

## SECTION B: BASELINE ASSESSMENT

### CHAPTER B10: LAND USE

#### Contents

<b>10.</b>	<b>LAND USE .....</b>	<b>3</b>
10.1	INTRODUCTION .....	3
10.2	METHODOLOGY .....	3
10.3	LEGAL & POLICY FRAMEWORK .....	5
10.3.1	<i>Mongolian Standards</i> .....	5
10.3.2	<i>International Standards</i> .....	5
10.4	LAND USE IN MONGOLIA .....	7
10.4.1	<i>Overview</i> .....	7
10.4.2	<i>The Pastoral Way of Life</i> .....	7
10.4.3	<i>Rangeland Ecosystems</i> .....	8
10.4.4	<i>Livestock Resources</i> .....	8
10.4.5	<i>Land Degradation</i> .....	9
10.5	OMNOGOVI AIMAG .....	9
10.5.1	<i>Overview</i> .....	9
10.5.2	<i>Rangeland Ecosystems</i> .....	10
10.5.3	<i>Land Use Rights</i> .....	10
10.5.4	<i>Livestock Resources</i> .....	11
10.5.5	<i>Land Degradation</i> .....	11
10.6	KHANBOGD SOUM .....	12
10.6.1	<i>Overview</i> .....	12
10.6.2	<i>Rangeland Ecosystems</i> .....	14
10.6.3	<i>Land Use Rights</i> .....	14
10.6.4	<i>Herder Households in Khanbogd</i> .....	15
10.6.5	<i>Livestock Resources</i> .....	16
10.6.6	<i>Hay and Fodder Production</i> .....	16
10.6.7	<i>Wildlife Habitat and Domestic Livestock</i> .....	16
10.6.8	<i>Land Degradation and Carrying Capacity</i> .....	17
10.6.9	<i>Herder Land Use</i> .....	18
10.6.10	<i>Herder Water Resources</i> .....	24
10.7	PLANNED WORK.....	28

#### Figures

Figure 10.1:	Mongolian Rangeland (Grass Steppe).....	8
Figure 10.2:	Land Use and Bagh Boundaries within the Soum .....	13
Figure 10.3:	Khanbogd Soum: Steppe Vegetation.....	14
Figure 10.4:	Herder Winter Shelter .....	20
Figure 10.5:	Khanbogd Soum Herder Families and Livestock.....	20
Figure 10.6:	Herder Winter Camps and Wells North of Oyu Tolgoi .....	21
Figure 10.7:	Herder Winter Camps and Wells South of Oyu Tolgoi .....	22
Figure 10.8:	Herder Summer Camp .....	23
Figure 10.9:	Customary Grazing Areas of Pasture User Groups in Khanbogd Soum, 2011 .....	24
Figure 10.10:	Typical Shallow Hand-Dug Herder Well.....	25
Figure 10.11:	Herder and Other Wells North of Oyu Tolgoi .....	26
Figure 10.12:	Herder and Other Wells South of Oyu Tolgoi .....	26

#### Tables

Table 10.1:	Herd growth, head by soums, 2003-2007 .....	11
Table 10.2:	Pastureland Carrying Capacity, 2007 .....	11
Table 10.3:	Herder Households and No. of Herders in Khanbogd Soum, 2006 – 2010 .....	15
Table 10.4:	Number of Livestock by Bagh, 2010 .....	16
Table 10.5:	Pasture Carrying Capacity Regardless of Water Supply or Other Land Effects, 2010 .....	17
Table 10.6:	Pasture Carrying Capacity Calculated by Area with Water Supply, 2010 .....	18
Table 10.7:	Number and Type of Water Wells .....	25

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Table 10.8: Water Supply and Well Information for Pastures in Khanbogd Soum, 2009\* ..... 28

## 10. LAND USE

### 10.1 INTRODUCTION

This Chapter of the ESIA describes the context of the Oyu Tolgoi Project in relation to land use, land use rights, herders' use of grazing land and water resources at the national, regional (*aimag*) and local (*soum*) levels. The Chapter also discusses the dependencies of rural pastoralists on land and livestock. The Oyu Tolgoi Project is located in Khanbogd *soum* which is a sparsely-populated area of the South Gobi in southern Mongolia. The *soum* comprises mostly pastureland (rangeland) with desert and desert steppe ecosystems and with limited pockets of forest, springs and residential land.<sup>1</sup>

### 10.2 METHODOLOGY

#### **Primary Data Collection**

Oyu Tolgoi has carried out extensive surveys of land use and pastureland quality within the *aimag* and *soum*; this information is regularly updated through various programmes managed by CRSD and through community-led programmes with the support of Oyu Tolgoi. Information developed specifically for this Project includes the following:

- *Oyu Tolgoi Project Environmental Impact Assessment, Volume 3 Mining and Processing, Eco-Trade LLC 2006.*<sup>2</sup> In June 2003, Mongolian consultants EcoTrade conducted a census of all households within a 20 km radius of the Oyu Tolgoi mine camp. Households were surveyed to obtain data on land use, land entitlements and household assets (mostly livestock). A total of 15 households (91 people) were involved. Between 2004-2005, additional data were obtained from the 10 herder households that had been resettled from the 10km Exclusion Zone in order to develop the entitlements under the Project resettlement package (see *Chapter D15: Resettlement Action Plan*). An additional survey was also conducted in 2010, to assess each family's level of satisfaction with the Oyu Tolgoi relocation programme, and the standard of living for the affected households post resettlement.
- *Oyu Tolgoi, Water Perception Study in Khanbogd Soum (2007)*. This study was used to assess community concerns related to water issues and to develop measures for participatory water management. Wells and shelters were mapped, and livestock numbers and other key data gathered. A total of 280 herder households were interviewed (58 of them with extensive semi-structured interviews, the remaining 222 with a short questionnaire). Another 51 people were also involved in Focus Group Discussions (FGDs) based on four groupings: - staff from the Governor's office, water users, representatives from private sector, and budgetary bodies. The Mongolian Centre for Policy Research led this work.
- *Water Use Study, 2008*. An additional water use study was conducted in Bayan *bagh* to obtain information on herders located within the Gunii Hooloi borefield area. The study entailed a small-scale exploratory survey on customary arrangements for water and involved 21 herder families. An internal report was prepared from this work by Oyu Tolgoi. A range of other data collection activities have been conducted to gather environmental data on herder water supplies and monitor water quality and availability within the areas surrounding the Oyu Tolgoi Project sites. These sources of data are described in detail in *Chapter B6: Water Resources*.
- *Omnogovi Aimag Social, Economic and Environmental Baseline Survey in 2008*. Oyu Tolgoi commissioned the survey which was conducted by the Centre for Policy Research Mongolia, and the Population Training and Research Centre. A more detailed analysis of the *soums* neighbouring the Project, entitled the *Oyu Tolgoi Project Social, Economic and Environmental Subset*, was completed in 2009 based on the same data and information. The focus of the main

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<sup>1</sup> Rural pastoralists/herders are those who reside in winter shelters located throughout the *soum* and raise livestock as a main source of subsistence livelihoods. Seasonal pastoralists are residents who generally reside in the *soum* centre but have livestock within the *soum*. They may have others to look after their livestock in winter, and then tend to them in summer, or they may have someone to raise their livestock year round (usually other family members).

<sup>2</sup> Eco Trade LLC (2006), Oyu Tolgoi Project Detailed Environmental Impact Assessment, Volume 3 – Report for the Oyu Tolgoi Project Mining and Processing, May 2006.

study was Omnogovi *aimag*, and the focus of the subset report was the *soums* of Khanbogd, Manlai, Bayan-Ovoo, Tsogttsetsii and also Dalanzadgad, with Omnogovi *aimag* figures provided for comparison. A total of 1,323 households in the *aimag* were sampled, representing 10% of the total number of households; this included 70 households in Khanbogd *soum* centre and 37 rural households. Data of relevance to this Chapter include: land use rights, livestock data, herder perceptions on land use and rangeland resources.

- *Pastureland Mapping and Assessment Programme, 2009 to 2010*. This programme was conducted to identify herders using pastures around the different Oyu Tolgoi Project sites. Data (to date) has been collected from 79 herder households in the Javkhlant, Gaviluud, Nomgon and Bayan *baghs*. The main goal has been to understand grazing land boundaries, pastureland management arrangements, and to identify herder families using land and other assets in and around the Project sites. Oyu Tolgoi visited each herder household, conducted semi-structured interviews and drew seasonal pastureland area boundaries on an area map with the herders. Seasonal maps of pasture territory for livestock were drawn, shelters, wells and livestock were inventoried, socio-economic characteristics were obtained and family members were consulted about their activities and concerns related to land use and Oyu Tolgoi.
- *Sustainable Pasture Management in Khanbogd Soum, 2010 to 2011*. Between September 2010 and September 2011, the Mongolian Society for Range Management (MSRM) on behalf of Oyu Tolgoi, consulted with over 400 herders (370 male; 79 female) from Khanbogd *soum* in a series of meetings, workshops and household visits. Qualitative information was gathered including herders' perception of pasture conditions and water availability, and suggestions for measures to improve pastureland management.<sup>3</sup> Further information on consultation with herders through the *Sustainable Pastureland Management Programme* is provided in *D15: Resettlement Action Plan*.
- *Pastureland Health Assessment and Monitoring in Khanbogd Soum, 2010*. The MSRM research team conducted an assessment of pastureland in the *soum*, based on 15 monitoring points established with the Oyu Tolgoi Environment Department and with the participation of herders. Pasture carrying capacity in each *soum* was estimated from the data available. Water supply and well information was also used to estimate the amount of pasture area susceptible to water shortage, e.g. due to lack of wells or non-functioning wells. The results of this work are included their first internal quarterly report to Oyu Tolgoi, *Sustainable Pasture Management in Khanbogd Soum (Sept – Dec 2010)*.<sup>4</sup>

### Secondary Data Sources

Data on the total number of herders, households per *bagh*, livestock numbers, and crop production figures for Khanbogd *soum* have also been obtained from the Statistical Office of South Gobi, the *aimag* and *soum* Governments. This information has been compiled into a database managed by Oyu Tolgoi and updated on a regular basis. Other sources external to the Project used in this document include:

- *Mongolia: Livestock and Wildlife in the Southern Gobi Region, with Special Attention to Wild Ass, World Bank, 2010*. National and *aimag* land use and livestock information has also been obtained from this report; and
- *Land Resources and their Management, Mongolia Environmental Monitor, 2003*. This report from the World Bank provided information on Mongolian and South Gobi region land use and management.

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<sup>3</sup> The MSRM provides quarterly reports to Oyu Tolgoi, local government, Pasture NGO and 14 Pasture User Groups that have been established as part of the *Sustainable Pastureland Management Programme* (see also Section 10.7). The MSRM assessments and reports have been provided to the Pasture User Groups (PUGs) and local government. They have not been produced to publication standard in English, as the programme is ongoing. A report with results from initial interventions is planned by early 2012. Text on this and further details on MSRM consultation with herders will be included in *D15: Resettlement Action Plan*.

<sup>4</sup> At present, this is an internal report to Oyu Tolgoi and is not reproduced in full in the ESIA.

## 10.3 LEGAL & POLICY FRAMEWORK

### 10.3.1 Mongolian Standards

The *Law on Land of Mongolia* (2002), which came into force on 1 January 2003, specifies the authority of the various state institutions and officials, fees, land management regulations, procedures for application for licences, rights and privileges, duties, and sanctions, with respect to ownership, possession and use of land. The Mongolian Constitution provides for *common use of pasture land* and *public ownership of natural resources* unless granted through law. According to Article 3 of the *Law on Land* there are three main ways to gain access to land, including *possession*, *ownership* and *usage*:

- **Section 3.1.2:** “to own land” means to be in legitimate control of land with the right to dispose of this land. This establishes private property of land for Mongolian citizens without time limits. Land allocation and the size of plots are tied to specific uses, including family needs and commercial use. Family land is allocated once and for free; the size varies with the type of administrative unit, being 0.07 hectares (ha) in the Capital City and aimag urban areas and 0.35 ha in aimag rural areas. Land for other uses may be allocated by sale or auction.
- **Section 3.1.3:** “to possess land” means to be in legitimate control of the land in accordance with the purpose of its use and terms and conditions specified in respective contracts (persons with this right may then apply for the right of ownership). In this case, the State retains ownership of the land. Possession may be limited in time (15-60 years), but renewed for another 40 years. Households, government, companies and organisations may possess land and size limits apply as agreed in specific contracts for land possession.
- **Section 3.1.4:** “to use land” means to undertake a legitimate and concrete activity to make use of some of the land’s characteristics in accordance with contracts made with owners and possessors of land. Land use rights can be given to Mongolian citizens and foreign companies or foreign legal entities for 5 years and are renewable for 5 years at a time.

The Law on Land enables *soum* Governors to grant land possession contracts to herders for winter shelters, but not explicitly to secure access to the associated pastures. The granting of possession contracts for winter shelters, for a period of up to 60 years, is well understood by local officials and most herders. However, many herders believe that possession contracts apply to pastures as well as winter shelters, whereas most *soum* officials contend that a possession contract applies *only* to the residential land on which the shelter is located.<sup>5</sup>

Summer pastures are not formally allocated and are considered to be open for access. Pastureland can be used openly by herders regardless of the location of their winter shelter or origin of residence. *Summer and fall pastures must remain openly accessible, and so must water and mineral licks*. The law empowers *soum* and *bagh* governors to enforce these provisions and regulate seasonal movements and stocking rates, but few of them are aware they have this authority, nor do they have the resources to undertake enforcement.<sup>6</sup>

Land use for permanent infrastructure must be granted and fees paid in accordance with the Mongolian Land Law and the Land Fees Law. Land use for the mine development, including camps and roads, is currently permitted through an annual application process to the Khanbogd *soum* administration. The law requires Oyu Tolgoi to rehabilitate land used at its own expense after it is no longer needed or permitted. It also stipulates the requirement for an environmental impact assessment to be completed prior to beginning projects.

### 10.3.2 International Standards

#### ***IFC Performance Standards (2006) and EBRD Performance Requirements (2008)***

International Finance Corporation (IFC) Performance Standard 5 and the European Bank for Reconstruction and Development (EBRD) Performance Requirement 5 set out requirements and

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<sup>5</sup> Upton, C., “‘Custom’ and Contestation: Land Reform in Post-Socialist Mongolia”, *World Development*, vol. 37, no. 8, 2009, p. 1405.

<sup>6</sup> Schulze, A., p.5.

recommendations for land acquisition and involuntary resettlement. Key requirements of both institutions include:

- The concepts of physical displacement (loss of shelter) and of economic displacement (loss of means of livelihood) - both Physically Displaced and Economically Displaced People are to be considered in resettlement planning;
- The Project shall mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by: (i) providing compensation for loss of assets at full replacement cost; and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;
- The Project is expected to offer displaced persons (both physically and economically displaced) and communities, compensation for loss of assets at full replacement cost and other assistance to help them at least restore their livelihood and improve their standard of living, including through the provision of adequate housing with security of tenure at resettlement sites;
- Special provisions shall apply to consultations which involve Indigenous Peoples as well as individuals belonging to vulnerable groups;
- Where livelihoods of displaced persons are land-based, or where land is collectively owned, the client will offer land-based compensation, where feasible;
- The Project is to "consult with and facilitate the informed participation of affected persons and communities, including host communities, in decision-making processes related to resettlement. Consultation will continue during the implementation, monitoring, and evaluation";
- The Project is expected to "establish a grievance mechanism consistent with Performance Standard 1 to receive and address specific concerns about compensation and relocation that are raised by displaced persons or members of host communities, including a recourse mechanism designed to resolve disputes in an impartial manner"; and
- The Project is expected to "carry out a census with appropriate socio-economic baseline data to identify the persons who will be displaced by the Project, to determine who will be eligible for compensation and assistance, and to discourage inflow of people who are ineligible for these benefits. In the absence of host government procedures, the client will establish a cut-off date for eligibility. Information regarding the cut-off date will be well documented and disseminated throughout the Project area".

EBRD PR5 also includes specific details on the contents that should be included in a Resettlement Action Plan (RAP) and Livelihood Restoration Framework (LRF), as well as the following key additional requirements:

- The Project is required to "provide assistance that will offset any loss of a community's commonly held resources. This could take the form of initiatives to enhance the productivity of the remaining resources to which the community has access, in-kind or cash compensation for loss of access or provision of access to alternative sources of the lost resource";
- "Where a Project involves loss of public amenities, the client shall undertake meaningful consultation, in accordance with PR10, with the locally affected community to identify and agree upon a suitable alternative where possible"; and
- With respect to public disclosure, the client shall provide "a summary of complaints and the measures taken to resolve them...to the public on a regular basis" and also "...summarise the information contained in the LRF...to ensure that affected people understand the compensation procedures and know what to expect at the various stages of the Project..."

## 10.4 LAND USE IN MONGOLIA

### 10.4.1 Overview

Of Mongolia's total population of approximately 2.9 million, 37% live in rural areas and are nomadic or semi-nomadic herders and 63% occupy urban areas including Ulaanbaatar, *aimag* and *soum* centres.<sup>7</sup> With its vast land area, Mongolia still remains one of the most sparsely populated countries in the world. Much of the land area is covered by steppe (open grassland), with mountains both to the north and west and the Gobi Desert to the south. The South Gobi region comprises approximately 22% of the total land of Mongolia and forms part of the international border with China.

### 10.4.2 The Pastoral Way of Life

Rangelands represent an important resource in Mongolia and around one third of the population of the country is dependent on the rangelands and derives most of its income and sustenance from livestock grazing in semi-arid areas. Approximately 44 million head of livestock supply the staples of the Mongolian diet. Mongolia has a rich history and culture of mobile pastoralism that has been preserved until now as an integral part of the social and ecological systems. The vast pasturelands of the country have been used collectively by herding communities under both traditional and communists systems.<sup>8</sup> Mongolian culture has been heavily influenced by a nomadic way of life which still exists right across Mongolia, especially in rural areas. (Further information on intangible cultural heritage and the nomadic way of life is provided in *Chapter B12: Cultural Heritage Baseline*).

However it is important to highlight that herding as a way of life is not immutable and has changed a great deal over the past century. In feudal times (pre-1920s), livestock and the land were owned by the aristocracy and monasteries and the herders who tended the animals were their serfs. The many changes that have taken place in the last hundred years have had major impacts upon herders and their lives, as summarised below:

*...Mongolian pastoralism in the 20<sup>th</sup> century was not immune to the country's broader political, economic and social transformations. The pre-revolutionary neo-feudal economy was swept away following Mongolia's communist revolution in 1921. Under the new system the whole herding sector was collectivised from 1959 until the early 1990s and all herders became waged employees of the state. Decollectivisation, completed throughout the country by 1993 and triggered by the demise of the Soviet Union, marked the end of a major privatisation programme. Pastureland was specifically exempted from the privatisation process.<sup>9</sup>*

Since the democratic transition in early 1990s, the extensive livestock husbandry sector is facing multifaceted problems associated with socio-economic and ecological changes. During the past 20 years, herders in Mongolia have experienced rapid changes in economic and socio-political systems that have greatly influenced their rangeland and livestock management practices and knowledge. In particular, poor supplies of pastoral irrigation, growing numbers of livestock and decreased herd movements around seasonal pastures have created more pressure on the pastureland affecting its productivity and sustainability.<sup>10</sup>

In addition to these factors, pastureland management by the Mongolian government at both national and local levels has been weakened as a result of fragmentation of responsibilities between several government institutions. The 1994 and 2002 Mongolian Land Laws granted authority for organising the allocation of pastures and grazing lands to local governments, however in practice they find it very difficult to manage herder activities, and there is little management and planning taking place.

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<sup>7</sup> United Nations Population Division: Mongolia Demographic Profile.

<sup>8</sup> Swiss Agency for Development and Cooperation, "Green Gold" Pasture Ecosystem Management Program, Phase I, 2004-2008, Terminal Report, Ulaanbaatar, March 2009, p. 4.

<sup>9</sup> Upton, C., 'Living off the land: Nature and Nomadism in Mongolia', Geoforum, vol. 41, 2010, p. 866.

<sup>10</sup> *Ibid*, Swiss Agency for Development.

### 10.4.3 Rangeland Ecosystems

About 80% of the total land area in Mongolia comprises rangelands. The remaining land comprises forested land (about 11%), arable land (less than 1%) and other land 8% (including urban areas, reserves, and water bodies).<sup>11</sup> Around 27% of Mongolian rangeland is classified as forest/mountain steppe; 30% as dry steppe grassland, and the remaining 43% as Gobi desert steppe and desert (the desert can be used for grazing, but is suitable for camels rather than other livestock).<sup>12</sup> Grasslands in Mongolia have a very short growing season, limited by cold temperatures and by low and variable precipitation. Pasture growth begins in mid-May and ceases after mid-August. Frosts can set in as early as the end of August, and end as late as June. The thermal growing season is shorter in the mountains and longer in the Gobi. *Figure 10.1* shows typical Mongolian grass steppe.

**Figure 10.1: Mongolian Rangeland (Grass Steppe)**



Source: Oyu Tolgoi.

Grass steppe in Mongolia has an annual standing crop yield (grass/fodder) ranging from 650 – 1,300 kg/ha. The lowest grass yield is reported in the Gobi region. Desert steppes in Mongolia generally have standing crop yields between 290–380 kg/ha (i.e. very low) but with a high diversity of vegetation communities, soils, and topography that create forage patch-grazing opportunities for livestock and wild herbivores.<sup>13</sup> Desert steppes are dominated by shrubs and perennial forbs and are especially suited to grazing by domestic camels, sheep and goats.

### 10.4.4 Livestock Resources

Livestock production is an important industry in Mongolia providing food, fibre and fuel to the Mongolian people, particularly herders, as well as products for domestic and international trade. Extensively managed livestock production (i.e. practised by individual herder families) is a traditional and sustainable system and one that is well-adapted to Mongolian rangeland conditions.<sup>14</sup>

Mongolian livestock numbers have fluctuated over the past two decades, influenced particularly by the breakdown of the rural collective system that has resulted in an increase in the national herd, but also by droughts and *dzuds*<sup>15</sup> (extreme winter cold periods); the 2001/2002 *dzud* reduced the herd size by almost 10 million. During the winter of 2010, Mongolia experienced a white *dzud*– a multiple natural disaster

<sup>11</sup> Sheehy, D. et al, “Mongolia: Livestock and Wildlife in the Southern Gobi Region, with Special Attention to Wild Ass”, World Bank, 2010.

<sup>12</sup> *Ibid*, Sheehy, p. 10.

<sup>13</sup> World Bank, “Land Resources and their Management”, Mongolia Environmental Monitor, 2003.

<sup>14</sup> *Ibid*, Sheehy, p. 10.

<sup>15</sup> *Dzuds* occur when the winter conditions, particularly heavy snow cover, prevent livestock from accessing pasture or from receiving adequate hay and fodder.

consisting of a summer drought resulting in inadequate pasture and production of hay, followed by very heavy winter snow, winds and lower-than-normal temperatures. This disaster caused the loss of approximately 3% of the country's roughly 44 million livestock, with some herders having lost up to 50-70% of their livestock. Compounding the problem was the poor condition of many pastures as a result of the preceding year's drought and overgrazing, as well as an early heavy snowfall in October 2009.<sup>16</sup>

In addition to changes in total livestock numbers, there have been changes in livestock composition. Over the past 10 years, numbers of sheep and goats have increased (the latter due to the extensive increase in demand for cashmere) whereas numbers of camel and cattle have decreased. The increase in goats as the mainstay of livestock herds is considered a major contributing factor to rangeland degradation.<sup>17</sup>

#### 10.4.5 Land Degradation

There is a consensus among herders, government officials, donor institutions, and the public that Mongolian rangeland has, and is, degrading from a combination of livestock overuse and increasing aridity. According to the World Bank studies cited above, unless changes in management relative to herd structure and stocking rate are implemented, and other issues contributing to degradation are addressed, the rate at which rangeland is being degraded will accelerate with potentially disastrous consequences.

In terms of rangeland degradation in Mongolia, it is worth commenting on the commonly held assumption that goats are inherently destructive to rangeland resources. As noted by Sheehy et al in their August 2010 report for the World Bank.... *"the current inclination of herders to increase goat numbers in response to market incentives is not a good practice of pasture or livestock management. This is because the increasing grazing intensity on selected plants may lead to changes in competitive relationships among plant species and reduce both quantity and quality of forage available for livestock production; not because of the myth that goats are inherently destructive of rangeland"*.

In response to the rangeland degradation challenge, numerous government and non-government programmes are being implemented to help reform pastureland management systems, improve herd quality and to establish a livestock insurance system. Several donor projects including those undertaken by the United Nations Development Programme, International Fund for Agricultural Development, Swiss Development Corporation, and Mercy Corps have supported rangeland research and management, as well as poverty alleviation for affected herder families following the *dzud* of 2001/2002. Rangeland management, and measures to mitigate pastoral risk were a primary focus of the World Bank's Sustainable Livelihood Project implemented from 2002 to 2007.

The response to rangeland degradation is hampered by the lack of reliable statistics on land degradation across Mongolia; assessment methods differ greatly and no comprehensive scientific studies have been completed on a national scale to date. The regional studies conducted with support of Oyu Tolgoi are some of the first in the country to study the causative factors of land degradation.

### 10.5 OMNOGOVI AIMAG

#### 10.5.1 Overview

Omnogovi *aimag* is the southernmost province in the South Gobi region bordering China. Similar to other parts of Mongolia, the *aimag* supports a small population which has grown slowly but is poised to accelerate rapidly as a result of economic development from mineral resources and improving health conditions (see *Chapter B8 Population and Demographics*).

The *aimag* has a total area of 165,400 km<sup>2</sup>.<sup>18</sup> Most of the land in the *aimag* is grazing land (72%) used by livestock herders, however there are a number of Special Protected Areas, including in Khanbogd *soum* (see Section 10.6 below). The remaining land is made up of forest lands, water areas, residential areas, roads and communications infrastructure. Khanbogd *soum* is the largest *soum* by area within the *aimag*.

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<sup>16</sup> Dzud: a slow natural disaster kills livestock --and livelihoods-- in Mongolia. By Arshad Sayed, 31/01/2010. Source URL: World Bank, <http://blogs.worldbank.org/eastasiapacific/dzud-a-slow-natural-disaster-kills-livestock-and-livelihoods-in-mongolia>

<sup>17</sup> *Ibid*, Sheehy, p. iii.

<sup>18</sup> Asian Development Bank, "Socio-Economic Analyses for Four Focus Areas in Mongolia", Appendix 5, Aug 2004.

## 10.5.2 Rangeland Ecosystems

Natural rangeland types occurring in the Omnogovi *aimag* comprise grass steppe, desert steppe, and desert, the latter two providing the most suitable habitat for camel, sheep and goats, whereas grass steppe rangeland along the Chinese border provides suitable habitat for horses and cattle. Soils are generally thin and are not suitable for arable crops. They are also friable and easily disturbed by vehicle traffic and sharp-hooved animals.<sup>19</sup>

Despite the availability of pastureland, plant productivity is low, and water sources scarce (groundwater recharge is about 1 -mm per year). These conditions necessitate the rotation of herds from one location to another and impose natural limits on herd size and composition. Seasonal migrations are a primary response to these conditions and a way of using pastures in a sustainable manner. However, herders in the *aimag* (and elsewhere) are becoming increasingly urbanised with permanent residences in *soum* centres and local settlements. On average, only 34% of herder households in the *aimag* now migrate.<sup>20</sup> According to the Baseline Survey, *aimag* herders move their herds and camps about 3-5 times a year to summer pastures based on forage quantity, quality and water availability.

## 10.5.3 Land Use Rights

### ***Residential and Grazing Land Use***

There is no private ownership of grazing lands in the *aimag*, in accordance with the Law on Land (see Section 10.3.1). Pastureland *use* rights are obtained through a number of mechanisms:

- Use of the land by previous generations;
- Access/proximity to a well;
- Proximity to crop lands;
- Ownership of a dwelling (e.g. winter shelter); and
- Inherited through formal arrangements.

Private ownership is restricted to residential land. In *aimag* urban areas, residential land of 0.07 ha is allocated, and in *aimag* rural areas residential land of 0.35 ha is allocated. In Omnogovi *aimag*, as is the case elsewhere in Mongolia, not all herders have formal rights to residential land, mainly because they have not applied for the land use certificate. According to the Baseline Survey findings, 73.3% of herders have formal certificates for land under winter shelters/camps in Omnogovi *aimag*.

### ***Mining Land Use***

As described in *Chapter A2: Policy and Legal Framework*, with respect to mining land use rights, mineral licences are granted for a period of 30 years for strategic reserves such as the Oyu Tolgoi Project, and may be extended for two consecutive periods of 20 years. A mineral licence includes the following rights:

- to use the mining area for mining and related activities;
- to access the mining area subject to the consent of adjoining land owners and occupiers;
- the right to use water in compliance with applicable laws;
- the right to sell mineral products on the international market; and
- the right to transfer or surrender all or part of the mine licence.

The Mine Licence Area and thus the land use rights that have been afforded to Oyu Tolgoi are set out in the Investment Agreement, signed on October 6, 2009 (see also *Chapter 2: Policy and Legal Framework*). Construction of the Oyu Tolgoi to Gashuun Sukhait Road and also the construction and operation of the airport for the Project are also governed by the Investment Agreement. For permanent land use requirements outside the Mine Licence Area, land must be acquired by the Project from the *soum* government, and for temporary land use rights, local permits must be obtained from the *soum* government (e.g. for borrow pits, or temporary camp areas).

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<sup>19</sup> *Ibid*, Sheehy, p. 8.

<sup>20</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

#### 10.5.4 Livestock Resources

Livestock production is still the main economic activity in Omnogovi *aimag*. As shown in *Table 10.1*, the livestock population grew by 64.8% from 2003 to 2007.

**Table 10.1: Herd growth, head by soums, 2003-2007**

Soums	2003	2004	2005	2006	2007
Bayan-Ovoo	43,725	51,989	58,698	64,485	77,591
Manlai	65,517	79,063	83,265	82,238	95,629
<b>Khanbogd</b>	<b>53,375</b>	<b>62,256</b>	<b>69,098</b>	<b>71,285</b>	<b>86,031</b>
Tsogttsetsii	38,702	49,079	57,715	66,456	84,225
Dalanzadgad	35,462	413,25	44,446	46,071	56,549
<b>Aimag total</b>	<b>907,355</b>	<b>1,070,058</b>	<b>1,121,524</b>	<b>1,155,747</b>	<b>1,399,996</b>

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

Similar to the national situation, the increase in livestock numbers in the *aimag* also corresponds with a change in livestock composition. The most dramatic shift in herd growth occurred in goats and camels with the percentage of goats increasing from 30% to 57% between 1970 and 2009, and the percentage of camels decreasing from 18% to 2.6%.<sup>21</sup> The change in herd composition, and related decline in the overall proportion of large stock (e.g. camels, cows) in individuals herds, is largely related to higher (although fluctuating) world cashmere prices, and thus an increased proportion of goats. Goats now dominate *aimag* herds. Around 60% of *aimag* herders own more than 100 head of livestock.<sup>22</sup>

#### 10.5.5 Land Degradation

Pasture carrying capacity was assessed as part of the Oyu Tolgoi Baseline Survey using an empirical formula:  $Carrying\ Capacity = (Surface\ Area * Grass\ Yield) / Demand\ per\ Sheep\ Unit$ . The Gobi grass yield is 470 kg/ha per annum while for Mongolia as a whole it is 560 kg/ha (according to the Mongolian Institute of Meteorology). The results outlined in *Table 10.2* below, indicate that all *soums* are overstocked. Intense use by grazing livestock and inter-annual variations in precipitation both play a role in land degradation. Grazing areas in Omnogovi *aimag* are reportedly degraded and/or destroyed due to poor quality earth roads and uncontrolled traffic movements. Heavy trucks generate dust over large areas that pollute pasture vegetation.

**Table 10.2: Pastureland Carrying Capacity, 2007**

Soums	Pasture (ha)	Livestock Numbers (Sheep Equivalent)	Total Carrying Capacity (Sheep Equivalent)	Stocking Rate (+ = % over-stocked)
Bayan-Ovoo	538,472	102,070	100,162	+1.8
Manlai	1,198,865	143,047	96,337	+32.6
<b>Khanbogd</b>	<b>1,116,177</b>	<b>180,595</b>	<b>159,453</b>	<b>+11.7</b>
Tsogttsetsi	698,667	146,286	84,214	+42.3
Dalanzadgad	39,924	55,315	20,972	+62.1
<b>Aimag total</b>	<b>11,466,860</b>	<b>1,895,753</b>	<b>2,384,211</b>	

Source: Annual Report, Institute of Meteorology and Hydrology, 2008, cited in Subset Report, 2009.

Ecological monitoring conducted in 2008 elsewhere in the Gobi (in Altai province) supports the anecdotal evidence of increasing damage to rangeland resources across the region. This survey indicated that desert ecosystems had declined from good and fair ecological conditions to poor and very poor conditions, and that heavily grazed rangeland was becoming increasingly degraded. The findings also suggest that the effects of variations in grazing pressure and precipitation on Mongolian rangeland dynamics are complex and interactive.<sup>23</sup>

<sup>21</sup> Ibid, Sheehy, p. 9.

<sup>22</sup> Ibid, Subset Report, 2009.

<sup>23</sup> Ibid, Sheehy, p. 13.

## 10.6 KHANBOGD *Soum*

### 10.6.1 Overview

Khanbogd *soum* is characterised by a sparse and widely-spread population. In 2010, Khanbogd *soum* had a population of 3,522 of which rural herders comprised 2,067 and the *soum* centre 1,455.<sup>24</sup> Total land within Khanbogd *soum* is estimated at 1,496,000 ha<sup>25</sup> and comprises the following land use units:

- *Grazing land.* Grazing land is reported to total 1,176,164 hectares (ha), or approximately 78% of the total area in Khanbogd;
- *Urban land.* Urban land covers 36,375 ha, or approximately 2.5% of the land area. The *soum* centre is the only built up area; the majority of public infrastructure and services, and businesses, are located there. In addition, each *bagh* has a small '*bagh* centre' which comprises a few basic community buildings used predominantly as a meeting place for herder communities;
- *Cultivated land.* This comprises less than 1 ha in Khanbogd *soum*, and produces 4.6 tonnes of potatoes and other vegetables.<sup>26</sup> Crop production is limited to a few households growing vegetables using water from a deep well, mostly for family consumption;
- *State Special Needs land.* The remaining land is made up of State Special Needs Land<sup>27</sup>; and
- *Other land.* Other minor land units, including those for roads and communications infrastructure; forest land; and water (springs and playas); as well as mining land now allocated for Oyu Tolgoi (a total of approximately 11,000 hectares<sup>28</sup>).

Figure 10.2 shows the land use units within the *soum*. There have been minimal changes to land distribution in recent years other than a small change in the number of hectares of private land made available for use by citizens of the *soum* centre. Urban land use in Khanbogd *soum* centre is described in further detail in *Chapter B11: Transport and Infrastructure*. A detailed description of the land cover units around each of the Project facilities and within the *soum* are also provided in *Chapter B7a: Biodiversity Baseline*.

There are four *baghs* in the Khanbogd *soum*: Javkhlant, Bayan, Gaviluud and Nomgon *baghs*.<sup>29</sup> Figure 10.2 also shows the *bagh* boundaries and the *soum* centre at the junction between these four *baghs*. The areas of each *bagh* are approximately as follows:

- Gaviluud – 198,730 ha;
- Bayan – 284,001 ha;
- Javkhlant – 530,383 ha; and
- Nomgon – 482,729 ha.

The Oyu Tolgoi Mine Licence Area, most of the infrastructure corridor (for the Oyu Tolgoi to Gashuun Sukhait road and transmission line) and a portion of the airport sites are located in Javkhlant *bagh*. The airport sites (temporary domestic and planned permanent airports) also extend into Gaviluud *bagh* territory, while the infrastructure corridor extends into Nomgon *bagh* near the border with China. Water supply for the Project will be taken from the Gunii Hooloi basin which is in Bayan *bagh*.

<sup>24</sup> Statistics and Treasury Officer, Khanbogd *Soum* Governor's Office, Obtained by Oyu Tolgoi in 2011.

<sup>25</sup> Khanbogd *Soum* Governor's Office, Obtained by Oyu Tolgoi in 2011.

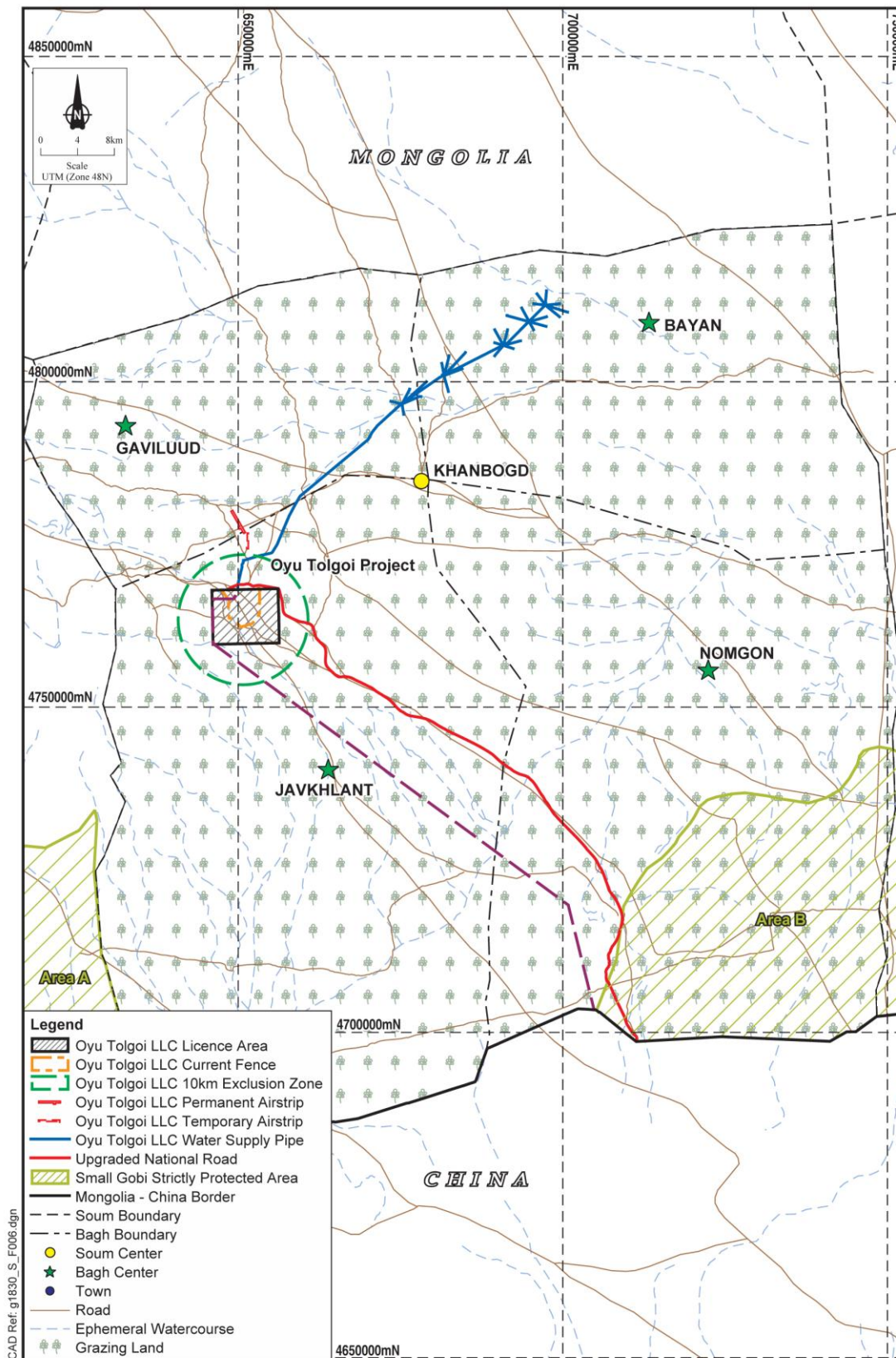
<sup>26</sup> Khanbogd *Soum* Governor's Office, Obtained by Oyu Tolgoi in March 2010.

<sup>27</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009. As defined in the Land Law, **State Special Needs** means that the national government holds the land in reserve for anything it deems important, the most commonly known use is for military installations or training purposes etc.

<sup>28</sup> A schedule of project land requirements is provided in *Chapter C10: Land Use and Displacement Impacts*.

<sup>29</sup> *Bagh* is the lowest administrative unit in Mongolia.

Figure 10.2: Land Use and Bagh Boundaries within the Soum



## 10.6.2 Rangeland Ecosystems

Khanbogd *soum* is characterised by a desert steppe ecosystem of sparse and low-lying vegetation, minimal vegetation cover (<10%), with occasional trees around ephemeral and permanent spring areas (see *Figure 10.3*). Within the desert steppe ecosystem, the grazing gradient shifts year by year according to rain, hence the pattern of pastureland use is seasonally variable. Rainfall is extremely low and it is also unpredictable. These conditions result in herders having to move longer distances in some years to find suitable pasture, and water supplies with water are a key limiting factor to pastureland use. The poor condition of some wells compounds this issue (see *Chapter B6: Water Resources* for further information). Herders observe that the droughts over the last few years have caused an observable reduction in the growth of indigenous pasture grasses and some grasses have ceased to grow at all. Further information on vegetation cover and rangeland ecosystems in Khanbogd *soum* is provided in *Chapter B7: Biodiversity*.

**Figure 10.3: Khanbogd Soum: Steppe Vegetation**



## 10.6.3 Land Use Rights

According to the findings of the Baseline Survey, allocation of formal residential land ownership and possession certificates has been more advanced in Khanbogd *soum* (80% of respondents in Khanbogd own residential land) than in other *soums* in the *aimag* (an average of 62% respondents in the *aimag* own residential land). Almost all of the residential land owned by *soum* residents is within the *soum* centre.<sup>30</sup> The reasons some herders in Khanbogd do not possess land ownership documentation is reportedly due to them not applying to formalize their rights.

Since grazing land is communal property, every member of the community has equal access to use of grazing land; however in the Oyu Tolgoi Project Area of Influence, pastoralists have largely developed their own system of managing and controlling their pastures. Herders have traditional grazing rights to pastureland at their winter shelter sites, which acts as an informal pastureland management system.

Herders in Khanbogd *soum* mainly use customary informal arrangements to obtain grazing rights, including:

- Using the land for several generations (33.3%);
- Inheritance under formal arrangements (23.8%);
- Privatisation of animal shelters (4.8%);
- Resident on the land since the socialist cooperative period (4.8%);
- Possession of a well nearby (2.4%); and

<sup>30</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

- No formal rights (31%).

There is no formal system of pasture management in Khanbogd *soum*. Summer grazing is conducted informally, and there are no designated summer pasture areas, as these change from year to year depending on forage conditions, livestock numbers, weather and the individual requirements of herder families. Herders reported during consultation in 2010<sup>31</sup> that they do not have conflicts or misunderstanding related to pasture use among locals, but do experience some issues with herders who come from outside the *soum* (e.g. from neighbouring *soums* or further away); this may change in the future as more pasture areas are acquired for different mining and related activities.

#### 10.6.4 Herder Households in Khanbogd

The majority of residents of Khanbogd *soum* are rural and/or seasonal pastoralists totalling 2,067 in 2010 of which 1,015 were male and 1,052 were female. Of the total *soum* population (3,522), approximately 40% are nomadic herders and an additional 18% have livestock but live either part or full-time in the *soum* centre.<sup>32</sup> Nomadic pastoralism involves the movement of herds of camels, horses, goats and other livestock between summer and winter grazing areas.<sup>33</sup> There is no stall-fed livestock raising.

Herder families are widely dispersed (often many kilometres from their nearest neighbours)<sup>34</sup> with large distances between different grazing areas. The number of herder households and total numbers of herders in Khanbogd has grown slightly between 2009 and 2010, as shown in *Table 10.3*. Data on herder households numbers prior to 2009 were not available.

**Table 10.3: Herder Households and No. of Herders in Khanbogd Soum, 2006 – 2010**

Soum	2009			2010		
	Total	Male	Female	Total	Male	Female
<b>Total</b>	3,156	1,562	1,594	3,522	1,753	1,769
<b>Rural herder</b>	1,793	887	906	2,067	1,015	1,052
<b>Soum centre</b>	1,363	675	688	1,455	738	717

Source: Statistical Department of South Gobi, obtained by Oyu Tolgoi in 2011.

Although anecdotal evidence suggests a trend away from herding towards wage-based employment and small business, these figures show an opposite trend. However, consultation with herders conducted for Oyu Tolgoi by the MSRSM in 2010, still supports the perceived trend away from herding, but highlight the fact that this trend is gradual. For example, many herder families report that they collaborate with other families to share herding responsibilities, or pay the wage of someone else to look after their livestock so that they can participate in other economic activities. Herder family members often participate in these other activities part-time or part of the year (e.g. a café at the truck stop in summer) and then move back to their shelters for winter. Since the majority of households still own some livestock and rely on herding for at least part of their income, they continue to identify themselves as herders.

Based on data obtained by Oyu Tolgoi surveys in 2010 and 2011, there is also a trend showing more single family households; which means there are fewer extended families residing together in one household. There are also more single-person households, which usually involves one family member who continues to look after livestock while the rest of the family reside in or near to the *soum* centre for school and work reasons. Herder demographics and livelihoods are discussed in detail in *Chapter B8: Population and Demographics* and *Chapter B9: Employment and Livelihoods* respectively.

<sup>31</sup> Consultation with the Oyu Tolgoi and the Mongolian Society for Range Management as part of the Sustainable Pastureland Management Programme (see also *Chapters C10* and *D15* for more information).

<sup>32</sup> Further details on population movements to and from the *soum*, and within the *soum* are provided in *Chapter B9: Population and Demographics*.

<sup>33</sup> Water Perception Study, Centre for Policy Research, 2007.

<sup>34</sup> Mongolian Society for Range Management, Sustainable Pasture Management Project in Khanbogd *Soum*, for Oyu Tolgoi, Quarterly Report, September – December 2010.

### 10.6.5 Livestock Resources

Goats, camels and sheep are the main animals raised in Khanbogd *soum*. Around 54% of livestock in the *soum* are goats, 26% are sheep, 14% are camels and the remainder horses (4%) and cows (2%). All types of livestock grew steadily in number during the period between 2003 and 2009, with total herd size increasing from 53,000 to 116,000 head. These figures and the distribution of animals within the *soum* are shown in *Table 10.4*.

**Table 10.4: Number of Livestock by Bagh, 2010**

<i>Baghs</i>	Camel	Horse	Cow	Sheep	Goat	Total
Nomgon	2,881	771	1,012	5,574	12,205	<b>22,443</b>
Gaviluud	3,500	1,837	407	12,382	19,472	<b>37,598</b>
Javkhlant	3,389	668	599	6,684	17,051	<b>28,391</b>
Bayan	6,594	1,315	263	5,736	13,943	<b>27,851</b>
<b>Total number in <i>soum</i></b>	<b>16,364</b>	<b>4,591</b>	<b>2,281</b>	<b>30,376</b>	<b>62,671</b>	<b>116,283</b>

Source: Statistical Department of South Gobi, obtained by Oyu Tolgoi, 2010.

Most herders own between 100 and 500 animals. The survey of potentially affected herder households in 2011 identified that the average number of livestock per family is 224 head of livestock. However, the survey also highlighted that there is a wide range of herd sizes; for example, some families have under 10 animals, while other families were recorded as having between 900 and 1,000 livestock. Herd size varies for a wide range of reasons, for example some have low numbers of animals because they have other income sources such as a job with Oyu Tolgoi, while others have fewer livestock due to low income or because they are a single person household. Consultation with herders identified that a herd of about 400 animals is considered generally sufficient to support a family of 4-5 people<sup>35</sup>, although they indicated that herd quality is more important than total head count. Although herders are interested in all livestock breeds, the preference is to keep goats, camels and sheep rather than horses and cattle – because they bring more income, particularly goats from cashmere sales.

### 10.6.6 Hay and Fodder Production

Hay and fodder are used to supplement feed during colder months. Between 2003 and 2007, livestock owners in Khanbogd *soum* prepared 395 tonnes of hay on average per year together with 76 tonnes of hand-made fodder.<sup>36</sup> Due to the lack of land for haymaking, herders and livestock keepers collect different grasses from pasture by 'hand-pick-up' or cutting with clippers and scythes, and from grass growing at the edges of crop fields and along irrigation channels.

During the harsh winter and *dzud* of 2009-2010 no hay was produced. Khanbogd *soum* received 3,500 sacks of fodder, 2,350 packs of hay, 233 sacks of wheat and 64 tons of soy from the *soum* administration. A pack of hay was given free of charge to every herder household and another was provided at a reduced charge. A sack of wheat was also given free of charge to every household with horses.<sup>37</sup>

### 10.6.7 Wildlife Habitat and Domestic Livestock

Managing the overlap of pastures for domestic livestock and the habitat areas of wildlife is one of the key problems that influence the use of pasture resources. Wild animals whose habitat areas overlap with pasture are large mammals indigenous to the Gobi environment, such as Wild Ass (*Equus heminus*), Mountain Sheep (*Ovis ammon*), Ibex (*Capra sibirica*), Gazelles (*Gazella gutturosa and subgutturosa*) and Wolves (*Canis lupus*). Details on these mammals and other fauna in relation to land use are provided in *Chapter B7: Biodiversity*.

Very localised or lower forage and/or water availability can both directly and indirectly increase potential conflict between domestic livestock and wildlife that co-use the same rangelands.<sup>38</sup> Herder interviews

<sup>35</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

<sup>36</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

<sup>37</sup> Statistical Department of South Gobi, obtained by Oyu Tolgoi, 2010.

<sup>38</sup> Sheehy, *Ibid*, p. 15.

during the Baseline Survey<sup>39</sup> indicated that herders do not give up their grazing areas or migrate away to allow space for wild animals. Instead, they attempt to discourage using sticks, noise, vehicles etc which either threaten the herd or use of pastures.

## 10.6.8 Land Degradation and Carrying Capacity

### Pastureland Carrying Capacity

As described above (Section 10.5.5), the carrying capacity of Khanbogd *soum* was assessed in 2008 as part of the Baseline Survey in the *aimag*. The results indicated that Khanbogd was overstocked by approximately 11.7%. More recently in 2010, the Mongolian Society of Range Management conducted another assessment of pasture carrying capacity in Khanbogd. The results from this assessment are shown in *Table 10.5* and in *Table 10.6*.

The assessment shows that pasture for grazing is sufficient in Khanbogd *soum* if available water supply is not taken into account. These findings are consistent with what was anticipated, because conditions in the previous summer and autumn were good, with high relative rainfall and a good pasture yield per hectare. Gaviluud *bagh* was the only *bagh* identified as overstocked, and this can be attributed to the low total area of rangeland, and the high number of camels and overall sheep equivalent units. Gaviluud *bagh* comprises mostly large stock/camel pasture (i.e. low pasture yield and potential carrying capacity).

The assessment also identified that, in some areas of the *soum*, up to 50% of pastures are underutilised due to water shortage for animal and human consumption. In other words, there are no wells or wells are not functioning in these areas. As a result, an additional assessment of carrying capacity was conducted based only on pastureland with water supply. The results again show that only Gaviluud *bagh* is overstocked (see also Section 10.6.10 on water resources below).

**Table 10.5: Pasture Carrying Capacity Regardless of Water Supply or Other Land Effects, 2010**

Name of <i>bagh</i>	Pasture area /hectare/	Pasture yield per hectare/centner/ha/	Total pasture yield /centner/	Annual average pasture carrying capacity /sheep head/	Livestock number per 100 ha by sheep unit	Current livestock number /sheep unit/	Actual livestock number per 100 ha, by sheep unit	Pasture carrying capacity /sheep unit /+ refers pasture is sufficient, - refers pasture is not sufficient/
Nomgon	482,888	2.1	1,004,407	211,677	43	70,354	15	141,323
Gaviluud	198,989	0.7	133,323	28,098	14	80,940	41	-52,842
Javkhlant	531,472	2.3	1,201,128	253,136	47	11,433	2	241,703
Bayan	284,239	1.3	358,142	75,478	26	10,667	4	64,811
<b>Total</b>	<b>1,497,591</b>	<b>1.6</b>	<b>2,697,001</b>	<b>568,388</b>	<b>37</b>	<b>173393</b>	<b>15</b>	<b>394,995</b>

Source: Mongolian Society for Range Management, Sustainable Pasture Management Project in Khanbogd Soum, for Oyu Tolgoi, Quarterly Report, September – December 2010.

<sup>39</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

**Table 10.6: Pasture Carrying Capacity Calculated by Area with Water Supply, 2010**

Name of <i>bagh</i>	Pasture Area /ha/	Pasture yield per hectare/centner/ha/	Total pasture yield /centner/	Annual average pasture carrying capacity /sheep head	Livestock number per 100 ha by sheep unit	Current livestock number /sheep unit/	Actual livestock number per 100 ha, by sheep unit	Pasture carrying capacity /sheep unit /+ refers pasture is sufficient, -refers pasture is not sufficient/
Nomgon	213,290	2.1	443,644	93,497	44	70,354	33	23,143
Gaviluud	142,437	0.7	95,433	20,112	14	80,940	57	-60,828
Javkhlant	296,176	2.3	669,359	141,066	48	11,433	4	129,634
Bayan	129,334	1.3	162,961	34,344	27	10,667	8	23,677
<b>Total</b>	<b>781,239</b>	<b>1.6</b>	<b>1,371,399</b>	<b>289,020</b>	<b>37</b>	<b>173,393</b>	<b>22</b>	<b>115,626</b>

Source: Mongolian Society for Range Management, Sustainable Pasture Management Project in Khanbogd Soum, for Oyu Tolgoi, Quarterly Report, September – December 2010.

When surveyed in 2007, herders considered that the carrying capacity of pastures in the Khanbogd *soum* is good (58.2%) to fair (31.6%) if the weather conditions stay “normal”. The herders’ view was that, in overall terms, pastures in Khanbogd *soum* were sufficient in size to support local herds given good weather conditions. When herders were asked how pasture was five years previous, the response was overwhelmingly the same (78.2%). In 2010, herders have identified increasing concerns about pastureland degradation and damage, particularly from dust, heavy vehicle use, mining and a lack of water and other climatic conditions. Herders reported during field work with Oyu Tolgoi in 2010, that pasture access is becoming an increasing problem in Khanbogd, with 5-6 *khot ail*<sup>40</sup> reported in a single 2.5 km<sup>2</sup> pasture area.

### Pastureland Health

Another factor in rangeland degradation is vegetation health. No previous detailed data has been available in Khanbogd to assess the existing damage/degradation of pastures in the *soum*. In order to improve pastureland management there is a need for consistent and reliable data and information on pastureland health monitoring. In October 2010, the MSRM launched a pastureland health assessment and monitoring programme in Khanbogd *soum*.<sup>41</sup>

Field data was gathered from a total of 33 sites, and a total of 18 different ecological sites were selected for long-term monitoring of pastures. These sites were selected to represent the various vegetation types and ecological conditions across the *soum*, as well as active and inactive grazing areas. A range of qualitative and quantitative methods were used to conduct the research and assess the pastures, including photographs of vegetation cover and vegetation analysis (e.g. total cover, sub-covers, basal cover, bare soil, biomass of a particular vegetation community etc).

The key results from this work were the establishment of a *Pastureland Health Database for Khanbogd Soum* and an initial assessment of pastureland health. The assessment findings indicated that 72% of sites studied were healthy or not degraded, and 22% were slightly degraded.

### 10.6.9 Herder Land Use

Oyu Tolgoi has conducted detailed investigations into how *soum* herders use grazing land. Data has been collected from herder households residing nearby to different Project components, including coordinates for winter shelter and wells, number of household members, number of livestock, livelihoods data and migration patterns (if any) during all seasons (winter, spring, summer and autumn). Oyu Tolgoi also has a community grievance mechanism in place to receive herder concerns/complaints about pastureland impacts from the Project (see *Chapter D15: Resettlement Action Plan*).

<sup>40</sup> Denotes a small socio-economic unit which manages a herd (see also Section 10.6.9 below).

<sup>41</sup> *Initiation of Pastureland Health Monitoring Programme in Khanbogd Soum, Omnogovi Aimag, Funded by Oyu Tolgoi*, Annual Report, Mongolian Society for Range Management, 2010.

### ***Khot Ail in Khanbogd***

Herder families in Khanbogd collaborate with other families to share herding responsibilities. This occurs through small grouping of herder families, usually extended families and/or neighbours, which is known as a *khot ail*. *Khot ail* refers to a “union of private livestock keeping families”. The original concept of the *khot ail* or group of herder families that collaborate to conduct mobile livestock keeping, dates back for centuries, although the term has only been used since the 19<sup>th</sup> century.<sup>42</sup> The original *khot ail* concept was based on the need of herders to solve problems associated with migrations and nomadic herding in harsh climates with seasonally varying resources of natural pasture. For example not every family had at its disposal at all times the necessary labour, beasts of burden and equipment such as carts, or the knowledge of available pastureland. Although nomadic livestock keeping in Mongolia does not require intensive labour on a daily basis, extra labour is necessary at certain times, e.g. during calving or shearing. Scarce resources were also another key reason for the derivation of the *khot ail*, as many herders share wells with other families in their *khot ail*.

The *khot ail* based on kinship ties were reportedly suppressed during the collective era (1950s - 1980s), temporarily replaced in favour of non-kinship based production units of one or two households, known as “*suur*”.<sup>43</sup> The *khot ail* has re-emerged since the 1990s and is once again, the most important social basis of nomadic animal husbandry.

The *khot ail* that has developed after the communist period, differs from its original form. The main difference is that families belonging to a *khot ail* manage themselves separately, whereas before they were economically connected within their *khot ail*. For example, now families keep their stock separate from one another, produce in principle only with the family and market their produce in most cases alone, despite the fact that they belong to a *khot ail*.

### ***Winter Shelters and Livestock Management***

Winter camps/shelters and corrals are established by herder households and used during colder periods to keep animals gathered together in a shelter. Winter is a sedentary season with few herder families moving at all during this time. Shelters are critical for survival – with winter temperatures averaging minus 30-40°C. Shelters are often located along the foot of hills where water will collect, vegetation is most prolific, and shallow wells are located. Livestock are kept close by, and families use fodder, hay, and wheat to supplement feed for their animals.

Winter shelters normally consist of a built up area for livestock (corral) and storage area, plus a *ger* and small wood or concrete house. A corral is reported to cost between \$800 and \$1,000 (USD) to construct using locally-available materials.<sup>44</sup> Winter/spring shelters are made of natural products such as stone, wood and even scrap materials including iron and rubber tyres. They are usually maintained for years, although no precise information is available on how long winter shelters usually last. *Figure 10.4* shows a herder winter shelter in Khanbogd *soum*. Herders usually have a hand dug well or borehole nearby to their winter shelter.

*Figure 10.5* shows some herder families and their livestock, while *Figure 10.6* and *Figure 10.7* illustrate the location of herder winter camps within Khanbogd *soum* (north and south).

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<sup>42</sup> Commission on Nomadic Peoples, *Socio-economic Segmentation – Khot Ail in Nomadic Livestock Keeping of Mongolia*, Bat-Ochir Bold, Nomadic Peoples, Number 39, 1996.

<sup>43</sup> *Democratic decentralization through a natural resource lense*, Jesse Craig Ribot, Anne M. Larson, European Association of Development Research and Training Institutes, 2005.

<sup>44</sup> Ukhaa Khudag (UHG) Project, Draft Social and Environmental Impact Assessment, UHG Phase II, Energy Resources LLC, September 2009 (page 5-128).

**Figure 10.4: Herder Winter Shelter**



*Note: photo taken 2010*

**Figure 10.5: Khanbogd Soum Herder Families and Livestock**



*Source: Oyu Tolgoi, photos taken 2004.*

*Figure 10.6 shows herder winter camps north of Oyu Tolgoi, whilst Figure 10.7 shows the winter camps south of Oyu Tolgoi.*

Figure 10.6: Herder Winter Camps and Wells North of Oyu Tolgoi

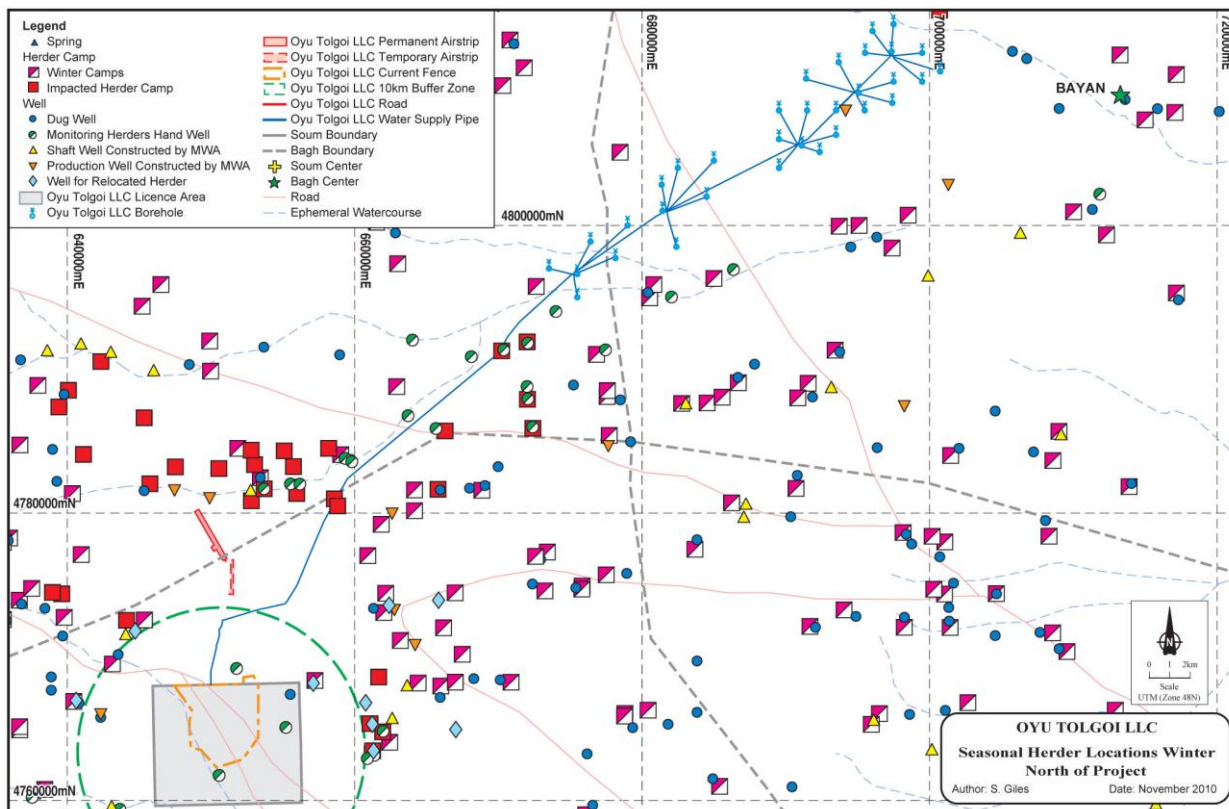
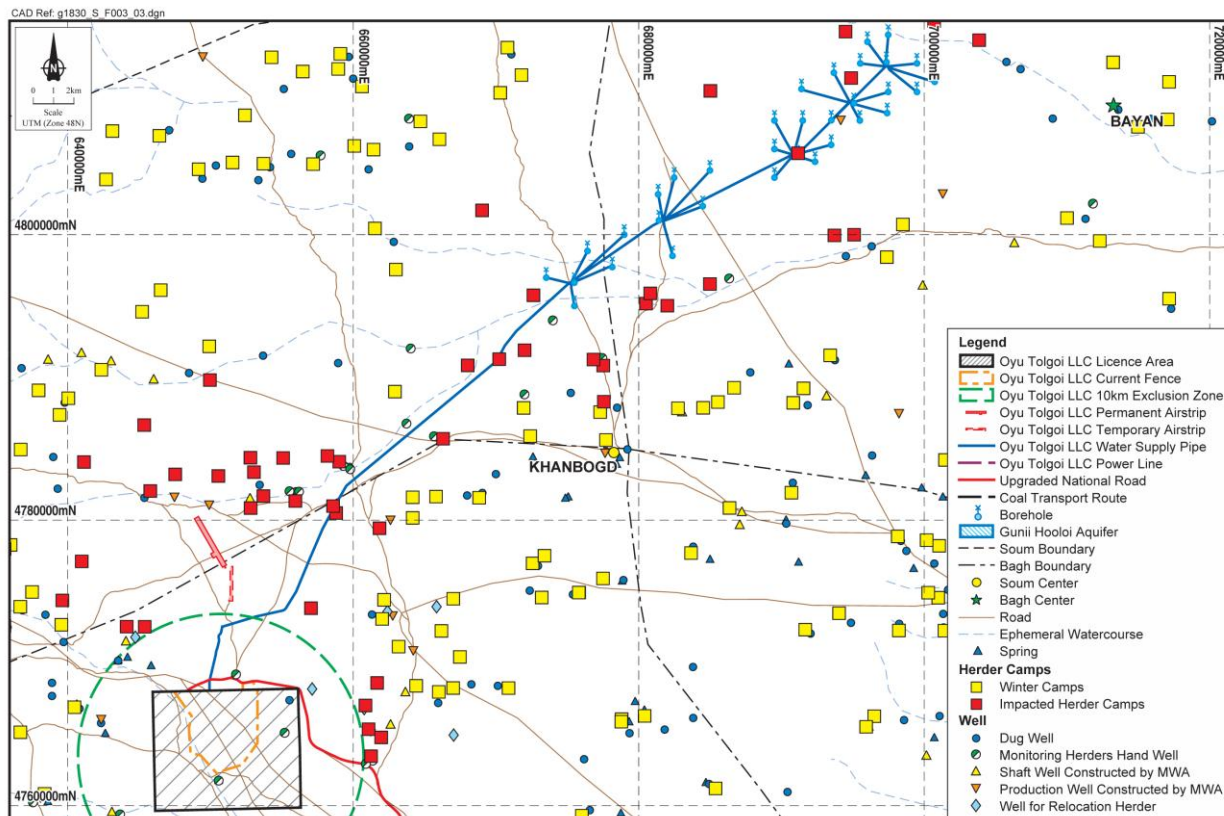
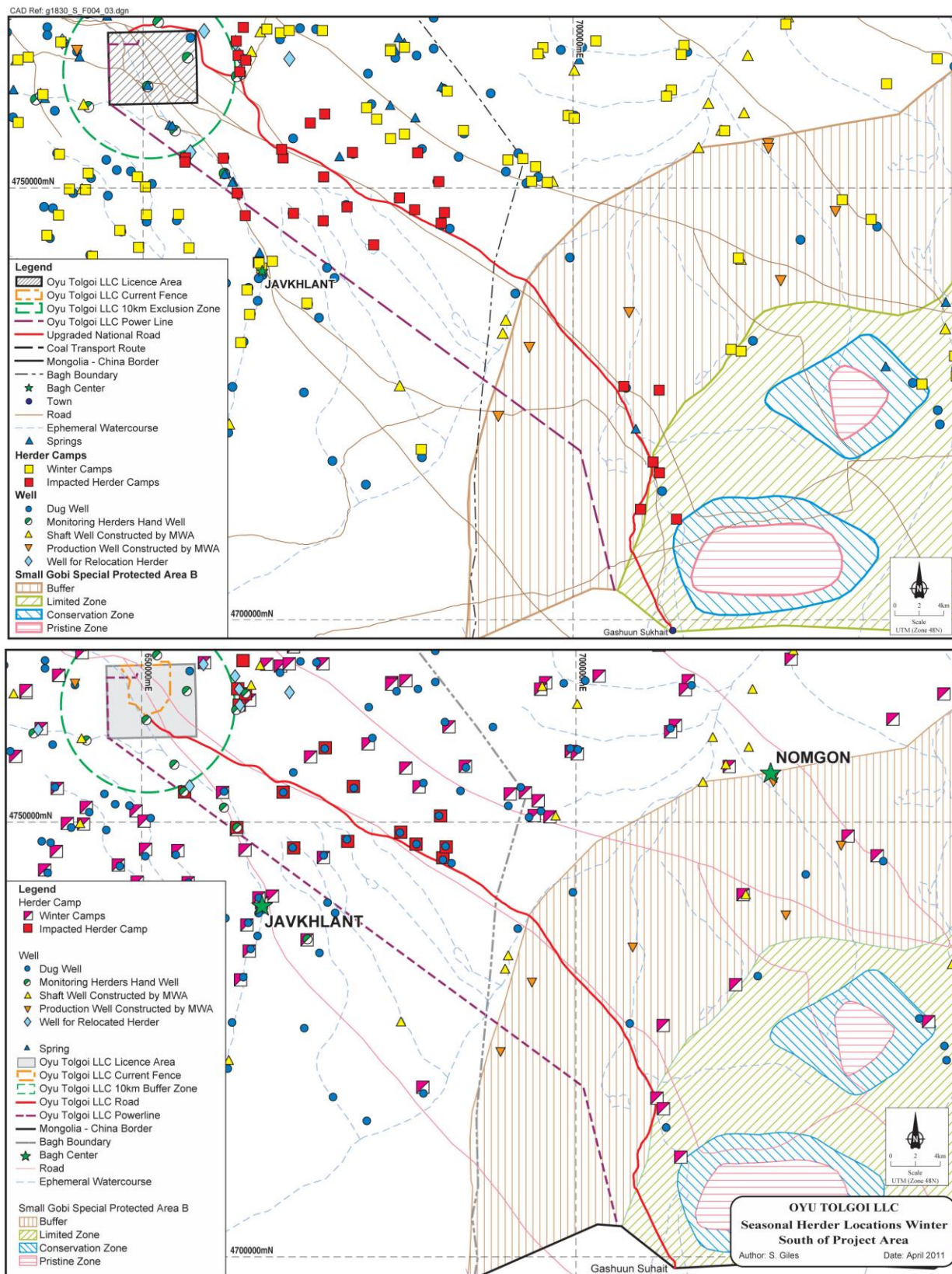


Figure 10.7: Herder Winter Camps and Wells South of Oyu Tolgoi



### Seasonal Migrations and Summer Camps

During summer and autumn when pastures grow, seasonal herders move their *gers* to a location they consider to have good pasture. These summer camps are typically located in the vicinity of hand dug shallow wells that provide water for animals and families. *Figure 10.8* shows a summer camp in Khanbogd *soum*. Summer/autumn grazing is practised to allow winter corrals time to recover and to let the livestock gain fat and strengthen.

During the Baseline Survey in 2008, 39% of herder households in Khanbogd reported that they migrate seasonally in summer and autumn, followed by slightly shorter moves in the spring. Over a year, herder households in Khanbogd migrate over distances of approximately 12-13 km. Although the average repetition of movement is estimated at 5-6 times, herders report that this depends heavily on the number of family members and livestock.<sup>45</sup> Herders move back to winter shelters in late August. Herders report that cow and camel pastures are within 20-35 km of camps and water, and sheep and goat pastures are within 3-5 km. Herders herd their goats and sheep on a daily basis, but camels, horses and cows do not require daily herding, as they are “semi” wild.<sup>46</sup>

Herders in Khanbogd *soum* continue to migrate in customary areas, mostly within their respective *baghs*. Consultation with herders in Khanbogd *soum* identified that a number of herders do travel to Manlai *soum* to graze their livestock at some times of the year, e.g. if summer pastures are not considered good in Khanbogd.<sup>47</sup>

**Figure 10.8: Herder Summer Camp**



Note: photo taken 2010

Extensive consultation with herders has highlighted that there are no clear boundaries for summer and autumn grazing areas, and that these vary from year to year and from household to household, making it difficult to be firm about where infrastructure can best be placed to minimise inconvenience and disruption to herding practices. It has therefore not been possible to map with analytical precision specific seasonal pastures, although broad, general usage patterns can be mapped.

As described above, as part of the *Sustainable Pastureland Management Programme* being implemented by the *khot ail*. As a result, 14 groups have been established<sup>48</sup>, and customary grazing areas of these

<sup>45</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

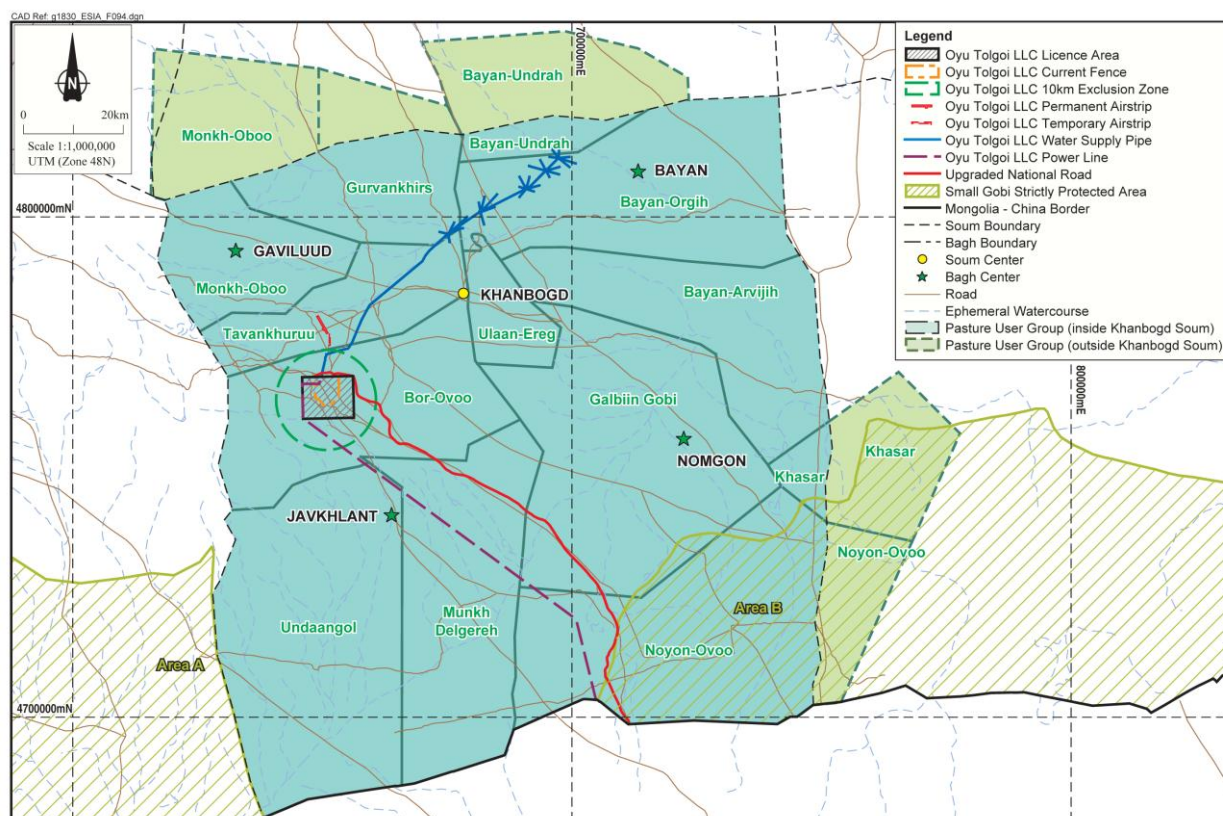
<sup>46</sup> *Ibid*, Baseline Survey, 2009.

<sup>47</sup> Sustainable Pastureland Management Programme consultation, Mongolian Society for Range Management, 2010.

<sup>48</sup> Note: there are different numbers of households involved in each user group depending on family/neighbour relationships and customary grazing rights.

groups have been identified. *Figure 10.9* shows the location of the different groups and their names<sup>49</sup>. It is important to note that these boundaries are general and there can be considerable overlap in seasonal grazing patterns between the different user groups. Also, since these groups were established in late 2010, the customary grazing areas do not represent a pre-Project baseline but rather the current grazing patterns of *soum* herders. Further information on the *Sustainable Pastureland Management Programme* and Pasture User Groups see *Chapter D15: Resettlement Action Plan*.

**Figure 10.9: Customary Grazing Areas of Pasture User Groups in Khanbogd Soum, 2011**



Source: Mongolian Society for Range Management, *Sustainable Pasture Management Project in Khanbogd Soum, for Oyu Tolgoi, Quarterly Report, January – March 2011*.

## 10.6.10 Herder Water Resources

### Herder Water Sources

Water is a key pastureland resource and plays a major role in the location of the seasonal camps of herders within the *soum*. Over 90% of herders take water from hand-dug wells because there are no permanent sources of open water.<sup>50</sup> *Figure 10.10* shows an example of a hand dug well. Springs and hand-dug wells are fed by shallow gravel aquifers that are recharged from periodic rainfall events. The average distance to water sources for herders is about 2.5 km, which is quite small considering this distance falls within the range of daily grazing of small stock.<sup>51</sup> When there is no water available from snow, ephemeral or permanent springs, access to wells is a critical factor for livestock production and human consumption. *Chapter B6: Water Resources* provides further details on the nature, type and use of herder wells in the *soum* and in particular those near to different Oyu Tolgoi Project facilities.

<sup>49</sup> The customary pastures of some herders/pasture user groups extend beyond Khanbogd *soum* into neighbouring *soums*. The MSR and Oyu Tolgoi have been working with neighbouring *soums* and herders to ensure all relevant herders are included in the various programmes being implemented.

<sup>50</sup> *Ibid*, Sheehy, p. 15.

<sup>51</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

**Figure 10.10: Typical Shallow Hand-Dug Herder Well**



Source: Oyu Tolgoi, photo taken 2010.

Table 10.7 indicates the number and type of water wells in Khanbogd and neighbouring *soums*. Many of the mechanical wells developed during the Socialist period in the region are no longer functioning because neither the government nor herders have the funds or capacity to maintain them. Figure 10.11 and Figure 10.12 show the types of wells and other water features in the *soum*. As shown in these figures, numerous herder wells are being monitored by Oyu Tolgoi; a total of 94 herder wells were being monitored in 2010 (and a total of 333 water monitoring points are in place across the *soum*). Further detailed information on wells in the *soum* and Oyu Tolgoi monitoring of herder wells is provided in Chapter B6: Water Resources.

**Table 10.7: Number and Type of Water Wells**

<b>Soum</b>	<b>Deep wells</b>	<b>Concrete-lined wells</b>	<b>Short-cased wells</b>	<b>Hand wells</b>	<b>Total number of wells</b>
Bayan-Ovoo	21	22	24	264	331
Manlai	48	45	82	258	433
Khanbogd	38	7	39	302	386
Tsogttsetsii	23	12	57	160	252
Dalanzadgad	30	0	2	75	107
Aimag average	28	22	44	259	353

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

A reported 90% of herders in Khanbogd *soum* share their wells with neighbours, who are often family members. The family that “owns” the well is responsible for fixing the well, motor, sink, cleaning the wall of the well, and so on. If the well is owned by several families (neighbours), they collectively protect their well. It is reported that herder families with the greatest number of livestock are expected to contribute the most towards well maintenance in the case of several families sharing a well.<sup>52</sup>

As described above, there are also some deep wells in the *soum*, including those provided to the 10 herder households resettled by Oyu Tolgoi from the exclusion zone around the Mine Licence Area. These deep wells with pumps are sometimes locked in a shed, which is in contravention to herder tradition, but understandably as a result of wanting to protect proprietary rights (i.e. over the pump). Some herders report to have previously locked their wells to protect them from truck drivers and ninja miners, not necessarily from other herders. Most deep wells are actually reported by herders to be open

<sup>52</sup> Oyu Tolgoi, Water Perception Study in Khanbogd *Soum*, August 2007.

for access to other herders, but in the case of deep wells, users are expected to contribute to the maintenance and diesel costs of the pump, in agreement with the pump owner. Herders generally try to sort out any issues related to water sharing through their *bagh* meetings and the *soum* government if disputes arise.

Figure 10.11: Herder and Other Wells North of Oyu Tolgoi

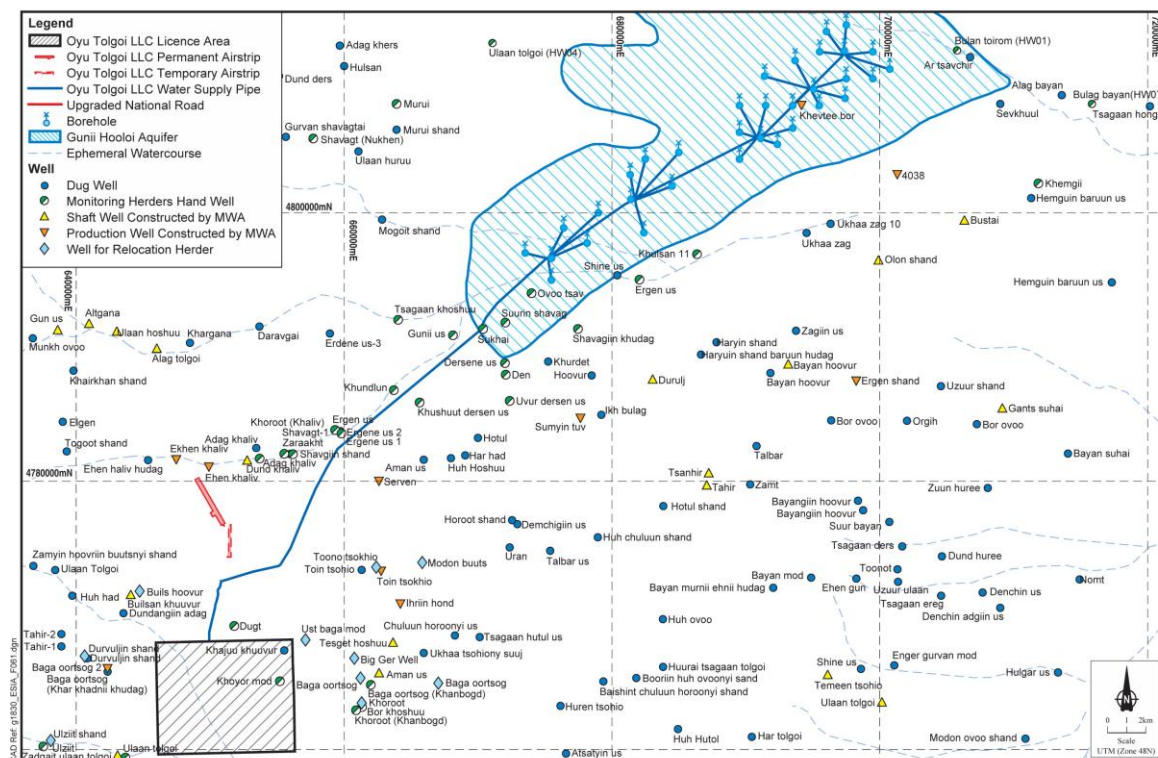
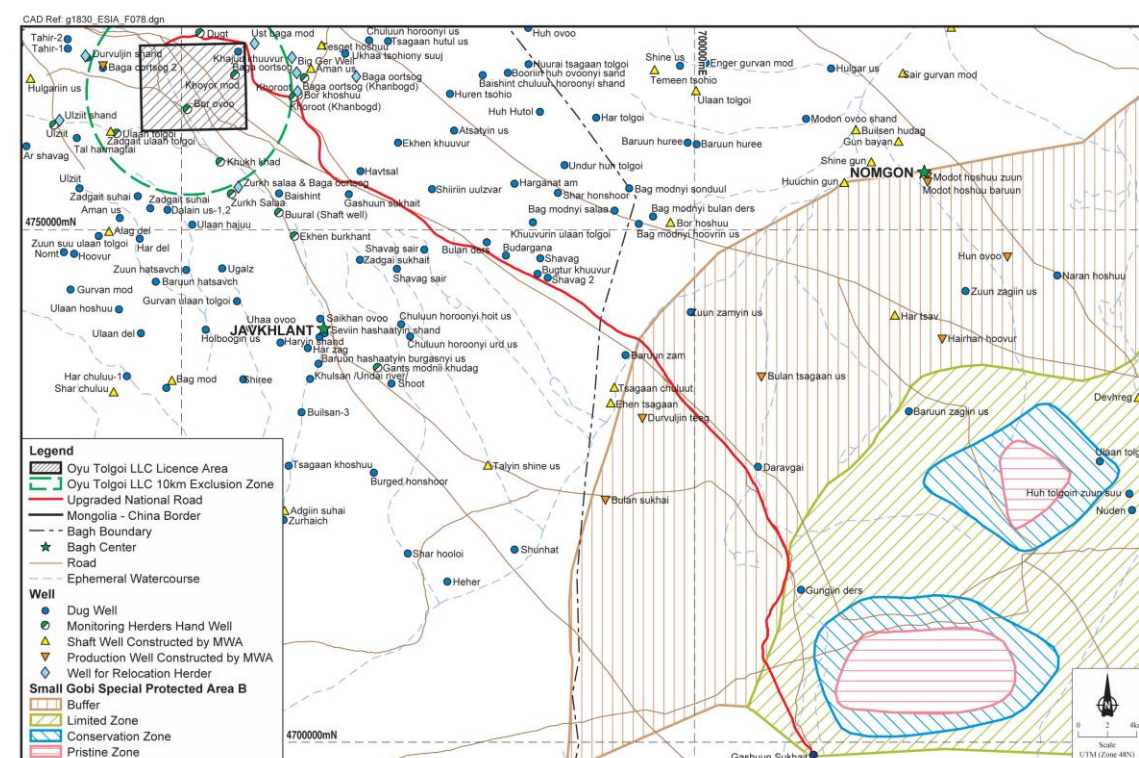


Figure 10.12: Herder and Other Wells South of Oyu Tolgoi



### **Studies on Herder Wells**

Initial studies were undertaken between 2004 and 2006 to assess the potential impact of the pit and underground mine on the groundwater, using limited hydrological data available, to provide Oyu Tolgoi with an assessment of the worst case water inflows to the pit and assess the area of influence. The modelling used a number of scenarios, which took into account of the possibility of subsidence around the underground block caving which could cause the surficial groundwater to flow into the block caving. These models, which used conservative assumptions (e.g. no internal flow barriers and just four modelled units – alluvial, soil, weathered bedrock and bedrock), predicted an ellipsoid cone of depression which was approximately 10 km by 8 km for the 1 m drawdown contour. The 1 m contour was, given the conservative nature of the model, taken as equivalent to the zero drawdown contour as it was considered to overestimate the extent of any zone of influence of the pit dewatering. This initial information along with other factors, such as anticipated dust emissions, was used to define the 10 km zone designated for herder relocation (see *Chapter C10: Land Use and Displacement*).

Since this initial modelling there have been a significant number of additional boreholes drilled, including those used for the construction water supply, which has provided a better appreciation of the layering of the sediments and their relative hydraulic conductivities. Oyu Tolgoi has commissioned a revision of the groundwater model for the mining licence which will include undertaking hydraulic testing on the various formations and other geotechnical testing. This work is underway and a new model will be developed in 2012. As an interim step the original simplistic model has been revisited and re-run using more realistic (lower) hydraulic conductivities based on recent data gathered from the Mine Licence Area (see also *Chapter B6: Water Resources*).

This re-run of the model predicted a smaller cone of depression, with the 1 m drawdown contour being approximately 5 km from the mine at the end of the open pit mining extending beneath the WRD and a section of the Undai and its diversion, and the majority of the TSF. The 1 m drawdown contour in the interim model is also used as an approximation to the maximum drawdown contour as the data used in this model is insufficient to refine the outer edge of the groundwater area with greater confidence. Within this area there are no other groundwater users such as herders or springs (other than the Bor Ovoo) or any groundwater dependent flora (see *Chapter B7: Biodiversity*).

It is anticipated that when further layers are put in the model in 2011, together with more representative hydraulic conductivities, the modelled cone of depression will be smaller in extent and irregular in shape and therefore will better reflect the local geology and structures in the Mine Licence Area. This will provide Oyu Tolgoi with a model with a higher degree of confidence with which to evaluate the potential impacts of the drawdown on the different aquifers, including the wider spread weathered and fractured bedrock aquifer, and the linear aquifers associated with the ephemeral watercourses.

Importantly the revised groundwater model in 2012 will enable Oyu Tolgoi to review critically the area of influence of the cone of depression and verify that impacts will not extend to any of the herders around the Mine Licence Area; Oyu Tolgoi will present this data to the herding community through the various forums such as the participatory environmental monitoring programme.

### **Water Availability and Pastures**

As described previously, the MSRM conducted a number of assessments of pasture and water availability as part of their studies in late 2010. *Table 10.8* shows the results from the assessment of pastures with water supply. Results show that about 48% of total pastureland area is not used because of water shortages (i.e. no wells or wells not working).

**Table 10.8: Water Supply and Well Information for Pastures in Khanbogd Soum, 2009\***

Name of <i>bagh</i>	Pasture area with water supply /ha/	Pasture area with water shortage /ha/	Percentage of pastureland area with water supply	Total water wells	Well Type		Operational Status	
					Deep engineered	Well	In use	Not in use
Nomgon	213,291	269,598	44	63	18	45	60	3
Gaviluud	142,438	56,552	72	96	18	48	96	
Javkhlant	296,177	235,296	56	89	4	85	89	
Bayan	129,335	154,905	46	66	18	43	65	1
<b>Total</b>	<b>781,239</b>	<b>716,351</b>	<b>52</b>	<b>314</b>	<b>58</b>	<b>221</b>	<b>310</b>	<b>4</b>

Source: Mongolian Society for Range Management, Sustainable Pasture Management Project in Khanbogd Soum, for Oyu Tolgoi, September – December 2010.

\* The number of wells are from year 2009, the calculation of pastureland area with water supply is estimated by grazing distance of sheep from water sources.

Herders in Khanbogd were surveyed about water quality and availability during the *Water Perception Survey* (280 herder households), and although over 60% interviewed said that overall water availability is good, they indicated that there are sometimes shortages in the warmer seasons when usage peaks.<sup>53</sup> More recent consultation with herders has highlighted that they believe droughts and other activities, including Oyu Tolgoi mine development, are causing water levels to lower, and have led to a reduction of the growth of indigenous pasture grasses. Herders believe that a number of old wells could be rehabilitated for use in future pastureland management programmes, which is under consideration by Oyu Tolgoi through the *Sustainable Pastureland Management Programme*. Further discussion on water resources and their importance to pastures and thus herders, is provided in *Chapter B7a: Biodiversity Baseline*.

## 10.7 PLANNED WORK

### ***Continuation of Sustainable Pastureland Management and Assessment***

The *Sustainable Pastureland Management Programme* that is being implemented by the MSRM in Khanbogd *soum* on behalf of Oyu Tolgoi, is working towards establishing a sustainable pastureland management system for *soum* herders. Herders have been actively engaged in this programme since September 2010, and are eager to develop and implement pasture management and improvement measures in their *baghs*. The initial work is a starting point to establish the existing baseline for pasture quantity and quality within Khanbogd, and to mobilise herders into groups for future pasture management. Ongoing work will include regular assessment of carrying capacity and pastureland health, as well as support to implement specific measures identified by herders improve pastures and livestock production. The MSRM provides quarterly reports of their work to Oyu Tolgoi, local government, and to the Pasture NGO and 14 Pasture User Groups. The MSRM assessments and reports have not yet been produced to publication standard in English, as the programme is ongoing..

### ***Additional Household Surveys***

Although the recent survey work provides detailed data for herder households directly adjacent to the different Project sites, an additional household survey will be conducted to obtain further socio-economic data on *soum* centre residents as well as herders. Details of this proposed further work are provided in *Chapter B9: Employment and Livelihoods*.

<sup>53</sup> Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.