regions precipitation can influence the vegetation growth with a lag of few days up till a year or more (Yu, Price et al 2004). Therefore the precipitation season that influences the vegetation growth of the particular year, is in this case assumed to start in the previous September and last till the August when the vegetation growth peaks.

One of the reasons of the long time lag between the falling of the precipitation and the growth of vegetation is the soil moisture memory. As explained by Shinoda et al (2004), the soil moisture anomalies present in the summer and autumn are “remembered” by the frozen soil during the winter time and the effects of the previous droughts can be therefore seen during the next growing season. These observations were concluded from the data obtained from a long term study in Mongolian steppe region in Arvaikheer which situated close to Khujirt *soum*. It has also been concluded that the recent several years of drought has been significantly emphasized by the soil memory. (Shinoda et al 2004). Therefore it is evident that the

⁹ The shift of the satellite in the year 2000 might have also contributed to the differences in the results between that year and the other ones

amount of vegetation cover is not determined by the precipitation only, but the other factors, like soil moisture and atmosphere moisture are important as well.

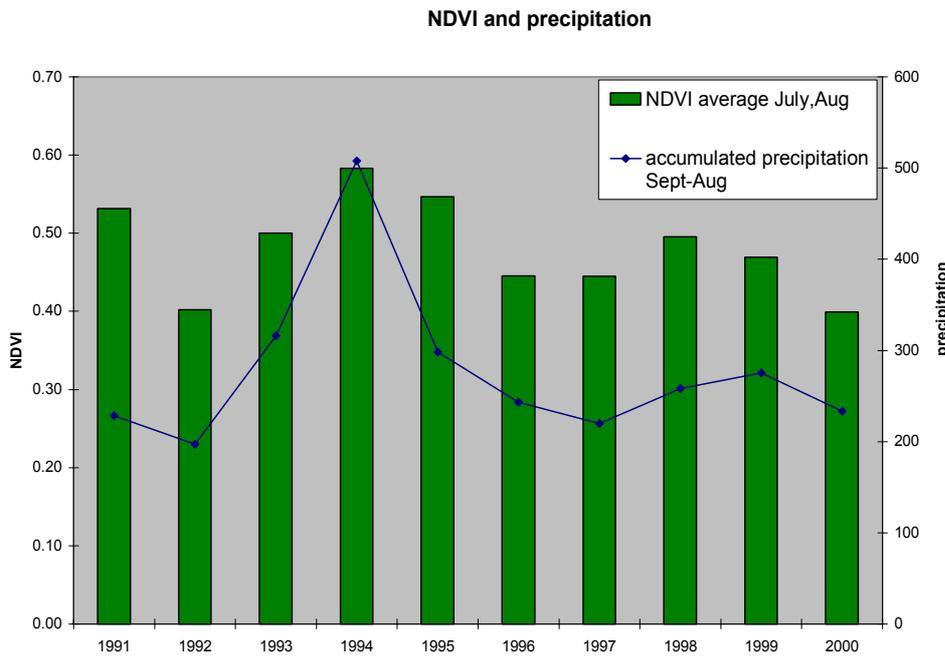


Figure 5 The accumulated precipitation since the September previous year until August of the year and the average NDVI of July and August in Khujirt area (data from NOAA AVHRR and Hydrometeorology office of Mongolia).

The discussion why the squared correlation coefficient - r^2 between precipitation and the resulting vegetation cover is only 0.55. However the correlation becomes stronger if year 1991 is excluded from the data set, then the squared correlation coefficient reaches 0.72. The precipitation data from the year 1990 from Khujirt *soum* are not available but the results from the other two stations shown above, indicate comparatively high amount of precipitation during the 1990 that with a help of soil memory might have contributed to the high vegetation growth during the next year. However, it is also possible that some other factors, like decrease of livestock resulting from the reforms going on at that time, may have contributed to less grazing and thus more left vegetation. Another clear example of soil memory is the year 1994 with the extremely high precipitation and the resulting comparatively high amount of vegetation also during the next summer. Thus it can be concluded that except some effects of soil memory, there is a strong connection between the amount of precipitation and the resulting vegetation cover. Therefore the vegetation cover changes are highly related to precipitation amount which means that there are not significant human induced changes in the amount of vegetation. This, however, means that the decrease of pasture land quality is most likely connected to meteorological drought, but significantly less to overgrazing.

The first of the graphs below (Figure 6) is reflecting the conditions influencing the livestock health - the accumulated precipitation of the passed September till August period that have provided certain amount of food for the livestock (and thus preparedness for the winter) is shown in the white bars; the precipitation accumulated since the previous September till August of that year determining the amount of food during the summer of this year is shown in the dark bars; the lines show the mean temperature of the coldest month of the winter in the beginning of that year. This graph has to be analysed together with the Figure 7 showing the changes in livestock.

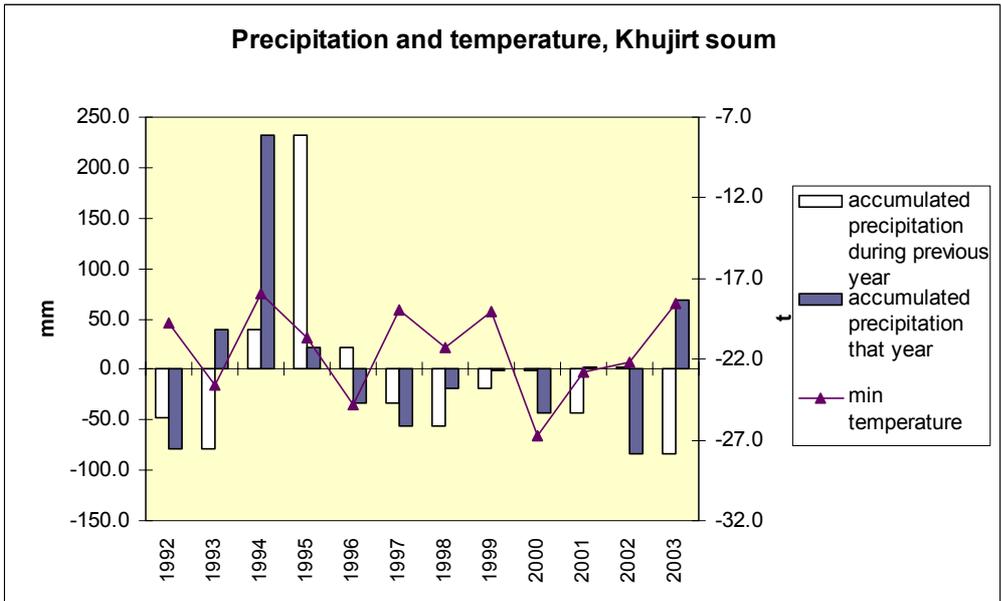


Figure 6 The precipitation accumulated up till the previous summer (Sept-Aug) and up till the summer of that year, and the minimum monthly mean temperature of the winter in between - all together reflecting amount of food for the livestock and the severity of the winter in Khujirt *soum* (data from Hydrometeorology office)

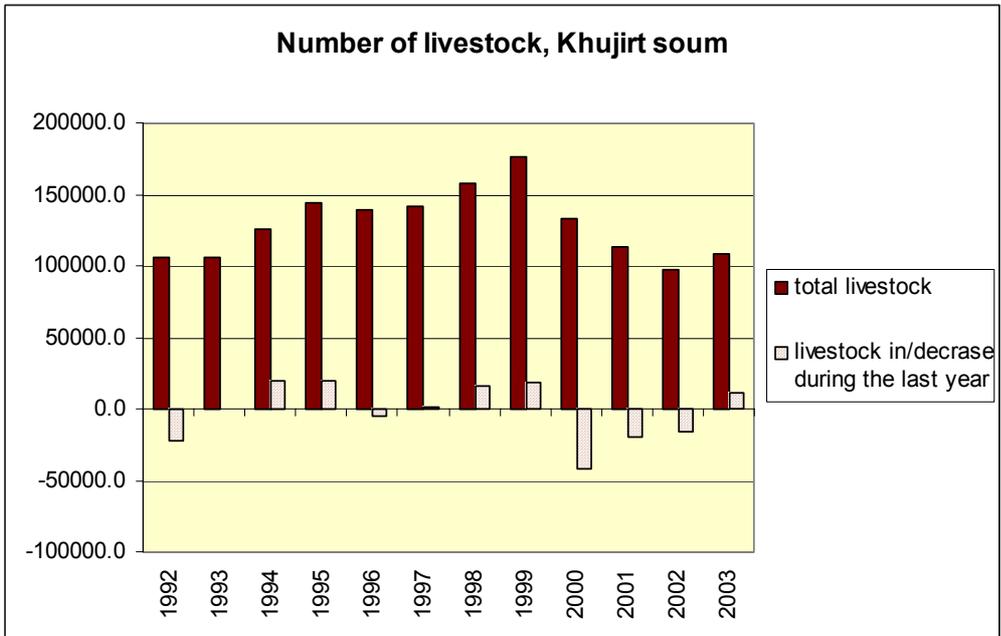


Figure 7 The changes in the total number of livestock and the increase or decrease of the livestock number during the last year (data from Mongolian Statistical office)

It is obvious that all the years since 1996 have had precipitation that is slightly to significantly lower than the average, however the losses of livestock have been experienced only during the years the winter temperature was the lowest, especially 1996 and 2000. The drought did not have as significant effects on the livestock during years 1997 to 1999 when the livestock number kept climbing up and reached its maximum. However the extreme cold weather during the beginning of the year 2000 led to losing several tens of thousands of animals. The Figure 5 showing the vegetation changes also suggests that the precipitation amount had only partial immediate negative effect on the vegetation, some of the effects were seen only during the next year. Thus the four years long period of a comparatively lower precipitation might have shown its effects on the vegetation with a lag, and the gradually weakened livestock was harmed only when an extremely severe winter came. The decreased quality of the vegetation required more grazing that might have led to overgrazing in some places that prevented part of the livestock from receiving the necessary nutrients also for the next winters. The additive effect of the meteorological droughts and temporal overuse of the pasture land might have contributed to the repeated *dzud* occasions. The higher amount of

precipitation in the year 2003 (and also 2004 according to the herders), however, is might solve the temporal meteorological drought problem.

All together this part illustrates the variability and vulnerability of the ecosystem in Khujirt area. It also shows that the general rainfall pattern has not changed significantly since the 1930ies, however, a drought was experienced during the last few years. An average high correlation between the rainfall and the vegetation amount on the same year has been observed. The correlation shows that a soil memory exists, thus the effects of the precipitation can be observed with a time lag up to a year or more. However, the observations suggest that the pasture quality is directly related to precipitation amount, and it might only partially suffer from overgrazing or other human-induced land degradation. Also the changes in the number of livestock can be explained by the combination of the effects of the droughts and extremely low winter temperature. Still, it is not denied that the high total number of livestock might also have contributed to the temporal overgrazing in some places and partly facilitated the high losses of the livestock. The general rainfall pattern and the fact that precipitation was quite above the average on the year 2003 suggests that this was a temporal meteorological drought and the pasture land quality is improving. These findings reflect exactly what herders were telling on the changes in the pasture land quality thus once more proving the reliability of the local knowledge and observations.

Discussion

Sustainability of the pasture land management regimes

The main goal of the ecological sustainability is a non-degrading pasture land. As it was concluded from the climatic and vegetation data analysis the decreasing quality of the vegetation cover and the high losses of livestock during *dzud* in Khujirt *soum* were only partially caused by overgrazing but rather the temporal changes in precipitation are to blame. As the situation is improving now, the pasture land quality can be expected to increase in a near future. Thus the ecological sustainability of the present land use pattern might not be challenged by the land degradation.

The present pasture land use practice is reflecting most of the preconditions for the sustainable pasturing according as it was concluded from the chapter on fieldwork observations. The high mobility is present, and it is possible to have long distance moves in *dzud* cases. The traditional grazing knowledge and rules seems to be quite well observed as nearly no trespassing is reported. The approximate borders of the pastures are known and observed by the herders which is especially important for winter and spring pastures. The more flexible pattern of summer and autumn pasture use means that the location can be changed depending on the vegetation and availability of water. However, there are some problems, like a shortage of water during dry years leading to overuse of some pastures leaving other ones undergrazed; and the improvements, like well building, are not very likely under the present situation. Also a better coordination of the moves could contribute to a better use of the whole pasture land and prevent the pasture scarcity problem for a long time. There is no or small formal reserved pasture therefore some problems may be faced in *dzud* cases, however, the chance to migrate to better pastures elsewhere might partially solve this situation.

The allocation of the pasture land for possession or use according to the Land Law and with in the SGMP might face difficulties. The high mobility of the Khujirt *soum* herders may be scaled down because of starting small businesses may facilitate sedentarisation. The potentially long negotiations before the *dzud* movements, may lead to losses of livestock. At the same time, the coordination of the movements and the chances of moving to more remote undergrazed pastures as wells will be constructed, will mean a more sustainable use of the whole pasture land. The knowledge on higher quality lower quantity herds may contribute to the decrease of the total number of livestock that in a long run might be more important. The formal reserve pastures are set aside thus at least partially securing for the *dzud* case.

Thus even though the allocation of the pasture lands might lead to more of investments and use of the undergrazed pastures, the general ecological sustainability is in question because of the limited mobility and potential sedentarisation. At the present situation herders hardly ever face problems of trespassing and out-of-season grazing, the elimination of these problems, however, is done according to the law and the SGMP by attempting to set clear social and spatial boundaries. It might be argued that the social costs of these negotiations would be much higher than the environmental benefits of solving non-existing problems.

The present situation in Khujirt *soum* is characterised by flexible cooperation within *khot ail* communities. This cooperation provides necessary labour for everyday work and special occasions like movements. The support provided to any other herding household who is in need leads to more of reliance on others, mutual trust and behavioural certainty. The presence of the social capital that is deeply rooted in the traditions is invaluable under the harsh environmental conditions; it is one of the main preconditions in successful overcoming the drought or *dzud* occasions. However, within the new herders' associations traditional support in *dzud* and droughts will not be as feasible, the delineation of the pasture land may bring up controversial claims and conflicts, the herders who are not the part of the new associations can be left out from receiving the benefits and therefore tensions may appear. Therefore unsustainably high social costs might be present if pasture land is allocated.

The present way of pasturing does not provide many options for the herders to acquire more wealth; most of what herder possess is represented in their livestock. The nomadic way of life does not allow accumulation of things and no alternative ways of saving are available for herders. One of the tools of the SGMP is increasing herders' knowledge on small scale manufacturing that might be a useful in increasing

herders' wellbeing. Also the knowledge of alternative and less vulnerable ways of saving without increasing number of livestock, may contribute to better life of the herders and pasture land quality. Thus by improving some of the herders' skills and knowledge, the SGMP can contribute to achieving more of the economical sustainability of the pasturing.

This discussion does not give a clear answer as to which kind of cooperation is better in general but it highlights some of the strength and weaknesses of each of the land ownership and cooperation patterns. It could be suggested that in order to achieve the sustainability goals, a synthesis of both types of cooperation needs to be found. As shown above, the setting of the borders of the pasture land possessed by a group and limiting the number of users might lead to high environmental and social costs. Therefore, a type of coordinated movement of herders within the traditional practice of the grazing on the partly overlapping pastures might be one of the solutions¹⁰. The feasibility of a similar pasture land management practice is open for discussion and can be a subject for a further research.

Conclusion

It is agreed that the major challenge to sustainability of pasture land management is the decreasing grassland quality all over Mongolia. The two main causes are said to be the high number of livestock and irresponsible grazing practice. The latter includes decreased mobility, and even sedentarisation. The lack of transportation and other support that was received from former collectives also challenges mobility and weakens livestock's health. The concentration of herders in some places, especially close to infrastructure and water sources leads to escalating overgrazing there while the other places might be left under-grazed. These problems are being closely related to lack of cooperation among the herders that have led to behavioural uncertainty making herders chose to strive for their own rather than the common good. The lack of institutions that might coordinate the actions and strengthen cooperation are said to be essential to improve the situation.

The provisions of the Land Law promote pasture allocation for possession or use to herders' groups in order to achieve better land management by securing land lease rights, introducing land market and sanctions in case of misuse of the pasture land. The division of the whole pastureland for shared use of summer and autumn pastures within larger herders groups, and use or possession of winter and spring pastures within probably smaller groups, are meant to lead to more efficient pasture management. It also means elimination of trespassing by strict fines, increasing investments in the necessary infrastructure and decreasing possibilities to free-ride. The implementation of the law, however, might be complicated by the traditional grazing practice that includes use of large pasture areas that are located far from each other and often overlapping between different users. Therefore setting of clear boundaries of different pastures and limiting the number of users is one of the most important the challenges to the implementation of the law. Local institutions might be helpful in overcoming these constraints, still the Land Law does not promote formation of any pasture land management institutions.

One of the institutions that is partly working on fulfilling goals of the Land Law is the Sustainable Grassland Management project. The main goal of the SGMP is increasing herders' well-being; the other sustainability components – pasture land quality and presence of social capital are rather means used by the project for achieving its goal. One of the tools used by the SGMP is allocation of the pasture land for the herders' associations in order to increase the pasture land quality. The new-built herders' associations are aimed to become robust institutions that are based on the before existing cooperation among the herders. Assuming that the quality of the pasture land has been degraded because of human activities, mainly overgrazing, SGMP aims to decrease number of livestock, increase and coordinate herders' mobility, eliminate trespassing and out-of-season grazing, promote grazing in underused pastures, and it in general promotes more responsible grazing practices derived from more secure rights to land. However, one of the problems the SGMP faces already is the difficulties in delineation and division of the pasture land. In the

¹⁰ A similar solution was suggested by Fernandez-Gimenez 2002

future the activities carried out within the SGMP might lead to decreasing mobility, to problems with moving far away in *dzud* cases, exclusion of the non-members from receiving benefits leading to social segregation, and others. Thus even though, some of the SGMP activities will facilitate more sustainable pasture land management, the other ones might be significant challenges for the sustainability.

Current local land utilisation patterns and problems in the case study area are different from the ones in general present in Mongolia. The mobility pattern of the Khujirt *soum* herders has not changed significantly, most of them report having four seasonal pastures. Still the pasture quality has been said to decrease in general, however, large part of the herders have also observed slight increases of the quality during the last two years. The changes of the grassland are connected to lack of precipitation that cause both – lower quality and quantity vegetation and decrease the availability of the fresh water sources, making herders to concentrate around the left rivers and streams causing overgrazing in some places. A better coordination of the mobility of herders is therefore necessary in order to make use of all the pasture land, provided that also more water sources, like wells, are available in the marginal areas. The implementation of the SGMP might contribute to a better coordination of the movements and utilisation of the more remote areas. The local herders' support to the SGMP is strong, still the herders' understanding of the project is sometimes different from the objectives and the tools of the SGMP. The present cooperation among the herders in general is based upon the informal *khot ail* communities most of the herders belong to. The cooperation in both – everyday life within *khot ail* communities, and the always present support in *dzud* cases, show the presence of strong social capital that is based upon the traditions and the harsh environmental conditions.

The analysis of the climatic conditions suggests that the changes in the pasture quality in Khujirt *soum* area is related to the changes in precipitation amount, and that role of the overgrazing or other human activities is not as significant as in other places in Mongolia. Also the changes in the number of livestock can be explained by the combination of the effects of the droughts and extremely low winter temperature. Still, it might be true that the high total number of livestock might have also contributed to the temporal overgrazing in some places and partly facilitated the high losses of the livestock. The general rainfall pattern and the fact that precipitation was quite above the average in the year 2003 suggests that this was a temporal meteorological drought and the pasture land quality will increase as the more precipitation is received. This conclusion is as well supported by the herders' observations. Thus it might be argued that the present pasture land utilisation pattern in Khujirt *soum* is ecologically sustainable in most of its aspects. However, this conclusion is restricted to the investigation area and limited by the data and methods used during the analysis.

Neither the present pasture land management pattern, nor the new one promoted within SGMP are sustainable in all their aspects. The present way of grazing has not lead to pasture degradation, still the practice might be improved by better coordination of the mobility, thus avoiding overgrazing and undergrazing. Even though SGMP promotes coordinated mobility, other activities within the project might lead to more unsustainable grazing. The strong side of the SGMP is the economical sustainability aspects, like goals of increasing herders' income, still the social costs that might appear as a result of the implementation of the project are too high. Among other things that challenge the social sustainability, the existing social capital based on traditional cooperation and helping practice might not survive in the new-built herders' associations. Therefore, a differentiated way of pasture land management, including the strong sides of both cooperation patterns – the existing one and the newly established one, could contribute to future sustainability of the use of the pasture land and herders' social and economic wellbeing.

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Appendix 1

Guidelines for interviews

Intro, family

- Are you originally from here;
- For how long have you been a herder, if not since born then – what did you do before;
- How big is your family;

Livestock

- How much livestock (what kind) do you have;
- Has the number changed during last 10-15 years;
- Do you think that is enough or you would like to have more;
- Are there any limits (regulations) for the number or kind of livestock, are they necessary;

Pastures

- Is pasture quality good, has it changed during last 10-15 years;
- Do you have different pasture for each season, how many pastures, how far one from another;
- Do you have your own winter/spring pastures, campsites or do you share them with others;
- Have you marked your winter, spring pastures, hay fields or how do others know they are not allowed to graze there;
- Are any overgrazed, degraded pastures around, has their amount increased, why; is it a problem at all;
- Do you have access to water and salt licks in the pastures you use, what water sources, how far;

Migration

- Where are your pastures located, how far one from another, has this changed lately, why;
- Do you move to same places every year or do they change, why;
- Can you migrate wherever you want or are there limits, borders, do you observe them;
- Timing of migration – how do you know when to go, is it regulated (advised);
- What kind of factors are important when you decide where to go (fi, infrastructure, possibility to sell products, access to water, saving transport costs, schools, medical service etc);
- Do you have many incomers from this or neighbouring *soums*, in normal years or in *dzud*, ;
- Do you graze only in your usual pasture or go to other places in this *soum* or other *soums*, is it necessary, why, have you experienced problems with local officials or herders when going to different pastures, do they cause problems/overgrazing, how do you treat these herders;
- Do other herders respect norms of seasonal pasture use - have you experienced trespassing, out of season grazing on the pastures;
- Have you ever been punished (paid fine) for grazing in territory of another *soum*;

Relations with other herders

- Do you know their neighbour households, do you migrate together
- Do you work together;
- Are you organised in *khot-ail*, how many households (people) are in it, for how long; what do you share, have you had any conflicts with other members, what, why;

Herders' associations

- Are you part of the new-formed herders' associations, are there any around;
- If yes – why, when joined; has the participation changed anything in your life, in grazing pattern; are you satisfied with your participation; do you face any problems; what support/benefits do you receive from the association's officials;
- If no – have you heard of associations, from who, were you offered to join, why did not you, do you think that is a good initiative, would you join if had a chance;

Local officials

- Which state institution is responsible for land management;
- Have you ever contacted it, received support, complained about something; have they helped, listened;
- Do you know what kind of responsibilities local administration has and does it fulfil them;
- What kind of support you would like to receive from the local officials.