The Tripartite Council of Khanbogd soum, Umnugovi aimag
Cover Letter to Final Report of MDT and IEP

Khanbogd soum
Umnugovi aimag
Mongolia

January 12, 2017

The reports of the socio-economic study of Khanbogd soum herder households and Phase 2 study of cumulative impact of Undai River diversion conducted by the independent experts employed by the Tripartite Council (TPC)[1] of Khanbogd soum, Umnugovi aimag, are hereby disclosed to the public.

This study was carried out to facilitate the resolution of complaints lodged by Khanbogd soum herders with the Office of the Compliance Advisor Ombudsman (CAO) of the World Bank Group. The purpose of study was to map independently and objectively the changes over the last decade in livelihood and socio-economic conditions of Khanbogd soum herder households, based on information from diverse sources, and subsequently to determine which changes were caused by or attributable to Oyu Tolgoi (OT) company operations. In addition, the study aimed to assess the adequacy of the OT's compensation programs, cumulative impacts on regional water and pasture resources due to Undai, Khaliv and Dugat River Diversions, and impacts from OT tailings' storage facility. Multi-Disciplinary Team (MDT) and Independent Experts' Panel (IEP) carried out the studies in 2016 and submitted the final report to the TPC of Khanbogd Soum in January, 2017.

Conclusions provided in the report by MDT and IEP are not the TPC's position; and the report presents solely independent conclusions and assessments of the independent experts. We notify any interested entities herein that some conclusions of the report are not fully accepted by the parties of TPC. Nonetheless, the Parties of TPC agreed to discuss and implement the recommendations of the report in order to solve the herders' complaint issues.

Any party using this report improperly will be subject to liability in accordance with the relevant laws.

Please refer to the following in respect of the report:

The Tripartite Council
Khanbogd soum
Umnugovi aimag

[1] TPC (The Tripartite Council), composed of representatives from Khanbogd soum local government, herders' representation and Oyu Tolgoi company, has been officially established on June 8, 2015, as per Memorandum of Understanding signed with purpose of resolving complaints among the Parties. The Office of the Compliance Advisor Ombudsman (CAO) facilitates the operations of the TPC. The CAO is the independent recourse mechanism for the International Finance Corporation & Multilateral Investment Guarantee Agency the World Bank Group.

JANUARY 2017

MULTI-DISCIPLINARY TEAM AND INDEPENDENT EXPERT PANEL JOINT FACT FINDING

SUMMARY OF THE EXPERTS' REPORTS

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Executive Summary

This Summary report presents the findings of a set of Joint Fact Finding studies carried out by independent experts and the Tripartite Council (TPC) that represents herders, the Oyu Tolgoi mine, and the administration of Khanbogd soum in Mongolia.

The purpose of the studies is to help resolve complaints made by herders to the Compliance Advisor Ombudsman (CAO) – the independent recourse mechanism for complaints by people affected by IFC projects.

The studies have looked at issues related to pasture and herd water; changes in, and sustainability of, traditional herding; the adequacy of compensation of herders by OT; impacts on the Undai and Haliv Dugat rivers and consequences for herders, and the integrity of the tailing storage facility and the impacts of any leakage in the Haliv Dugat river. Each study was conducted by independent experts according to a methodology and work plan agreed with TPC.

Overall, the studies have found that there are some impacts of OT on herders that have not been fully understood before, and not fully compensated. We also found that due to gaps in initial baseline monitoring and the concurrence of a range of changes in herding in Khanbogd soum not related to OT, some critical concerns of herders, particularly relating to impacts of OT on herder water, cannot be definitively resolved. There are improvements to be made in monitoring and communications that we consider will, if implemented, lead over time to improved trust between OT and herders. In addition, given that the soum is committed to successful coexistence between mining and herding, and there are multiple pressures on pasture including from increasing herd sizes, it is essential that measures to manage pasture and water across the soum level are implemented. We also recommend that OT sponsor development of additional wells in areas where there is unused pasture to recognize that OT cannot demonstrate that its activities have not damaged herder water resources.

The studies have resulted in recommendations in addition to those listed above, relating to pasture, water, compensation, communications between OT and herders, monitoring and the tailings storage facility. These are discussed in the summary report and in greater detail in the individual component reports; the recommendations are also presented in a consolidated list at the end of this summary report.

This report presents the findings of the independent experts totally independent of all the parties.

Jill Shankleman

Troy Sternberg

Oxford, January 2017

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1 Introduction

1.1 Background

The Oyu Tolgoi (OT) project is a $12 billion investment to develop a copper and gold mine at Oyu Tolgoi in the Southern Gobi region, Mongolia. Oyu Tolgoi LLC's majority owner (66 percent) is Turquoise Hills Resources, a Canadian public company listed on the Toronto Stock Exchange. Erdenes Oyu Tolgoi, LLC, a Mongolian state-owned holding company, owns the remaining 34 percent. Turquoise Hills Resources' majority shareholder is international mining major, Rio Tinto Plc. In 2013, the International Finance Corporation (IFC) approved an investment in OT as part of the project's financing package, having earlier disclosed the intention to invest.

In October 2012, local herders who claim to be affected by the Oyu Tolgoi project in the Southern Gobi, Mongolia filed a complaint to the Compliance Advisor Ombudsman (CAO) – the independent recourse mechanism for complaints by people affected by IFC projects - with the support of OT Watch, a national NGO, and Gobi Soil, a local Khanbogd-based NGO. The complainants are concerned about the project's use of land and water, which they claim disrupts their nomadic way of life, and puts in jeopardy their indigenous culture and livelihood. The complainants contend they have not been compensated or relocated appropriately, and they question the project's due diligence, particularly around the issue of sustainable use of water in an arid area.

In February 2013, a second complaint was filed by local nomadic herders and community members who reside and conduct livelihood activities close to the project site. The complainants' main concern is the Undai River diversion component of the project. The complainants contend that the river diversion jeopardizes their traditional nomadic lifestyle and livelihood. They are specifically worried that the diversion will lead to several water systems drying up, deteriorated pastureland yields, diminished water supply to unique stands of elm trees and a cultural impact to what they view as a sacred river.

Local herders elected a team to represent them in a single dispute resolution process for both CAO Oyu Tolgoi complaints. The complainants and OT agreed to work with the CAO Ombudsman/Dispute Resolution team to try to resolve the issues raised in the complaint using a collaborative approach. This lead to the formation in June 2015 of the Tri-partite Council (TPC) which comprises representatives of herders, OT, and the local government (Soum). Various interim agreements have been reached on topics such as access to information, tours/inspections of the mine site for herders, access to grazing land inside the OT project site and on using joint fact-finding (JFF)to address some project impacts.

1.2 Joint Fact Finding (JFF)

The approach to JFF involves TPC preparing a Terms of Reference (TOR), and selecting experts to conduct studies; regular contact between TPC and the appointed experts, for example, to agree work plans, identify and share relevant documents, organize focus group meetings and support survey teams locate herders and other interviewees; and detailed review of drafts. The conclusions and recommendations are those of the experts; TPC will decide whether and how to act on recommendations.

This document reports on the findings of the following joint fact-finding activities:

- Phase II of the IEP study relating to impacts on the Haliv Dugat River and cumulative impacts in the Undai river basin. This work began in February 2016. The parties had jointly selected

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an Independent Expert Panel (IEP)[1] to assess the impacts of the project on the Undai River.[2] [2] (Phase 1 of the IEP study was completed in early 2015 and results are available on the CAO website.)[3]

- The results of the Multidisciplinary team (MDT)[4] appointed by the parties to undertake socio-economic and environmental studies of herder households across the soum intended to independently map changes in livelihoods and socio-economic conditions over the last decade, analyze changes in vegetation and water, and evaluate the adequacy of compensation.[5]

The MDT and the IEP expert teams are very appreciative of the involvement and support of TPC in the JFF process and thank them for their support, enthusiasm and cooperation. Particular thanks are due to the TPC Secretariat for translating many emails between Mongolian and English speaking parties and facilitating the flow of documents. Thanks also to CAO for their support in facilitating the process.

1.3 This report

This report is written for the TPC. It presents a summary of the following JFF outputs:

- Evaluation of the quality of and access to pasture and herd water
- Analysis of changes over the past decade to herder assets and livelihoods
- Compensation Programme Review
- 2nd Phase Report: Undai River Diversion Complaint.

Drafts of the individual reports were discussed with TPC in October 2016, and useful and detailed written comments received from each of the parties. The individual reports were revised in the light of comments, and are available as Annexes to this Summary Report. However the reports reflect the conclusions of the independent experts totally independent of all the parties.

IEP and MDT had different terms of reference, methods and outcomes. MDT evaluated the soum as a whole including areas close to and further from the mine license site; IEP focused on a smaller area in the vicinity of the Undai River diverted by OT. MDT conducted a sample socio-economic survey across the soum, and vegetation, water and dust testing. IEP focused on collecting detailed accounts from herders of land use changes in the Undai area. Overall findings of the two teams are shown in this Summary Report but for full details the four outputs listed above should be consulted. This Summary Report also presents overall observations on the issues addressed by JFF, and a master list of the recommendations emerging from the JFF studies.

[1] The members of the panel are: Steve Buckley and Dr. Sabine Schmidt.
[2] The Terms of Reference for this work can be found on: http://www.cao-ombudsman.org/cases/document-links/documents/FINALENG_ToRfor_UndaiRiverDiversionComplaint_CAO_IEP.pdf
[2] http://www.cao-ombudsman.org/cases/document-links/documents/ExecutiveSummary_edit_Jan_30_2015-ENG.pdf
[3] The Terms of Reference for this work can be found on: http://www.cao-ombudsman.org/cases/document-links/documents/FINALENG_ToRfor_UndaiRiverDiversionComplaint_CAO_IEP.pdf
[4] The members of the team are: Dr. Ariell Ahearn, Dr Bajav Batbuyan, Dr Jill Shankleman, Dr Troy Sternberg.
[5] The Terms of Reference for this work can be found on: http://www.cao-ombudsman.org/cases/document-links/documents/MDTEOI_ENGandMON.pdf

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2 Evaluation of the quality of and access to pasture and herd water

2.1 Scope of the evaluation

This component of the MDT evaluated the quality and access to pastures and herd water:

- The changes to pasture and herder water in Khanbogd Soum since 2003
- What part of these are due to OT, and what is the capacity of pasture and herd water to bear future impacts caused by OT
- What is needed to preserve/restore ecosystems and enable the continuation of traditional herding.

2.2 Methodology

Extensive fieldwork, assessment of OT documents and review of a wide range of secondary sources were used to assess environmental conditions. Work included:

- Fieldwork to collect new data included water source assessment, vegetation transect evaluation, dust monitoring, environmental observation (covering 3,500 kilometres) and comparison with herding conditions in Manlai Soum.
- Secondary sources included climate data, remote sensing for satellite identification of historical vegetation cover, additional climate records and dust observation, OT and lender-mandated reports, other relevant research and work relating to the environment, government data and interviews.
- A herder environmental and livestock perception survey.

2.3 Conclusions

There are several factors that affect the herding environment in Khanbogd Soum: climate and natural forces; herder behaviour; the decisions and actions of government and other private sector actors, and OT activities. We find that each of these has affected, or currently affects pasture and the water resources available to herders in Khanbogd Soum.

- The principal factor is that Khanbogd Soum is an arid desert environment averaging 95mm of precipitation per year but with significant variability from year to year. The pasture and water resources available to herders are primarily determined by climate. The principal source of variation in vegetation is precipitation.
- Remote sensing data on vegetation compared with precipitation records shows high variability from year to year in precipitation and related vegetation and water levels.
- In some years, and in some locations, depending on rainfall and herder behaviour, there is acute pressure on pasture and water, but overall the increase in animal numbers shows that herding remains viable in the Soum.
- Analysis of livestock inventories shows that dzud has a significant effect on the herding environment and herding livelihoods, e.g. though increased debt post-dzud.
- Herder behaviour also affects pasture and water resources. In particular, the significant increase of livestock numbers since 2003 requires additional amount of water and vegetation. In addition, several factors lead to reduced mobility and a concentration of animals in some areas.
    - Household splitting, sedentarisation, e.g. to be close to the soum centre
    - Animal concentration around water points leads to pressure on some pastures
    - Poor maintenance of wells
    - Efforts by some herders to control resources though locked water points
    - Possession of winter camps being used to protect perceived rights to use pastures

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- Disturbance or loss of 200 km^2 of pastureland to OT infrastructure, MLA and roads.

Alongside changing socio-economic factors (vehicles, increased expenses, migration to the soum for education and services) herding differs in Khanbogd from other Gobi and Mongolian soums.

We find that there has also been a significant transition in how herders use and perceive the environment in Khanbogd Soum since 2003. There is a widespread sense of disruption and uncertainty particularly related to the presence of the OT mine; changes in how people understand their and others' rights to water and land, and increased use of vehicles for herding (with fuel costs and pasture impacts) and construction of fixed houses. Herding is shifting to maximising pasture and water use for personal advantage rather than following a customary, shared resource approach to land use. The increase in animals and decrease/changing mobility and changing household and labor organization places stress on pasture resources and requires more water. Herders need to acknowledge the environmental impact of changes in pastoral practices and recognize that their decisions affect long-term pastoral viability.

National and local government and other companies have made investments that affect herding, for example, construction of the railway, the Tavan Tolgoi road and the Qatar wildlife reserve. In addition, the soum authorities appear to have limited ability to deal with forces affecting pastoralism and the environment. Factors beyond the soum's control (infrastructure) are coupled with limited planning and management that sees the soum react to events and pressures rather than organising efficient claims on pasture that enable mobility, maintaining water wells and accessing unused pasture. The soum's 2015 Livestock Sector Sustainable Development Program addresses relevant issues; its implementation should be strongly supported. Shortcomings of the government are reflected both in its local management role and an apparent lack of attention to the soum from the national government. Indeed, both the herders and soum look to OT for direction and money though it is not OT's role to organise herding and soum development beyond contracted responsibilities.

In the recent past the OT exclusion zone and infrastructure (MLA, airport, roads, water pipeline) displaced or inconvenienced herders (addressed in MDT Component 2 and 3). OT currently has limited known direct impact on pasture and vegetation. Mine interaction with the land is well organised and follows identified, standardised procedures such as no off-road driving. Impacts on the environment include risks to animals from traffic on the OT road and dust in the immediate vicinity of the Khanbogd road (now in the process of being paved).

However, there is a potentially very significant issue of the possible connection between shallow and deep aquifers resulting from the 476 boreholes drilled on behalf of OT. A lack of baseline monitoring data means that there are no reliable, long term records of water levels in herder wells enabling present and past (before drilling) comparisons. The 2013 RPS Aquaterra report states that a few wells near Gunii Hooloi may be affected. Due to poor initial methodology for borehole construction and record keeping the potential for leakage cannot be negated beyond a reasonable doubt. Many herders are very concerned about damage to their water resources. Identification of 9 cascading boreholes, now being addressed by OT, establishes the possibility, however slight, of interconnectivity elsewhere in the soum. Uncertainty regarding water supply highlights the need for ongoing water monitoring.

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2.3.1 Monitoring

OT appears to have fragmentary knowledge of the local physical and social environment and has contracted out much work, e.g. on groundwater and pasture management, with limited oversight or involvement, to parties that lack a presence in the soum. As a consequence, OT lacks a cohesive approach to environmental engagement and can better integrate its environmental monitoring or pasture management processes. Staff are knowledgeable in their sub-field but a unified approach was not presented. The result is much data but poor explanation or justification, ineffective communication and low trust levels in the community. Some work is now being transferred to the soum though it lacks time and employees to adequately monitor pasture. Further, results of efforts to develop cooperative herding groups to strengthen pastoralism were not evident.

2.3.2 Dust

Apart from the immediate transport corridors created by OT (roads) and the local community (tracks), dust is not a major environmental impact at this time. Dust generation in the soum peaked in 2010 and levels are now satisfactory on the large scale; at individual sites, primarily the Khanbogd road, dust is generated along the roadway but has limited dispersal and will cease when paving is completed. Traffic includes OT and non-OT vehicles, thus OT cause a part, not all, of the localised road dust. Herder vehicle tracks throughout the soum also generate dust.

2.3.3 Overall

Overall, we conclude that whilst there are issues of concern – particularly relating to potential aquifer connectivity - and to monitoring, the principle impacts on pasture and herder water in Khanbogd Soum come from sources other than OT. Little credit or acknowledgment is given by herders to OT for developing and rebuilding some of the water sources that herders use. The lack of effective pastoral governance now sees OT cast in the role more commonly ascribed to government; this is in clear contrast with Manlai Soum.

2.4 Recommendations

Based on the analysis of pasture and water, we have the following conclusions and recommendations.

In relation to pasture:

- Human decision-making by herders and the soum authorities have significant impacts on pasture use, distribution and grazing intensity. Efforts by the authorities to encourage traditional herder mobility and open access to water and land, and reduced actions by herders to restrict access to wells and land, are needed before high grazing levels in some areas will change. The soum needs to take an active role in promoting effective customary herding practices and in opening up new areas in the soum for herding. There is much unused pasture, particularly in the northern, eastern and southern areas that can be productive if water is available; the Strictly Protected Area is excluded. The definition of herder rights to possession (winter, spring camps, wells etc.) and what these rights mean for use of land and wells by other herders needs to be clarified and implemented.
- Paving the Khanbogd road (now in process) will resolve dust along the road corridor and should be undertaken as scheduled during 2017-18.
- Animal crossing areas on the OT road should have speed bumps on both sides of the crossings to slow down traffic. This will be particularly important as construction traffic ramps up and when production increases and will alleviate fragmentation effects.

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- Land fragmentation, also identified in the IEP report, to the northeast of the mine licence area (MLA) is a concern that can be addressed through collective compensation.

In relation to water:

- The potential interconnectivity, however slight, of shallow and deep aquifers is an ongoing concern for herder water that needs to be mitigated by OT. Existing cases highlight that the issue remains a concern across the soum. As part of collective compensation (below) we recommend OT construct a series of shallow hand wells across the soum, particularly in areas where there is pasture but no wells. The wells should be shallow (not deep), robust and durable, provide community access and not lockable - *e.g.* the concrete shallow wells recently constructed by OT for herders are suggested. The aim is to:
    - open up new and additional pasture across the 4 baghs to encourage migration and use of pasture resources and give the means for herders to continue customary livelihood practices.
    - fill gaps in usable water in currently used pasture areas.
- The soum and OT should cooperate on this programme to mitigate the impacts of OT on water resources, land fragmentation by OT, limited government organisation of soum infrastructure and ineffective herder land use planning. The soum needs to enable and ensure greater herder access to pasture.
- Our expert view is that more hand wells of simple, solid design at lower per unit cost enables greater water and pasture access and is much more valuable than expensive and complex designs. Reports commission by OT in 2007 and 2010 identified approximately 320 hand wells; since that time livestock numbers have increased significantly. We suggest 75+ hand wells be constructed based on groundwater studies to encourage migration to outlying pastures. A series of wells enables small animal mobility; where pasture is only suitable for camels, wells can be further apart.
    - The location of new wells should be based on groundwater studies to ensure productivity and that new wells do not affect existing wells. Siting should be done in conjunction with the soum to ensure greatest possible pasture access for all herders. Wells address gaps in prior collective compensation.
    - The wells should be dispersed across the 4 baghs to enhance mobility and access to new and alternate pastures.
- We recommend monitoring and modelling of alluvial aquifers at geographically distributed sites and hydrological study focusing on alluvial resources that quantifies OT's current and future impacts. This will provide better understanding of shallow groundwater dynamics on which the herders depend, strengthen modelling and in the future can measure changes in water resources.
- Water delivery to herders is a temporary measure that should gradually stop because it creates dependency and anxiety (herders worry about if and when it will stop) and is not sustainable in the long term. Over an agreed timeframe the water resources around each site to which water is currently delivered should be assessed. If there are existing functioning water wells then the delivery programme can end; if there are no wells, then one should be constructed as part of the proposed well building programme.
- A well maintenance system is needed for existing herder wells in the soum and those proposed above. We believe this could be part of a collective compensation programme to fill gaps in compensation.
- The lack of baseline water data affected the ability to identify the change over time in water resources.

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- We see no reason why water reports and data cannot be made available to the community.

In relation to monitoring and communications between OT, herders and the soum authorities:

- The environmental monitoring programmes for herder wells, dust and pasture/ vegetation should be redesigned and re-organised in order to provide robust long-term data credible to herders and others. Programmes should be suited to herding practices to enable participation and be verifiable by herders. The programme should include herder well water (quantity and quality); dust and vegetation/pasture quality and be designed and implemented using a joint fact finding methodology to ensure scientific rigour, accessibility and credibility. Local monitoring should replace outsourced monitoring.
- OT should produce regular reports on the results of monitoring - and any actions taken or proposed as a result of monitoring - and present these regularly to herders and others in the community. Current communications are unsatisfactory. Information should be direct, understandable and relevant to herders, reports to the soum should be comprehensible to staff. Methods used at other Rio Tinto sites, such as real time dust monitoring data for Pilbara, Australia[6] should be applied in Khanbogd. OT should present findings at the bag centres throughout the soum as well as in the soum centre. Genuine involvement by herders is essential to monitoring success and a herder responsibility in the process.
- For vegetation monitoring, fenced plots are recommended. These should be done in cooperation with herders and soum officials.

In relation to land use:

- Khanbogd soum faces an array of current and likely future demands on land for new infrastructure and potentially for other mines and resource extraction. At present the soum administration lacks the capacity or powers to address the challenges these developments pose. There is an urgent need for comprehensive strategy implementation for land use and protection of rural livelihoods. We would like to see OT and its lenders (especially IFC as part of the World Bank Group) deploying their networks and leverage to work with national and local government and external (international) agencies on soum-level strategies and plans to maintain herder livelihoods in the context of these changes.

Collective compensation:

- We recommend remedying a suite of OT impact issues, including interconnectivity and fragmentation, through community compensation. Specifically, a programme to build a series of shallow hand wells should be undertaken by OT in coordination with the Soum and after hydrological study for site location. Wells should be in underused areas of the soum including northern, eastern and southern regions. This serves to open potential new pasture and herding areas to encourage customary herding and addresses water and pasture issues. This addresses general OT impacts through collective benefit to the community that encourages customary herding viability in the soum.

3 Analysis of changes over the past decade to herder assets and livelihoods

3.1 Scope

This component of the MDT work was a socio-economic survey that investigated the following:

- Changes in herder household livelihoods from 2003 to present and the extent of loss of traditional livelihoods and culture.

[6] riotinto.com/documents/_FAQ_air_quality_monitoring.pdf

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- Herder household capacity to sustain traditional livelihoods into the next generations.
- What impacts are attributable to OT.

3.2 Methodology

The study included a literature review, a socio-economic survey involving semi-structured interviews and participant observation with a sample of 106 herder households across the soum; focus group meetings in bagh centres; meetings with soum centre residents, and discussions with OT and soum government representatives between May and July 2016. Interviews in Manlai soum provided a comparison with a comparable area not directly impacted by OT.

3.3 Conclusions

The survey found that the main factors in changes in herder livelihoods in Khanbogd from 2003 are:

- the start of large scale mining in the region and the issuing of licenses for further mineral exploration;
- material changes in herding techniques and practices
- social changes including new forms of household organization and labour
- increased numbers of livestock; stress on water and pastureland
- changes in government policies that affect the organization of herder households.

Regarding the loss of traditional livelihoods and culture, our findings concur with other studies which have shown loss connected to new patterns of herder household organization based on socio-economic choices and accessing school for children, which has resulted in fewer opportunities for children to learn herding skills from a young age. Additionally, we have found loss of customs connected to the pressures on pastureland and water due to the development of infrastructure and new patterns of land tenure and use. We have observed less household production of traditional livestock-based products and produce and an increased focus on wage labour and cash-generating activities.

Regarding the capacity of herders to sustain traditional livelihoods, the survey indicated that not all herders wished the next generation to pursue herder livelihoods due to experiences of economic and environmental insecurity. For those that do, there are particular challenges in Khanbogd that need to be addressed to make this possible. The key challenge is not only the presence of mines but mine-related and other infrastructure, and the lack of a clear governance structure that protects herder traditional rights to use pasture, wells and to be mobile.

We found that OT has contributed to these pressures but is not the sole source. The impacts of OT include: providing an alternative to traditional herder livelihoods through full time and part time employment, and a resettlement and a compensation programme that has unintentionally led to conflicts and tensions between and within households over benefits and camp locations. Direct impacts on the Undai River, Bor Ovoo spring, and the number of bore holes and wells dug have changed herders' water use patterns. The establishment of displaced herder winter camps in Gaviluud without going through traditional processes for determining new camp locations has led to a sense of insecure land rights and livelihood expectations. As part of the local government structure, the soum's mandate is to solve local issues. However, OT is a project agreed with, and accountable to, the national as well as the soum government. The lack of national government involvement in resolving major questions of water availability has contributed to the expectation from local herders that OT can and should resolve all problems.

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3.4 Recommendations

There are certain issues that OT needs to remedy. This includes more active communications with herders, compensation where herders were missed in 2004 and 2011 (See Component 3 report), work with the national and local governments to support herder transition to sustainable livelihoods, actively sharing data with the soum government and support to the soum government to develop their capacity.

A specific recommendation for communication with herders is:

Expand the community relations team. The team should comprise trained people whose role includes ensuring effective two-way communication between OT and herders (as well as others in the community). This would include participating in formal meetings, for example, bagh meetings, and maintaining close contact with the local administration and elected officials; regular contacts with people in on-going compensation programmes, including identified 'vulnerable' people, but also informal contacts established by spending time travelling around across the soum.

The community relations team also need strong enough links within OT to be able to provide herders and other local residents with up-to-date information about OT activities (especially during construction, the activities of contractors working outside the MLA, such as who is working where, for what period of time and how recruitment is being done), and be able to communicate back into management any concerns and issues they become aware of.

We also recommend that OT produce an annual report to Khanbogd that presents information on the past year's performance and plans for the coming year, covering local economic impacts including employment, local taxes and fees paid, local procurement; environmental impacts - monitoring and management programmes and the related data, and social performance including compensation programmes, support for vulnerable people, training and business development, Co-operation Agreement projects, donations etc. This should be published in Mongolian in a form which is accessible to herders.

4 Compensation Programme Review

4.1 Scope of the review

The compensation programme review looked at compensation to herders impacted by OT. It addressed the following questions specified in the terms of reference.

1. Was the impact assessment methodology applied to the 2004 and 2011 compensation process suitable and adequate?
2. Has OT adequately compensated for any negative effects that can be attributed to OT's presence, including OT-related infrastructure and natural resource use?
3. Was the compensation provided sufficient to support transitions to sustainable livelihoods?
4. Have all herders deserving of compensation been paid?
5. Have the compensation processes complied with the IFC's Performance Standard 5?

The compensation review also included some analysis on the following topics that were raised by the herder group in TPC after the expert team had started their work.

- Emotional damage to herder elders resulting from resettlement
- The implications of two specific clauses in the compensation agreements

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- Assessment on impacts on vulnerable people
- Compensation for damage to intangible cultural heritage.

4.2 Methodology

The methodology for the compensation programme review was discussed and agreed with TPC. It included:

- review of relevant OT documents, especially impact assessments, resettlement action plans and related documents and compensation agreements;
- meetings with OT, TPC, herders and soum officials;
- incorporating the findings of the evaluation of the quality of and access to herder water and pasture and the analysis of changes over the past decade to herder assets and livelihoods;
- and assessing the adequacy of impact assessments and compliance with IFC PS5 on the basis of pre-agreed criteria.

4.3 Conclusions

The compensation programme review reached the following conclusions on the questions specified by TPC. (For full findings, please see the Compensation Programme Review Report.)

- The impact assessment carried out for the 2004 compensation programme was not adequate as a basis for mitigating impacts on herders. There was no Resettlement Action Plan.
- The studies, impact assessments and the resettlement action plan that provided the basis for 2011 compensation were largely suitable and adequate. There were some weaknesses e.g. in the identification of impact zones, that meant that some affected herders were not identified, and elements of the compensation package have proved not to be sustainable.
- There have been changes and developments of the project since 2012 that are not included in the existing impact assessment.
- In relation to impacts of OT on pasture, OT has adequately compensated for most of the negative impacts on pasture that can be attributed to OT.
- In relation to water, the failure of OT (especially the initial operator IMMI) to undertake or record comprehensive baseline data, or carry out modelling, of the alluvial aquifers and the wells used by herders means that it is not possible to disprove herder allegations that the water available to them has declined due to OT. But nor is it possible to prove impacts in the absence of robust baseline data and given that other factors have changed since OT started, notably increases in the number of herder animals.
- Weaknesses in the approach to impact identification mean that there are some additional herders who should have been provided compensation in 2004 and 2011. This includes herders with spring camps or provable established (but not licenced) use of pastures or wells that entitled herders with winter camp licenses to compensation; herders using the same pasture or wells as those compensated but outside the lines defined for entitlement to compensation, and any herders who can prove that their livelihood was damaged by people relocating into areas they had been using as a result of OT relocation.
- Herders in Khanbogd soum are semi-nomadic (moving to varying degrees from site to site during the year). OT land take, though substantial, accounts for a small proportion of the pasture land in Khanbogd soum. Therefore, it is in principle possible for herders to continue herding despite the presence of OT. In both 2004 and 2011 the compensation to herders

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included a mix of elements supportive of continued herding and compensation in the form of employment and education support for herders' children. We consider this a valid approach.

- However, in practice compensation appears not to have enabled all the displaced herders to transition to a sustainable livelihood (although the audit of 2011 compensation has not yet been conducted). Problems include issues with some replacement winter shelters and wells; with employment provided as part of compensation, and with the establishment of small businesses whether herding related or not. Over half the households that were compensated with a permanent job in 2004 do not now have a household member employed; while many of the larger number of households economically displaced have become dependent on the income from part time salaried work that was offered for 5 years only, and is now coming to an end.
- The 2004 compensation process did not comply with the 2012 IFC Performance Standard 5 in many respects.
- The 2011 compensation process was much improved, but was not compliant because it lacked an explicit and trackable Livelihood Restoration Plan and included inappropriate confidentiality conditions. Further the grievance mechanism, revised in 2015, lacks recourse to an independent mechanism.

In relation to questions raised by herders after the work was commissioned, we reached the following conclusions:

- Herders throughout the soum express anger and frustration about the changes that have taken place in their lives due in part to OT but also to other projects and changes that they feel powerless to influence. We have seen clear evidence of despair on the part of some, especially older, herders. The 2004 relocation caused distrust between herders and OT that remains today.
- Since 2011 OT has addressed questions of differential impacts on vulnerable people and the steps taken to address vulnerability are appropriate. However, information is lacking about implementation and results.
- Since 2011 OT appears to have identified tangible and intangible cultural heritage impacts, and the need to manage these in a sensitive and collaborative way, appropriately. However, we lack information on implementation and there were concerns expressed in the socio-economic survey about the impacts on the Bor Ovoo sacred site. Grievances about cultural heritage should be handled via the grievance mechanism. They are not issues of compensation.

4.4 Recommendations

In order to ensure impact assessments cover all planned developments of OT:

- OT should commission and disclose in advance of work starting the results of one or more supplemental ESIAs to IFC standards to identify and consult on any additional impacts (and impact mitigation measures) related to the underground mine project; the power agreement; changed plans for workforce accommodation; the railway construction; paving of the Khanbogd Soum to OT road, any significant changes to the project since the 2012 ESIA was published and update the analysis of cumulative impacts of other infrastructure and mining/oil projects.

In order to fill gaps in the herders who secured compensation in 2004 and 2011:

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- TPC should establish a Compensation Claims Committee (CCC) to opine on claims to be retrospectively included in 2004 or 2011 compensation.
- Herders in the groups listed in 'Recommendations: Compensation' should be entitled to present claims for compensation to the Compensation Claims Committee.

In order to ensure that compensation is capable of assisting herders move to sustainable livelihoods:

- Those households compensated in 2004 that no longer have a household member employed at OT should have the opportunity to have one person employed. After this is done, all the compensation agreements for 2004 should be clarified to state that there is no obligation on OT to permanently employ a member of these households through the lifetime of the mine.
- The winter shelters built in 2004 should be assessed and repairs made to any that are not adequate to shelter the number of animals for which they were built.
- The 2011 compensation programme should be audited and individual support programmes developed for any households that have not managed to restore their livelihoods.
- The temporary employment provided under the 2011 compensation programme should be continued for those still receiving compensation until the results of the audit are available. Note that any herders added to the 2011 programme as a result of the JFF must remain aware that the employment provided under this programme is temporary and designed to provide assistance as herders re-organize to take account of the impacts of OT.

5 2nd Phase Report: Undai River Diversion Complaint

5.1 Scope of the evaluation

- Whether the Haliv-Dugat river has been diverted or will be diverted in the future, and the potential cumulative impact of the diversion of Undai and Haliv-Dugat on the water and pasture resources in this region;
- Whether the tailings storage facility is currently leaking, the risk of such leakage in the future and what impact(s) such leakage would have on the Haliv-Dugat River or any other source of drinking water for the herders and their livestock; and
- The feasibility of modifying the Project's tailings storage facility or related monitoring and/or mitigation plans in order to avoid impacts on the Haliv-Dugat River.

5.2 Methodology

Hydrology

- existing reports and monitoring data were examined with particular emphasis on answering the questions outlined in the IEP Terms of Reference.

Social assessment

- field visits with joint site inspections in the target areas. Focus group discussions and key informant interviews with herders, local government and OT personnel, as well as with experts at national agencies.
- study to assess changes in livestock grazing (numbers) on pastures in the Haliv Dugat area, based on key informant and local government archive information on households and livestock type and numbers in the pastures of the study area.
- document review, focusing in particular on ESIA/DEIA sections concerned with cumulative impacts in the Undai River basin, and application of the approach to cumulative impact assessment as outlined in the IFC Good Practice Handbook.

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5.3 Conclusions

5.3.1 Hydrology

- The Haliv-Dugat River has been diverted and altered in several parts of the watershed. The river and/or its tributaries have been ditched, filled and blocked in several areas, due to mine and road infrastructure. This has changed the surface and groundwater flow in this part of the watershed. It is not possible to quantify the amount of change in the surface or groundwater due to insufficient pre-project monitoring of the hydrologic conditions in this part of the watershed.
- Seepage from the TSF has been documented. Most monitoring sites have intermittent or very little data, which makes quantifying the seepage difficult. The seepage collection system is designed to contain the seepage water within the Mine License Area (MLA) and it appears that the seepage has been contained within the MLA. In any case, the data that does exist suggests that the future monitoring program should be both thorough and vigilant.
- The prospect of modifying the TSF to avoid impact to the Haliv-Dugat River is not tenable due to the fact that the river has already been diverted and both cells are under construction and TSF Cell 1 is operational. There remain, however, some options for mitigation and monitoring that are outlined in the body of this report.

5.3.2 Social assessment

- The surface drainage in the Haliv Dugat basin has been affected by infrastructure developments including roads, quarries, the Tailings Storage Facility and diversion channels. This, and the loss of Haliv Dugat pastures to the MLA and other infrastructure, and resulting fragmentation as well as dust and noise pollution, has led to a concentration of livestock in other pasture areas. Herder households have moved into these areas either as a result of assisted resettlement, with establishment of winter camps, or are making seasonal use of these areas as they move away from lost, impacted and fragmented pastures.
- As a result, seasonal movements of herders are reduced, and summer grazing often takes place in the winter pasture. Herders' information and livestock data suggest that households in Haliv Dugat area have increased livestock numbers less than the overall increase Soum wide, and that they are focusing more on herding small livestock than large livestock. With areas permanently lost, it is not perceivable herding in this area can be restored to its previous state.
- Similar to the Undai River, where the Bor Ovoo spring and surrounding summer pasture were lost, the customary pattern of pasture use and livestock management of the herder community has been changed. With areas permanently lost, it is not perceivable that it can be restored to its previous state.

5. 4 Recommendations

5.4.1 Hydrology

- Expand and improve participatory water quality monitoring with OT, local government officials and herders. This could include an expansion of precipitation gage network, and additional monitoring wells downstream of the TSF. This should be done in the spirit of joint fact finding with the involvement of all parties in the water quality sampling process.
- Improve the integrity of the Haliv-Dugat diversion channel. This would reduce erosion and convey floodwaters of the Haliv-Dugat River more efficiently. This could be done using joint fact finding survey to assess the stability of the diversion and identify areas of excess erosion that could benefit from bank or bed hardening and reduction of ponding where appropriate.

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- Provide adequate drainage mechanisms such as culverts, arches or armored flood flow crossings, where appropriate, to reduce ponding and evaporation in the watershed. A review of these areas and potential mitigation techniques could be done jointly by TPC.
- Convene the Independent Technical Review Board (ITRB) to review the seepage and design modifications of the TSF and the potential for downstream impacts and report results to all parties.

5.4.2 Social assessment

- In general, IEP supports MDT recommendations. To the MDT- Component 1 recommendation on water point development soum-wide, IEP adds that wildlife/biodiversity – livestock conflicts be considered.
- Local government needs to re-establish a grazing system, to adjust for the lost pasture areas. It is recognized that this is a very difficult task, as key pasture areas (summer pasture) have been lost and not all the Soum's unused pasture is suitable due to the terrain and vegetation type.
- Local government (Soum and Aimag) should be supported by central government in these efforts by providing national experts and training; it will be important to increase ownership of this efforts – herders, local organizations, and government on all levels (Bag, Soum, Aimag, central government, and relevant professional agencies) need to carry this effort, as opposed to external actors (OT, foreign experts).
- While TPC has a crucial role in bringing stakeholders together, it is important that the existing institutions and structures of community and government are the key actors (i.e. bag meetings, bag representative khural, Soum khural etc., livestock unit, annual land use planning procedure etc.).
- ALAGAC's process of identifying resource use rights and of planning land and resource use with local government to document and secure customary use rights of herders could be used.
- Support for these programs could be provided from revenue generated through OT (taxes to central government, cooperation fund at Aimag level, others); the lender (IFC) could provide additional support while promoting local ownership of the process of planning and implementation.
- The issue of loss of local community's "Nutag" and of spiritual values remains. These losses will have to be addressed separately, and considered for community compensation.
- More detailed knowledge and transparency is needed on the increase of livestock. The IEP phase 2 study (and the previous CPR studies, 2012) suggest that affected households (both the officially recognized and those considering themselves affected) are mostly not the cause of significant livestock number increase; or that the rate of increase is much less than average. Rather, in general, they are adjusting their livestock number and type. The question of absentee livestock ownership in particular should be further investigated, in order to get a better understanding of the growth of livestock numbers and pasture pressure.
- IEP has noted earlier that no records on abstraction prior to 2007 are available. IEP has also made efforts in phase 2 to locate and access data, at local government and the Ministry for Environment and Tourism, but was informed that the data do not exist (at local level) or cannot be shared (by experts at the Ministry). Under this circumstance, experts cannot quantitatively assess impacts over time; in order to make progress, existing data need to be made available.
- Review the categories of affected households for compensation, - see IEP Phase 2 Report, Part 2 for suggested categories and MDT Component 2 for the process.

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- Names of households affected in different ways were provided in this report (IEP Phase 2 Report, Part 2) to the best judgement of the expert, though the list is not considered complete. The names are provided based mostly on information received in group discussions, with consensus of discussants. A review of the names is recommended, by a team of individuals elected by TPC (or through a process with broader participation).
- Organize discussions with Haliv Dugat households named in IEP Phase 2 Report, Part 2 on livelihood support strategies (similar to consultations with 59 households after IEP Phase 1 report)
- Assess options for fodder growing/production (lessons learnt, information available from programs implemented in other Soums in South Gobi, Uvurkhangai and Bayankhongor, namely the project "Sustainable Land Management Project for Combating Desertification" implemented with UNDP support in arid and semi-arid areas in Mongolia.
- OT should rehabilitate any disturbed/abandoned sites as soon as possible, in order to make pasture available again as soon as possible, to shorten time of dust generation from disturbed sites and minimize risks of accidents in quarries

6 Overall conclusions

6.1 MDT/IEP studies

The MDT and IEP joint fact finding work has generated a very substantial amount of information, many conclusions and many recommendations. The recommendations are mainly addressed to OT because the impetus for these studies was complaints about OT impacts. However, we find that there are important findings for all parties.

In reviewing all the findings, we draw four overall conclusions.

- Inadequate understanding of nomadic herding in Khanbogd soum by OT (and predecessor IMMI) since the initial days of exploration lead to a series of missteps with respect to compensation and understanding of the water resources used by herders and an underestimation of impacts on herders. This has been compounded by a failure by IMMI/ OT to collect adequate baseline information and to implement thorough monitoring programmes (and on-going analysis and communication of the results of monitoring). As a consequence, some herders who should have been compensated have not been compensated and due to the absence of baseline data, it is impossible to reach a definite conclusion on whether, and to what extent, OT has damaged herder water resources. This means that it will be very difficult to change the widespread view of herders across the soum that the water available to them has declined, and that OT is primarily responsible for this. Given OT commitments not to affect herder water, we conclude that OT should invest in constructing additional water wells to open up new areas for herding as well as extend the set of herders entitled to compensation.

- Herding practices and livelihoods in Khanbogd soum have changed since 2003. In particular, some herders are moving less; there are growing inequalities in wealth; more split families, and widespread debt, including for vehicles that are expensive to buy and run. Some of these changes are due to the presence of OT, but other changes reflect patterns common to herding communities throughout Mongolia, including herder's preferences, or other recent developments in the soum such as the coal road and the railway which fragment pasture. Some herders are prospering and enjoying new opportunities, e.g. for employment and business; others are struggling. We identified no clear pattern that links success, or

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problems, systematically with impacts of OT except in the Undai River area. However, some herders attribute most of their problems to OT.

- It is important that a soum wide strategy for pasture management is developed, resourced and implemented in the context of competing demands on land and water not only from OT and larger herds, but also from infrastructure, conservation areas and expansion of the soum centre. Pressures on pasture are likely to increase, making a forward-looking strategy essential.

- There is now an opportunity to move forward in a constructive way. The recommendations of the MDT/IEP studies address gaps in compensation, monitoring and communications between OT and herders in Khanbogd soum. TPC provides a forum for resolving compensation related claims and for discussion between herder representatives, OT and the soum. The 2015 Co-Operation Agreement provides for a substantial and long-term flow of funds that can focus on water and pasture for spending under the agreement; a set percentage of funds should go to Khanbogd for 5 years. This complements the soum's long term livestock sector plan that sets out a strategy to enable herding, mining and infrastructure to co-exist.

6.2 Additional observations

The MDT team has spent a significant amount of time in research and fieldwork. As a result, we have a number of observations that we consider may be of interest to TPC and others on points that were not specifically covered in our terms of reference. The observations below are offered as points that the parties may wish to follow up as their work goes forward.

- Employment at OT – is it possible to locate more jobs currently based at the mine site in the soum centre, and to have more of the jobs located at the mine scheduled on a normal working week pattern rather than the rotational schedule, for example, administrative roles, support roles –cafeteria, cleaning? This could make employment for local residents less disruptive of family and household patterns.

- Carbon. The potential benefit of carbon (CO_2) offsets can be explored with OT/Rio Tinto pioneering carbon credits or voluntary offsets from the Khanbogd environment. Deserts are scientifically identified as large carbon sinks, sequestering CO_2 below ground. Thus the carbon market may pay the community for offsetting CO_2 provided by the soum's arid land, or the sequestration can serve to offset Rio Tinto's carbon production elsewhere.

- All of the impact assessments and related studies have identified the need for a comprehensive land use and infrastructure plan for Khanbogd soum (and potentially the wider South Gobi region) given the importance of mining, transport and herding co-existing in a mutually beneficial way. However little has happened on the ground. Is there a role for IFC (given the investment in OT) and the World Bank Group (given its previous work on sustainable pasture management)[7] - to use their knowledge, resources and leverage to accelerate effective development and implementation of regional land use and infrastructure plans?

[7] Third Sustainable Livelihoods Project. $36.2 mln. - http://projects.worldbank.org/ P125232/third-sustainable-livelihoods-project?lang=en)

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- The impact assessments for OT demonstrate weaknesses that are common to impact assessment for large scale projects of many different types and in many different locations.
    - Expert assessments are made of different aspects, such as air, water, soil, land use and impacts on communities and biodiversity are identified, but the results of the individual assessments are then not examined holistically. Taking the example of OT and herders, what is missing is a section in the impact assessments that asks overall what are the combined impacts on herders of all the impacts identified, drawing relevant information from each of the relevant sections. This final step would, we suggest, enable potential problems and grievances to be identified before they happen and more effective mitigation measures to be implemented.
    - Social surveys do not fully capture nomadic/semi-nomadic populations because they are not conducted at enough different points in time or locations to identify all the various land users and ways of using land that might be impacted by a project.

7 Compendium of recommendations

The tables that follow draw together the recommendations of each of the studies. The recommendations are organized according to the following thematic headings to assist TPC and the parties agree their next steps:

- Recommendations relating to pasture
- Recommendations related to water and management of OT impacts on water resources
- Recommendations related to monitoring, reporting and community relations
- Recommendations relating to compensation.

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Recommendations relating to pasture

1	Local government needs to re-establish a grazing system, to adjust for the lost pasture areas. Soum should encourage traditional herder mobility and open access to water and land and reduce actions by herders to restrict access to wells and land. New and additional pasture can be opened through the well building programme. Herder rights to possession need to be clarified and implemented. Local government (Soum and Aimag) should be supported by central government in these efforts by providing national experts and training; it will be important to increase ownership of this efforts – herders, local organizations, and government on all levels (Bag, Soum, Aimag, central government, and relevant professional agencies) need to carry this effort, as opposed to external actors (OT, foreign experts). While TPC has a crucial role in bringing stakeholders together, it is important that the existing institutions and structures of community and government are the key actors (i.e. bag meetings, bag representative khural, Soum khural etc., livestock unit, annual land use planning procedure etc.). For example, herders should also consider how they can address problems related to herding but not to OT, such as increased use of vehicles and vehicle damage to pasture and the practice of locking wells, for example, by reviving or strengthening traditional mechanisms for dealing with disputes about land and water. Use the Agency for Land Affairs, Geodesy and Cartography (ALAGAC) process for identifying resource use, rights and land planning in conjunction with local government to document and secure customary herder use rights. Support for these programs could be provided from revenue generated through OT (taxes to central government, cooperation agreement at Aimag level, others); the lender (IFC) could provide additional support while promoting local ownership of the process of planning and implementation. More detailed analysis is needed of increases in livestock numbers and absentee livestock ownership.
2	Animal crossing areas on the OT road should have speed bumps on both sides of the crossings to slow down traffic. This will be particularly important as construction traffic ramps up and when production increases and will alleviate fragmentation effects
3	OT should rehabilitate any disturbed/abandoned sites as soon as possible in order to make pasture available again as soon as possible, to shorten time of dust generation from disturbed sites and minimize risks of accidents in quarries.

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Recommendations relating to water

1	OT should provide collective compensation in the form of a programme to construct new shallow hand wells that are not lockable (such as the concrete shallow wells recently constructed by OT). • The wells should be dispersed across the 4 baghs to encourage migration and use of alternate pastures and give the means for herders to continue customary livelihood practices. • The location of new wells should be based on groundwater studies to ensure productivity and ensure that new wells do not affect existing wells and herder preferences including concerns about impacts on, or from, wildlife. OT and the soum should collaborate to set up a team of people (ideally a mix of full time and part time workers) to build, repair and monitor the condition of wells. Funding should be sought from the Co-Operation Agreement.
2	OT and the soum should set up a well maintenance system for existing herder wells in the soum and those proposed above: we recommend that for a period of at least five years this is funded under the Co-Operation Agreement.
3	OT should monitor and model a sample of the alluvial aquifers at geographically distributed sites and undertake a hydrological study focusing on alluvial resources that quantifies as far as possible OT's past, current and predicted future impacts. This will provide better understanding of shallow groundwater dynamics on which the herders depend, strengthen modelling and in the future can measure changes in water resources.
4	Water delivery to herders is a temporary measure that should gradually stop. Over an agreed timeframe the water resources around each site to which water is currently delivered should be assessed. If there are existing functioning water wells then the delivery programme can end; if there are no wells, then one should be constructed as part of the proposed well building programme.
5	OT should improve the integrity of the Haliv-Dugat diversion channel to reduce erosion and convey floodwaters of the Haliv-Dugat River more efficiently. This could be done using joint fact finding survey to assess the stability of the diversion and identify areas of excess erosion that could benefit from bank or bed hardening and reduction of ponding where appropriate.
6	OT should provide adequate drainage mechanisms such as culverts, arches or armored flood flow crossings, where appropriate, to reduce ponding and evaporation in the watershed. A review of these areas and potential mitigation techniques could be done jointly by TPC.
7	OT should convene the Independent Technical Review Board (ITRB) to review the seepage and design modifications of the TSF and the potential for downstream impacts and report results to all parties.

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Recommendations related to monitoring, reporting and community relations

1	The environmental monitoring programmes for herder wells, dust and pasture/vegetation should be redesigned and reorganised in order to provide robust long-term data credible to herders and others. • Programmes should be suited to herding practices to enable participation; be verifiable by herders, and be designed and implemented using a joint fact finding methodology to ensure scientific rigour, accessibility and credibility. • Local monitoring should replace outsourced monitoring. • The programme should include: • herder well water (quantity and quality) • additional monitoring wells downstream of the TSF • dust • vegetation/pasture quality. NB - For vegetation monitoring, fenced plots are recommended. The fenced sites should be established in cooperation with herders and soum officials. • soil moisture • expansion of the precipitation gauge network. Genuine involvement by herders is essential to monitoring success and a herder responsibility in the process.
2	Progress with any new compensation, e.g. resulting from JFF recommendations, should be monitored with information presented quarterly to TPC, i.e. applications made to the Compensation Claims Committee; applications accepted; compensation agreements reached; compensation delivered
3	OT should produce regular reports on the results of monitoring - and any actions taken or proposed as a result of monitoring - and present these regularly to herders and others in the community. • Information should be direct, understandable and relevant to herders, reports to the soum should be comprehensible to staff. • Methods used at other Rio Tinto sites, such as real time dust monitoring data for Pilbara, Australia should be applied in Khanbogd.[8] • OT should present findings at the bag centres throughout the soum as well as in the soum centre.
4	OT should produce an annual report to Khanbogd that presents information on the past year's performance and plans for the coming year, covering local economic impacts including employment, local taxes and fees paid, local procurement; environmental impacts - monitoring and management programmes and the related data, and social performance including compensation programmes, support for vulnerable people, training and business development, Co-operation Agreement projects, donations etc. This should be published in the Mongolian language in a form which is accessible to herders.
5	Create an expanded community relations team. The team should comprise trained people whose role includes ensuring effective two-way communication between OT and herders (as well as others in the community). This would include participating in formal meetings, for

[8] riotinto.com/documents/FAQ_air_quality_monitoring.pdf

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	example, bagh meetings, and maintaining close contact with the local administration and elected officials; regular contacts with people in on-going compensation programmes, including identified 'vulnerable' people, but also informal contacts established by spending time travelling around across the soum. The community relations team also need strong enough links within OT to be able to provide herders and other local residents with up-to-date information about OT activities (and during construction especially, the activities of contractors working outside the MLA such as who is working where, and for what period of time and how recruitment is being done), and be able to communicate back into management any concerns and issues they become aware of.
6	OT should commission and disclose in advance of work starting the results of one or more supplemental ESIAs to IFC standards to identify and consult on any additional impacts (and impact mitigation measures) related to the underground mine project; the power agreement; changed plans for workforce accommodation; the railway construction; paving of the Khanbogd Soum to OT road, any significant changes to the project since the 2012 ESIA was published and update the analysis of cumulative impacts of other infrastructure and mining/oil projects. Assessment should consider if paving the soum centre to OT road will create additional and faster traffic that would limit animal movements.
7	OT and other TPC members should clarify the options for recourse to an external body in the grievance mechanism; communicate and consult on the current grievance mechanism with herders and others in the community; revise the mechanism as necessary, and encourage people with complaints about OT to use this mechanism.

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Recommendations on compensation

1.	OT should acknowledge to herders that there were problems in the approach used to relocation by IMMI in 2004, particularly in communications.
2.	TPC should establish a 3-person 'Compensation Claims Committee' comprising one person from each of the herder group, the soum and OT supported by an independent secretary such as CAO to decide if herders in the categories listed in recommendations below are eligible for compensation under the 2004 or 2011 programmes.
3.	The Compensation Claims Committee should establish procedures that include: • Screening applications for compensation to check they are potentially valid, e.g. the herder was registered in the soum at the relevant date, 2004 or 2011. The Committee may decide on other screening tests. • Requiring claims for compensation to be supported by evidence. For example: o Registration in the soum as a herder in 2004 or 2011 as relevant to the claim being made, and, o A winter camp registration or lease for the relevant area, or o A spring camp registration or lease for the relevant area, or o Well registration for the relevant area, or. o In relation to claims to have been using pasture and water in or just outside the 2004 or 2011 compensation zones by herders without camp registrations, evidence may include statements from the soum authorities and local consensus; evidence of livestock (ownership from soum records; soum maps etc.

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4.	In relation to eligibility for 2004 compensation, herders in the following categories should be entitled to present claims (supported by evidence as listed above) to be included retrospectively in 2004 compensation: ○ Any households with winter camps within the area designated for relocation in 2004 but not included in the compensation programme because they were not present at the time that surveys were done or agreements negotiated. ○ Any households with spring camps within the area designated for relocation in 2004. ○ Any herders with winter or spring camps close to, but outside, the compensation zones that were similarly affected as those compensated. I.e. where they can provide evidence that at that time they were using the same pasture and water wells as those who were compensated. ○ Families that were sharing a winter camp site but did not receive any compensation. ○ Households with camp registration who were not present at time of compensation. ○ Households registered with the soum as using pasture and water in or just outside the 2004 compensation zone without a camp registration, and affected by the loss of the same pasture and water wells as people who were compensated. ○ Herders with established winter and/or spring camps in areas that others herders relocated to under the 2004 resettlement programmes, and who can demonstrate that their access to pasture and water was negatively affected by this relocation.
5.	In relation to the content of 2004 compensation: • Each of the replacement winter shelters should be assessed by the Compensation Claims Committee (or a sub-committee) to determine if they are adequate for the number of animals held by the household at the time of compensation (this number is recorded in each compensation agreement). Where the shelter is not adequate, it should be repaired or replaced by OT to make it adequate. • Those households compensated in 2004 (including any additional households added to the list as a consequence of the process set out above in Section 6.2) that do not currently have a household member employed full time in OT because the people originally appointed lost their jobs should be offered the opportunity of employment for one family member in underground construction (this will be temporary) or mine operations. Note: This depends on there being a household member who is capable and qualified for employment and meets OT employment criteria. The compensation agreements should also be clarified to establish that OT has no obligation to employ another family member once the employment of the existing employees is finished whether by retirement, resignation or dismissal etc.; however, members of herder households are able to apply for employment at OT and will be considered alongside other applicants according to OT's recruitment policy.

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6.	Herders in the following categories should be entitled to present claims to the Compensation Committee to be included in 2011 compensation: • Herders with camps close to, but outside, the compensation zones that were similarly affected as those compensated. I.e. where they can provide evidence that at that time they were using the same pasture and water wells as those who were compensated. • Holders of Spring licences in the compensation zone at the time of the 2011 compensation or with spring camps close to, but outside, the compensation zone who were similarly affected, i.e. where they can provide evidence that at the time they were using the same pasture and water wells as those who were compensated[9]. • Any herders who can provide evidence that they were using the same pasture/wells as those who were compensated but do not have camp licences. Evidence might include records showing the location of households such as well passports, hand-drawn maps, or other kinds of registration materials which pre-date the camp license era. • Households that were sharing a winter camp site that was included in 2011 compensation but did not receive any compensation.
7.	In relation to the content of 2011 compensation: • OT should commission an independent audit of the implementation and results of the 2011 compensation programme • OT should develop tailored programmes to assist any the households compensated in 2011 that have not succeeded in restoring their income to that prior to displacement - where the reduction in income can be attributed to economic displacement by OT. • Build a team of well building, well maintenance and monitoring technicians to implement the well building programme recommended by the Component 1 study. (See Recommendation on Water.) Priority for employment in this team should be given to members of the 2011 compensated households that have not succeeded in restoring their livelihoods as long as there are members of these households capable of, and interested in, doing this work. • Recognising that Khanbogd soum is a challenging area in which to establish businesses because of its isolation and small population, OT should continue supporting consultants to work with herders to develop proposals for funding for herding related and other businesses under the Co-Operation Agreement.
8.	OT should cancel the confidentiality clauses in the 2004 and 2011 compensation agreements so that those who have been compensated are able to disclose information if they choose to do so.
9.	In relation to impacts on the Undai River system organize discussions with households named in the IEP2 report on livelihood support strategies (similar to consultations with 59 households after IEP Phase 1 report). A review of the names of households identified by the expert should be undertaken by TPC or through a process with broader participation.
10.	We recommend remedying a suite of OT impact issues, including interconnectivity and fragmentation, through community compensation. Specifically, a programme to build a series of shallow hand wells should be undertaken by OT in coordination with the Soum and

[9] The herder group have requested in their comments to the draft report that the impact zone be extended by 5kms to address impacts to herders close to but outside the existing impact area. We think that putting another arbitrary boundary is not the correct solution and that herders who consider that they were impacted because they were using the same wells or pasture as those who were compensated should make their specific case to the proposed 'Compensation Claims Committee'.

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Abbreviations

ALAGAC	Agency for Land Affairs, Geodesy and Cartography
CAO	Compliance Advisor Ombudsman
CCC	Compensation Claims Committee
IEP	Independent Expert Panel
IFC	International Finance Corporation
IMMI	Ivanhoe Mines
ITRB	Independent Technical Review Panel
JFF	Joint Fact Finding
MDT	Multidisciplinary Team
MLA	Mine Licence Area
OT	Oyu Tolgoi
NGO	Non-governmental Organisation
TOR	Terms of Reference
TPC	Tripartite Council
TSF	Tailings Storage Facility

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Photo Log
Photo Log
MDT Team Joint Fact Finding

Interviewee

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Livestock inspection

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Water measurement

Drone

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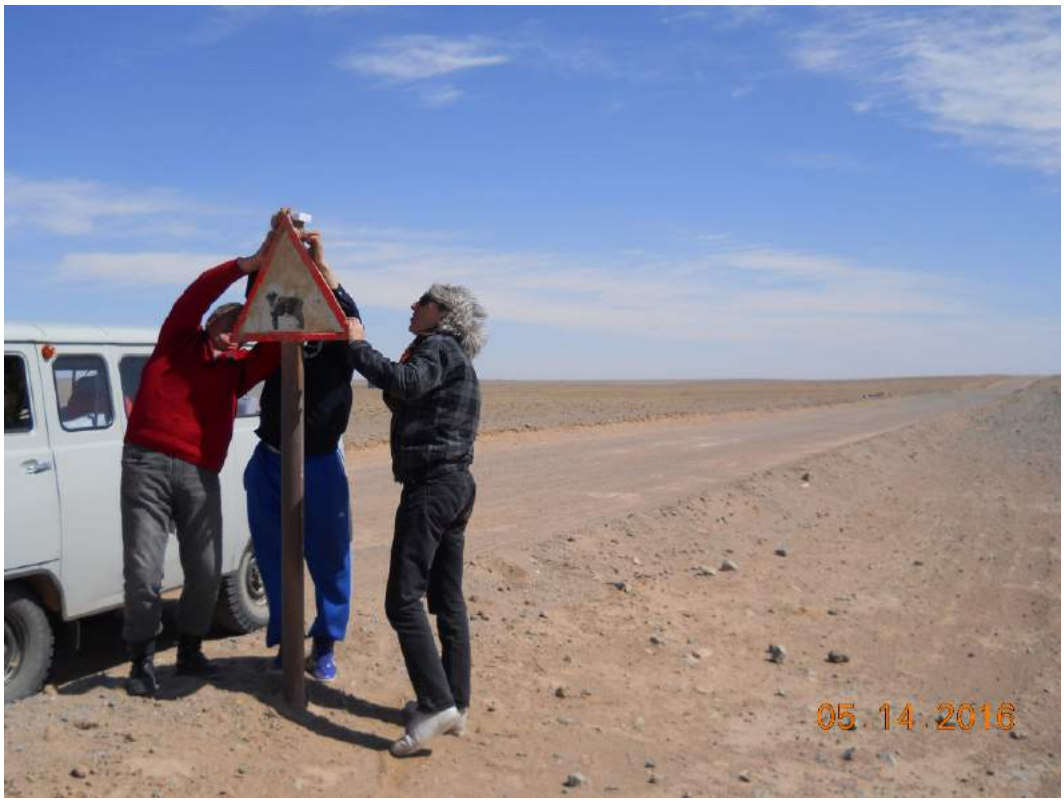
Surface water, Bayan Bagh



Placing dust trap

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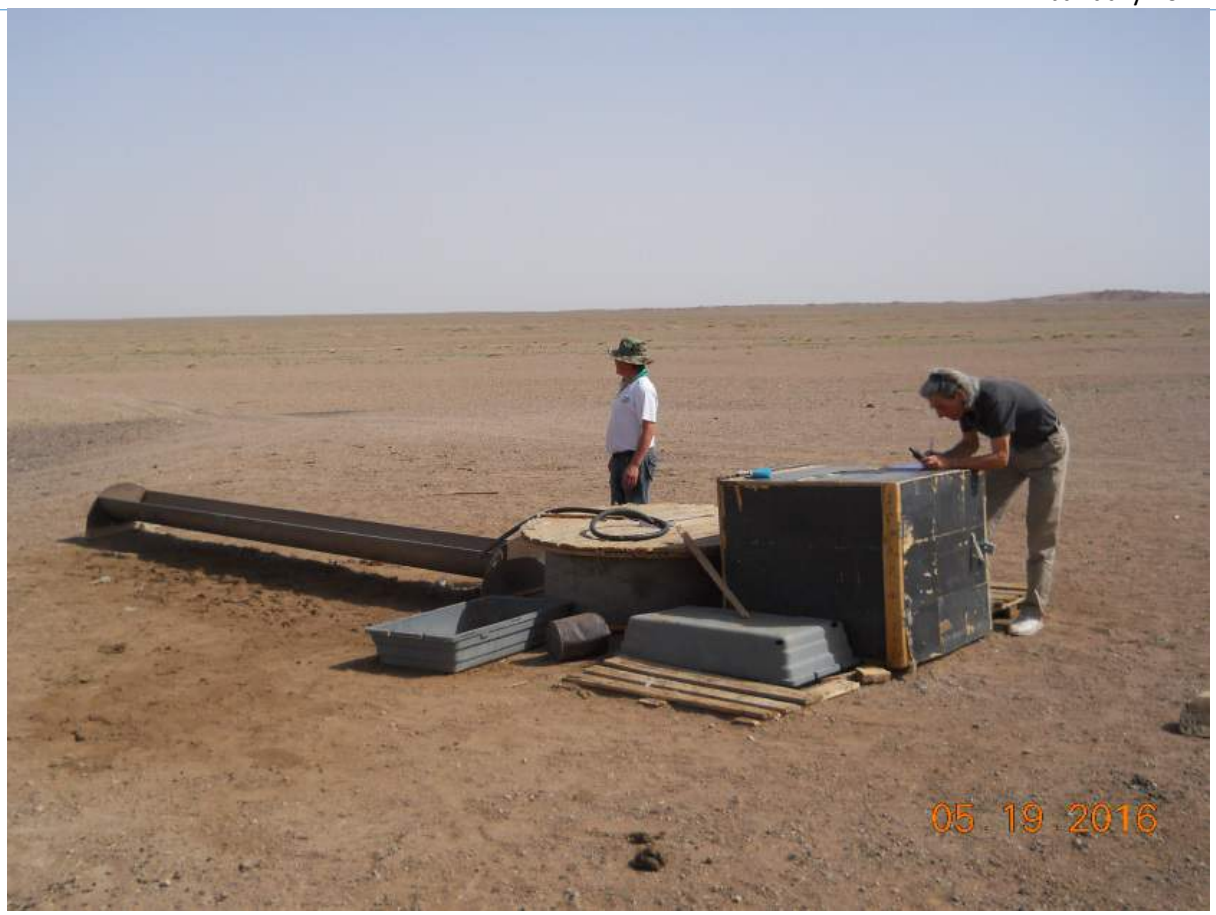
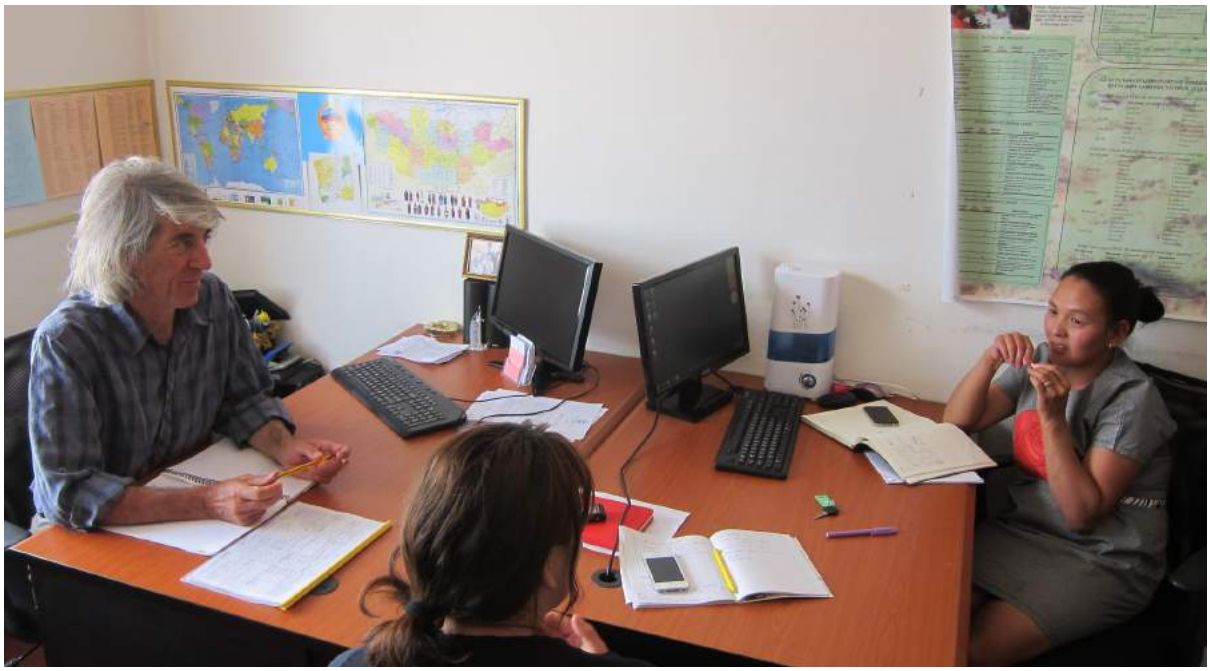


Locked well



Soum government

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Qatari Wildlife Reserve

Coal trucks waiting at the border

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JANUARY 2017

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Part 1: Evaluation of the quality of and access to pasture and herd water

Part 2: Analysis of changes over the past decade to herder assets and livelihoods

Part 3: Compensation Programme Review

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1 Introduction

This report addresses the following questions:

- The changes to pasture and herder water in Khanbogd Soum since 2003
- What part of these are due to OT, and what is the capacity of pasture and herd water to bear future impacts caused by OT
- What is needed to preserve/restore ecosystems and enable the continuation of traditional herding.

The full terms of reference for this component are shown in Appendix 1.

1.1 Approach

The terms of reference for this component indicated that much of the information needed is available in existing reports (secondary sources) but that additional fieldwork should be conducted as needed to supplement the reports. In practice we drew on a wide range of secondary sources in addition to OT documents, and conducted extensive fieldwork as well. Fieldwork assessed conditions in May-July 2016; secondary data enabled expanded environmental interpretation and insight into past environmental conditions.

- Secondary sources included climate data[1], remote sensing for satellite identification of historical vegetation cover,[2] additional climate records[3] and dust observation[4], OT and lender-mandated reports[5], other relevant research and work relating to the environment, government data and interviews[6].
- Fieldwork to collect new data included vegetation transect evaluation, water source assessment, dust monitoring, environmental observation (covering 3,500 kilometres), herder environmental and livestock surveys and comparison with herding conditions in Manlai Soum. Detailed results of the fieldwork are shown in Appendices 3-9.
- A herder environmental and livestock survey.

2 DETERMINE CHANGES TO KHANBOGD SOUM PASTURE SIZE, PASTURE QUALITY AND HERD WATER

2.1 Context

[1] Retrieved from soum and OT

[2] MODIS (NASA)

[3] Climate Research Unit, UEA, UK. See Harris et al. 2014

[4] Aerosol Product MOD-4, NASA

[5] Listed in Appendix 2

[6] Appendix 2

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2.1.1 Climate and Environment

Climate frames the herding environment with traditional pastoralism coping with environmental scarcity through adaptation, mobility and effective livelihood strategies. As Mongolia has developed herding has transitioned from customary practices to the organised, controlled Negdel approach and now to an independent, market economic based system. As livelihood approaches, technology, vehicles and development have transformed herding, the environment has remained a desert. Climate impacts on pasture and water remain the most important factor determining pasture vegetation, water resources and availability and drought and dzud events.

Khanbogd Soum averages 95.3 millimetres of precipitation per year (soum data). This results in low vegetation levels, little moisture, limited recharge of groundwater and high evaporation in summer. High climate variability both within and between years are standard conditions (Figure 1).

Mongolia's National Agency for Meteorology, Hydrology and Environmental Monitoring identifies dramatic climate change in Mongolia with a 2^0 C temperature warming since 1940, melting permafrost, variable precipitation and increasing extreme drought and dzud disasters[7]. Conditions in Khanbogd are similar to climate trends across the country; the soum is experiencing a 40-year warming trend and a slight increase in annual precipitation (Figure 1) (Appendix 3).

Summer rainfall is critical to plant growth and hence fodder for animals. Using a gridded global dataset[8] (figures, Appendix 3) precipitation data for Khanbogd Soum (broken down into 6 zones) and Manlai Soum (3 zones) shows:

- slight differences between climate parameters across the region.
- Khanbogd soum has experienced high rainfall years (2003, 2008, 2010) and droughts in 1989 and 2012.
- Across 6 zones Khanbogd Soum climate is similar over time (Appendix 3).
- Since 2002 the precipitation trend has been slightly positive (Appendix 3).

Focused on June, July and August from 1960-2013, the data provides a clear record of summer rainfall over time in greater detail. Particularly important is the timing of precipitation for plant growth and thus fodder for animals. In May and June, 2016 there were several rainy days (64 mm) which affected pasture productivity (Climate, Appendix 3). As one herder remarked, 'you can't count this year – there is too much rain.' This acknowledges the primary role of climate affecting the environment.

[7] NAMHEM. Second National Communications, UNFCCC. 2010.
[8] Harris et al. 2014

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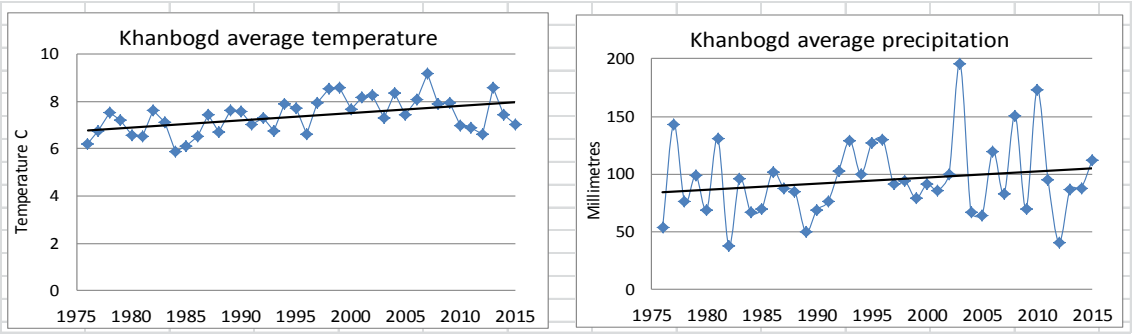

Figure 1. Average annual precipitation and temperature in Khanbogd Soum, 1976-2014. Source: Khanbogd Soum.

2.1.2 Livestock Numbers

According to soum data, the number of livestock in Khanbogd Soum increased significantly from 2003 to 2015.

- Total number went from 53,346 to 133,013[9], an increase of 149%.
- Using the Sheep Equivalency Unit to combine big and small animals (camel = 7 sheep, horse, cattle = 6 sheep, goat = 0.9 sheep)[9]. Livestock density increased significantly; by 2015 this is equivalent to 321,160 sheep in the soum.

The increase in livestock and big animals has a direct impact on pasture and water resources.

- more vegetation and water is consumed by livestock.
- intensified livestock practices
- concentration at water points
- competition for herding resources

Increased animal numbers results in greater pressure on water and pasture resources. Higher livestock numbers require more water, reflected in more water withdrawal. Livestock in an area can lead to over-grazing of the limited pasture vegetation. Stressed water supplies, longer well refill time and perception of water shortage can result from increasing the number of animals. All baghs show expanded livestock numbers, reflecting the soum-wide trend. The impact is similar both close to the MLA and away from the mine site (Appendix 4).

Traditional Mongolian herding adapts the number of livestock to environmental conditions. Mobility and changing herd numbers and composition have been key livelihood strategies, emphasising the benefit of open pasture access. Today socio-economic factors play an important part in herder livestock decisions and lead to a transition in decision-making and pastoral practices. The MDT was told in a bagh meeting that 'we need water for our number of animals'; this reflects a change away from naturally-determined animal numbers. The on-the-ground implication is that more water and forage is needed for the new number of animals. Whilst

[9] Soum data, 2015
[10] Sternberg 2012

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desirable for herders, that ignores the limited capacity for the soum or herders to build new wells. The desire for water points to satisfy additional livestock demand is not a result of OT action. The process highlights how OT is expected by some members of the community to perform functions that are the role of the state. The 2016-2025 soum livestock development program plans to create and rehabilitate water infrastructure (wells, storage, pumps), conduct grazing studies and implement a pasture management plan[11]. We note the translation of 'adequacy' from Mongolian to English (physical access vs well resources) in the Terms of Reference has led to some confusion.

2.2 Pasture

2.2.1 Pasture assessment

Pasture evaluation through fieldwork and remote sensing investigated how vegetation dynamics changed over time. Our focus was to assess pasture and identify if physical factors related to the Oyu Tolgoi mine have affected vegetation.

- Vegetation cover in Khanbogd Soum was examined at twelve vegetation transects (Figure 2 below). Each transect was conducted at a water source to determine plant density, composition and nutritional value for animals in an area used by herders.
- Remote sensing satellite data was used to establish and interpret vegetation and land use patterns from 2003-2015 (Appendix 6). In drylands vegetation is driven by precipitation, thus pasture results are closely related to climate.

2.2.2 Vegetation transects

At 12 randomly selected water wells data were collected along 1 kilometre (km) transects. All transects were conducted north of the well. Vegetation measurements were taken at 25, 50 100, 200, 500, and 1,000 metres (m) from the water source to identify cover as a function of distance from a well. At each distance a 50m section of pasture was examined. Percentage of plant basal cover for each meter along the line was recorded as a measure of plant density. At each site plant species growing along the transect were collected to establish species composition and animal palatability (Appendix 5). 2016 was a particularly rainy year, including several days in May when the MDT was conducting fieldwork. This would be expected to lead to higher cover than other years.

The transects found:

- low vegetation cover across soum sites, averaging 6.2 to 8.4% cover in 12 sites (Figure 2).
- Site 9, northeast of the soum centre had higher coverage whilst sites near the MLA were similar to more distant sites.
- These results reflect environmental factors, precipitation and land use (discussed below). It is also important to note that the surveys were conducted in May; if done in July or August, the results may have varied.
- The findings were lower than assessments done by OT where documents report cover of

[11] Khanbogd Soum Livestock Sector Sustainable Development Program, 2015.

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8-25% and higher across selected sites[12,13,14] .

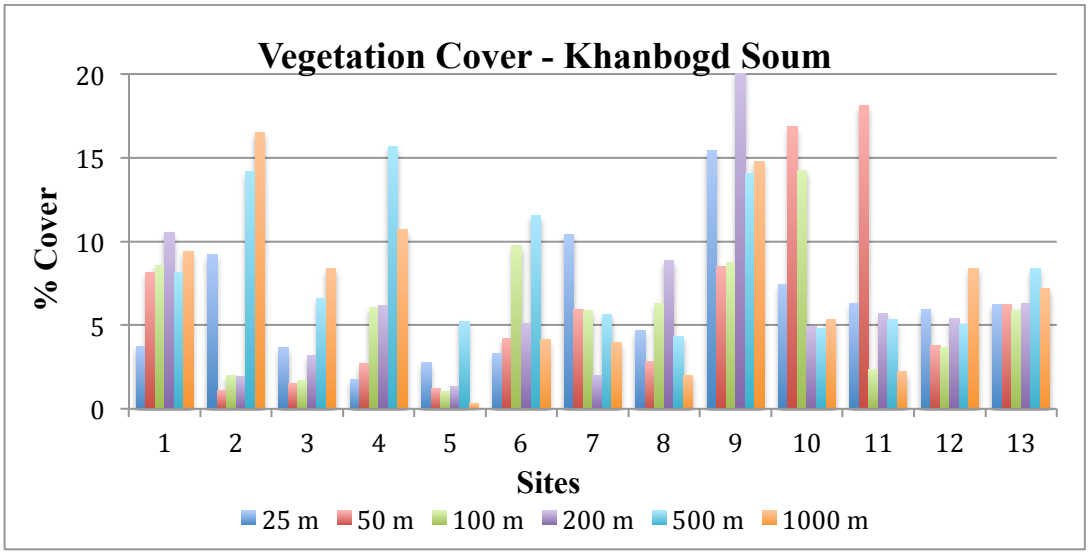

Figure 2. Vegetation cover at 12 transects in Khanbogd Soum.

2.2.3 Remote Sensing

Remote sensing using MODIS[15] data presents a history of pasture vegetation from 2003-2015 in Khanbogd Soum. The focus was on important sites – OT north entrance, Khanbogd Soum and bagh centres. Results provide an assessment of changes in land use, degradation, shifts in vegetation and evaluates if additional area has been removed from pasturage due to mining activities.

The data shows relatively high vegetation cover in 2003, 2008 and 2010, matching with above average precipitation. Similarly, low rainfall in 2012 was coupled with very low pasture vegetation levels. The variability shown on NDVI maps highlights the changing landscape from year to year. (Appendix 6). We conclude that the main impact on vegetation cover is from rainfall.

2.2.4 Pasture Quality

Several points are relevant to understanding pasture quality.

- Nutritional quality. The May 2016 transects identified plant cover and types of and found that most plants were palatable (edible) for animals.
- The number of animals. This affects grazing pressure and pasture productivity. Livestock numbers in the soum doubled from 2003 to 2015 (Appendix 5), having a resultant impact on pasture use and productivity.

[12] OT Non-Technical Summary ESIA 2012, p72.
[13] DEIA 2006, p. 263.
[14] Wildlife Conservation Society. Core Biodiversity Monitoring, 2016, p70.
[15] MODIS (NASA): modis.gsfc.nasa.gov/data/dataprod/mod13.php

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- Current OT activities – the current impact on pasture is minimal as activity and vehicles were confined to the MLA and related infrastructure. There was no evidence of action detrimental to pasture; past impact on herders is addressed in Component II and the work of IEP.
- Assessing biomass and soil moisture were not in the Terms of Reference nor in the work plan and were thus not assessed.

Additional factors affecting pasture reflect human decision-making by the soum government and herders. The government role includes the assignment of herder camps (predominately for winter and spring), well access and maintenance, facilitating mobility and access to pasture resources, limiting possession and de facto ownership, such as locked water sources, conflict avoidance and resolution and clear organisation/responsibility for several important factors affecting herding pasture use. Examples include the Tavan Tolgoi road, the railway, roads and tracks, distribution of fodder during emergencies and the Qatar wildlife reserve (extensive fenced exclusion zone east of the soum centre), the strictly protected area, other road works and activity of companies. Herders affect pasture through number and type of animals, migration and otor, concentration at wells, herding additional animals for others and labour issues that favour income through number of livestock rather than maximising income per animal. A combination of the above factors affects pasture productivity. Contrary to expectation, grazing levels were visually higher near the MLA, indicating herders find this a viable area. Again, 2016's high rainfall points to the dominant role of climate affecting pasture.

OT supported the development of 14 herder cooperatives and pasture user groups to improve pasture use and herding practices[16]. The initiative was to provide administrative support to herders in similar environments to address livelihood pressures and issues and develop land use plans. There was no on-the-ground evidence of externally-supported user groups or related productive pasture and water management outcomes.

2.2.5 Land Fragmentation, Infrastructure

Land fragmentation near the MLA has a detrimental impact on herder access to land in the area. The fracturing of a larger area, beyond individual factors (i.e. a road or the airport), is disruptive to herding[17]. The combination of OT-related infrastructure in one area creates an exclusion zone that is an impediment to herding in the area and breaks up customary pastoral patterns and local land use. This is most pronounced northeast of the MLA where infrastructure has reconfigured the environment:

- Khanbogd road; airport road; airport; Gunii Hooloi (GH) road; GH pipeline
- Graded and paved roads divide the pasture and can serve effectively as a restriction to animal movement. Herder vehicle tracks, found elsewhere, do not have similar impact.

The OT road from the mine to the border also divides pasture and creates difficulty for livestock and wildlife to cross. Locals state that animals can be hesitant to attempt to cross the road and

[16] Oyu Tolgoi Pastureland Livelihoods Improvement Strategy 2013.
[17] Oyu Tolgoi Socio-Economic Impact Assessment Final Report. 2009.

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that camels and wildlife are most likely to cross late at night. Animal crossings exist, yet as a herder said, 'animals cannot read the signs'. OT states there have been no herder livestock mortality on the road whilst a herder claims camels were killed on the road. The greater point is the limited effectiveness of the animal crossings as observation shows no reduction in speed by vehicles passing animal crossing zones.

2.2.6 Drone

A drone (flying aerial vehicle with photographic capacity) was used to provide aerial assessment of pasture, water and environment. The aim was to identify vegetation density and patterns, map physical landscapes, study livestock patterns at water sites and evaluate degradation in the vicinity of the mining exclusion zone, wells and settlements. However, poor weather conditions interfered with the drone work. Several days of rain and high winds prevented safe flying of the drone. Several attempts were ineffective, resulting in spectacular crashes but no photographic data for assessment.

2.2.7 OT land requirements

The land area disturbed by OT is estimated at 200 km^2 [18] of the soum's total of 15,200 km^2 [19]. The area covered by the MLA and related infrastructure is 104.1 km^2 [20]. At 86.2 km^2 the MLA covers most of this area, followed by the water pipeline and airport sites. Extensive travel throughout the soum supports that the 200 km^2 figure covers additional physical impacts. This represents 1.3% of soum territory - 0.6% is fenced and inaccessible (MLA) and 0.7% is disturbed (roads, pipeline, fragmentation). The State Inspection Report of Pasture Quality and Condition in Khanbogd Soum (ALAGC)[21] found 'only slight changes' in pasture area from 2003-2010. The report identifies 13,476 km^2 of pasture land in the soum.

2.3 Water

2.3.1 Water sources.

In Khanbogd there has been much discussion about the lack of water, falling water levels in wells and the need for deep wells by both herders and soum officials. Fieldwork was designed to investigate water issues, changes to herder water resources and OT's potential impact on water. Work evaluated water sources, distribution, quality and access and changes to water dynamics since 2003. The lack of baseline water data precluded clear identification of change over time in water resources.

- assessment of water records and reports was carried out. This focused on ESIA's, RPS AquaTerra, IESC and other reports and OT water monitoring data (see Appendix 2).
- Water availability is related to climate and precipitation for supply

[18] Mongolian Society for Range Management, in the 2012 ESIA, C-10.
[19] Khanbogd Soum Livestock Sector Sustainable Development Program. 2015
[20] OT 2012 ESIA, C-10.
[21] State Inspection Report of Pasture Quality and Condition in Khanbogd Soum 2010. Conducted by Lanres Co.Ltd for the Department of Land Affairs, Construction, Geodesy and Cartography.

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- livestock numbers affect demand
- potential impact of OT drawdown a serious concern
- uncertainty regarding water supply highlights the need for ongoing water monitoring

Investigation at a random sample of 67 sources (Table I) across the 4 main bags identified:

- 69% of water points were shallow hand wells
- at >80% of these the water level is less than 2 metres
- Motorised deep wells comprised 21% of water points
- 85% of deep wells were locked.

This highlights two key issues – the majority of water is retrieved from shallow hand wells (yet both herders and soum officials stress the need for motorized deep wells) (Table 1) and access to existing water has been reduced through physical (locked wells) or implied (winter camp) means of control (Appendix 7). Herders contend wells are locked to protect water points; the soum states that wells belong to the government and should be used and maintained collectively. The majority of water sources were of good to satisfactory quality; some had high pH or dissolved solids (TDS) levels (Appendix 7). As spring 2016 was rainy, potentially positively affecting water levels and creating temporary surface water sources in addition to wells. Well depth and recharge rates were not part of the ToR and were not assessed.

Table I. Type of water source; water level in hand wells.

Water Well Type	#	%
Hand	46	69
Motor	14	21
Surface	5	7
Delivery	2	3

Hand Well - Level		
Metres	#	%
≤ 1	12	26.1
≤ 2	24	52.2
≤ 3	4	9
≤ 5	2	4.3
≤ 9	2	4.3
unknown	2	4.3

Field and report review of OT-Herder water monitoring showed that a number of monitored wells had similar water levels from 2011 to 2016[22]. Discrepancies emerged concerning the number of wells that OT had built or renovated (103) between OT reports and the number the soum (37) had recorded. This is representative of poor communication between different groups in the soum and the difficulty in assessing a factual basis for assessing water resources. The doubling of livestock numbers from 2003-2015 (see section 4.2) suggests there have been adequate herder water resources in soum for the significant expansion of herd numbers (Appendix 4). Animal increases reflect herder decision-making and is not related to OT (see Component 2 report). The growth in livestock numbers has had direct environmental impact, increased water demand and drawdown, concentrated animals near water sources and consumed more pasture resources. This also escalates competition for pasture and water amongst herders. The increase in livestock numbers has been greatest in Javkhlant and Gaviluud Baghs, areas nearest to the mine site (Appendix 4). Herders continue to move and go on otor, signaling water availability as this enables or limits pasture access.

[22] OT Water Monitoring Report, comparison graphs. 2016.

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The way water is accessed by herders is changing. Motorised pumps are being used to draw water. This is the process at deep wells and increasingly, pumps are used at shallow wells. Whilst they are efficient at withdrawing water, they do so at a much faster rate than if done by hand. The result is that wells are drawn down quickly, take longer to refill and sufficient water is drawn to leave troughs full beyond what animals will consume at the time. A customary assessment of well water, how long the well takes to refill, is not a suitable measurement when using motorized pumps to withdraw water. This appearance of abundance is different than in the comparison soum.

2.3.2 Aquifer interconnection

The MDT finds potential interconnection, however slight, of shallow and deep aquifers across the soum is the major OT related water issue in Khanbogd[23]. There are copious reports on water yet there is a lack of clarity on the issue[24]. In 2009 OT asserted there would be no connectivity[25], now the possibility of linkage between shallow and deep aquifers in the soum is acknowledged[26]. Nine such wells have been identified by OT and are in the process of being remediated. The number and future impact, if any, is unknown. To assess the complex water history a review of the hydrological documentation found that:

- it has been established the alluvial aquifers are connected to weathered bedrock in the MLA. There is a slight possibility of reduced water supply in unspecified wells in the soum from loss in the alluvial aquifer due to groundwater abstraction. The possibility was addressed in the Aquaterra regional groundwater model[27].
- abstraction from the bedrock aquifer for water supply would tend to increase the hydraulic gradient from the alluvial aquifer.
- no details are available on any modelling of alluvial aquifers. Conducted in other parts of the world, this would add parameters to improve understanding of yield variability, sustainability and modelling. This can assist in management and monitoring supply.
- there is a lack of monitoring data on the alluvial aquifer from first exploration until present to confirm that leakage did not occur.
- baseline and updated information on herder experience of watering and water requirements has not been reported. There is no discussion of historical interannual variability of water supply or mapping of herder watering experience geographically to inform on local aquifer availability relating to OT activities.
- some loss of water during construction has been acknowledged[28].
- there are not details on how groundwater in the alluvium is being managed.
- Undai diversion has affected storage in the upstream alluvial aquifer.

Additional points:

[23] World Bank. 2010. Mongolia - Southern Gobi regional environmental assessment.
[24] note that groundwater modeling for Gunii Hooloi was revised after this report was submitted.
[25] ESIA 2009, p 104.
[26] OT comments on draft MDT report, November 2, 2016.
[27] Water Monitoring Plan, Aquaterra. 2013.
[28] ESIA C5 2012.

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- baseline and updated information on herder experience of watering and water requirements has not been reported. There is no discussion of historical interannual variability of water supply or mapping of herder watering experience geographically to inform on local aquifer availability relating to OT activities.
- there are not details on how groundwater in the alluvium is being managed.
- Undai diversion has storage the alluvial aquifer

The OT water borehole[29] report identifies 476 boreholes in the area with variable monitoring levels. Several of these boreholes were drilled before OT was in charge of operations. Interconnectivity has occurred; it cannot be established beyond a reasonable doubt that aquifer leakage will not happen in other parts of the soum. However slight the potential of future interconnectivity, the salient point is not the specific location but that OT is not able to demonstrate that this has not nor will not occur in other locations. If there is interconnection there may be a lowering of shallow water that herders use. This point is identified in the report on Gunii Hooloi[30]. Hydrological investigation identifies that there is the possibility for connection; OT acknowledges responsibility to prevent loss of herder water resources due to actions of the mine.

6.3 Missing springs and water
Herders concern expressed to the IEP[31] about the loss of several wells and springs (listed in the MDT 2nd progress report) was not borne out on inspection as part of MDT fieldwork. Several of the sites had water (water test results 60-67, Appendix 7), were unused due to disrepair rather than lack of water, or other nearer water sources existed. In one instance 3 identified 'lost' sources were near a functioning OT-built deep well (N 43.0964; E 106.7171). Past productivity of listed springs could not be assessed; 2 were near working wells, one had been made into a well, one had some moisture present. It was not clear that changes in sources or water level would have affected herding viability, nor were changes directly attributable to OT. The spring issue is part of the broader concern for water drawdown in boreholes addressed elsewhere.

The Undai River is reviewed in the IEP water report.

2.4 Dust

Dust was identified by herders as a major environmental challenge to herding in Khanbogd Soum. To monitor dust impact 43 dust traps were placed throughout the soum in May, 2016. This enabled assessment at locations important to herders (methods and map - Appendix 8). The aim was to identify amounts of aerosol dust at different sites in the soum and determine areas of concentration.

- Trap placement was done to cover both the exclusion zone and areas further from the mine site to record dust deposition rates both near to and at a distance from the MLA._

[29] OT Bore ID Summary, etc. 2015.
[30] Gunii Hooloi Groundwater Model Report. RPS Aquaterra 2013. 2015.
[31] IEP Phase 1 Report, 2015.

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- These included points on the Khanbogd-OT road, near the Mine License Area (MLA), at herder camps, bag centres, at water sources and in the soum (Appendix 8). Some sites were suggested by herders whilst the majority were placed by the MDT.
- The wide spread of sites was essential to identify dust deposition rates across the soum.
- The traps provide a local-scale assessment of dust in the soum.
- Due to distances and schedules traps were placed and collected on different dates, thus weather and environmental conditions are not directly comparable.

Unusually, May 2016 experienced several days of rain and winds that will have potentially impacted dust collection and retention at different sites. Cognizant of this, results give an idea of dust deposition in the soum; results are suggestive rather than definitive. Findings showed that dust volume varied across the soum (see Appendix 8).

- Highest levels were two sites on the Khanbogd road, yet other sites also on the road had 1/4 to 1/7 the amount of dust.
- Similar high amounts of dust were found in the soum centre and at an isolated site at the powerline.
- Nomgon Bag centre had more dust than Javalant or Gavaluut Bag.
- Sites at the old airport, on paved sections of road and at 250 metres off the Khanbogd road had low dust volumes.
- Some sites near OT were relatively low whilst locations east of the soum centre were higher.
- Independent variables of location, wind, weather and environment were relevant rather than vicinity to the mine, old airport, paved road or herder camp.
- Chemical analysis was not part of the ToR nor work plan. In any case chemical analysis does not link to sources (only infers). If future chemical tests are done this would only be worthwhile if it is linked to chemical signatures from within the MLA to differentiate OT sources from coal transport, Gobi dust etc.

Findings along unpaved sections of the Khanbogd road were mixed with low to high volumes recorded. Results and observation suggests Khanbogd road has limited dust impact beyond the immediate (to 250 metres) vicinity, reflecting international norms for dust assessment[32], and notes that a percentage of traffic on the road is not OT related but local vehicles.

Several other potential dust sources exist beyond the MLA:

- railway construction,
- coal trucks on Tavan Tolgoi road,
- the road to Manlai Soum,

[32] Only locations within 200 metres of roads are considered affected by air pollutants. UK Highways Agency Design Manual for Roads and Bridges. standardsforhighways.co.uk/ha/stand

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ards/dmrb/vol11/section3/ ha20707.pdf. PM_{10} impacts are considered negligible beyond >200 m.

- quarries and dirt pits,
- new powerline construction,
- vehicle traffic in Hairan Bag near the Chinese border,
- dry riverbeds,
- areas of livestock concentration
- herder vehicle tracks.

Driving tracks were as much as 75 metres wide in Javalant Bag and 55 metres wide in Bayan Bag (in comparison Khanbogd road is 11 metres wide with 2-4 metre soft edges). Heavy truck traffic (particularly coal transport) on dirt tracks, creation of new tracks and digging up of riverbeds for local (non-OT) construction material can instigate erosional process and provide source material for dust transport.

Primary and secondary investigation focused on amount and distribution of dust. Evaluating the impact of dust on human health was beyond the scope of the investigation. In rural desert locations testing for lung and respiratory health would first a) assess smoking, well-established as the greatest respiratory risk, b) smoke from cooking stoves, and c) ambient dust[33]. In arid environments residents grow up in dusty conditions, thus it is difficult to assess 'additionality' or source of dust[34]. An example is that Khanbumbat airport was temporarily closed due to dust storms on May 22, 2016. This reflects landscape-wide events and the fact that large-scale dust events occur in the desert environment; it is not possible to clearly identify or separate dust sources. We note that there were no admissions at Khanbogd Hospital for dust-related symptoms in 2015-2016.

To establish an historical dust record we performed an aerosol optical depth analysis for Khanbogd Soum through use of MODIS remote sensing data measuring dusty conditions[35]. Results show high variability in the 2000s, perhaps associated with mine site development and transport from Tavan Tolgoi on unpaved roads. High dust levels were found in the soum from 2005-2010 (Figure 3 below). After Fall, 2010 there is a notable decrease in dust. 2011 to 2015 show intra-annual fluctuation with higher dust levels in spring (related to wind patterns) and lower levels in fall, fluctuating between 0.1 (very clean air) and 0.3 (dusty conditions). OT dust monitoring shows similar to lower dust levels; indications are that dust is not a major source of environmental disturbance.

The IESC[36] identified exceedance of Mongolian dust standards both on and offsite in 2013. Whilst current OT dust monitoring shows satisfactory dust levels, past exceedance points to the need for continued monitoring and clear communication of results to the community.

[33] P. Baxter, Cambridge Medical School, personal communication, 2016.
[34] *ibid.*
[35] Aerosol Monitoring MOD-4, NASA.

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[36] Independent Environmental & Social Consultant, Oyu Tolgoi. D'Appolonia S.p.A., p. 67, 2015.

Livestock health may be impacted by dust yet claims about livestock illnesses influenced by dust have received limited investigation in the South Gobi region[37]. In 2011 the Mongolian National Veterinary Center conducted preliminary research on livestock illnesses related to coal dust[38]. An independent study cited in the 2015 RAP[39] identified 'no major difference in health status of animals located in areas of infrastructure development' in Khanbogd, Bayan Ovoo and Manlai soums. The 2015 OT Animal Health Assessment[40] evaluated 238 samples from 109 livestock. Laboratory testing was conducted on samples from 41 animals of which 12 indicated some changes in lungs with 9 not far from standard. Animal health should continue to be monitored to assess potential dust impact on livestock health.

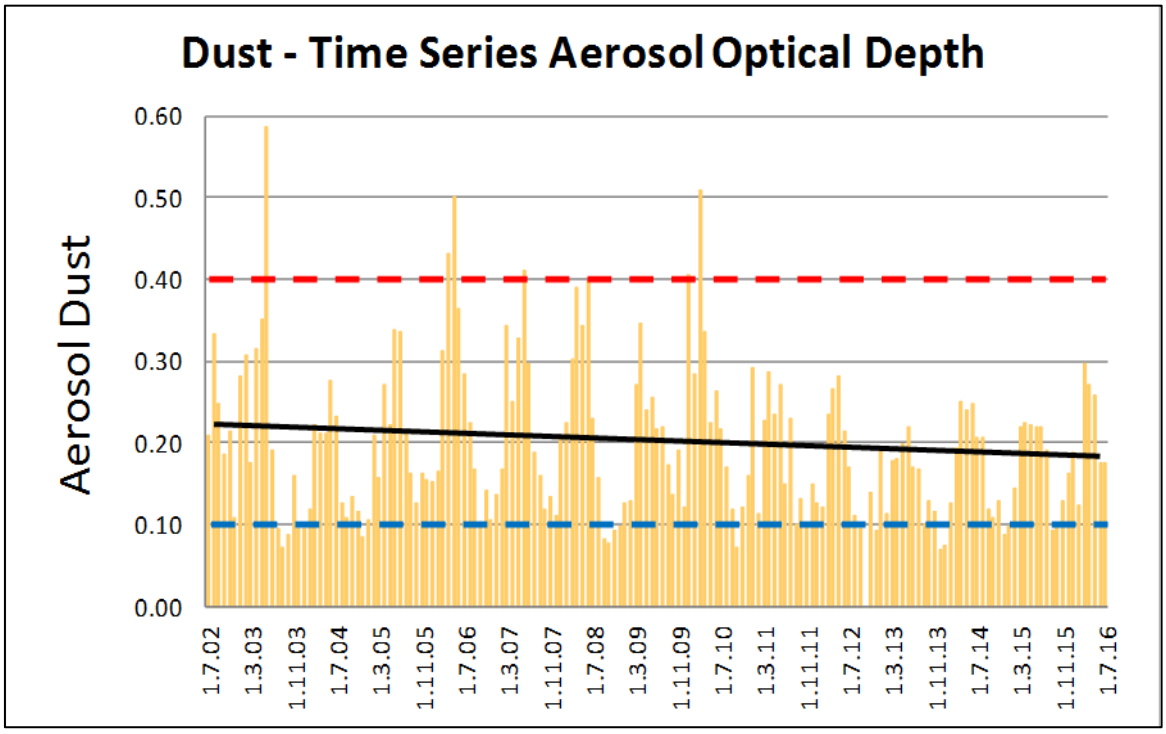

Figure 3. Remotely sensed dust assessment in Khanbogd Soum using MODIS aerosol programme (NASA 2016; giovanni.gsfc.nasa.gov/giovanni). Value 0.1 = very clear - blue dotted line; 0.4 = very dusty - red dotted line. Black line represents aerosol dust trend from July 2002 to July 2016 showing slight decrease in soum-wide dust over time (r^2= 0.033).

[37] Jackson, S.L., 2015. Dusty roads and disconnections: Perceptions of dust from unpaved mining roads in Mongolia's South Gobi province. Geoforum, 66, pp.94-105.

[38] Orgil, D., et al. 2011. Environmental Review of Umnugobi Province and Negative Influence of Mining Industry to Livestock Health. National Veterinarian Hygiene Laboratory Center.

[39] OT Resettlement Action Plan (RAP), 2015.

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[40] OT Animal Health Assessment, 2015.
At present there is little evidence of OT-sourced dust impact. OT monitoring of particulate matter PM_{10} in the MLA/exclusion zone identifies low dust concentration in the area[41]. Dust should continue to be monitored when the mine expansion occurs.

2.5 Comparison with Manlai Soum

As a comparison site the MDT evaluated environmental conditions in Manlai Soum (Appendix 9). Extensive travel assessed pasture and water resources, herder activities and perceptions of environmental challenges in an environment similar to Khanbogd. Pastoralism in Manlai Soum follows a more customary environmentally-driven approach that is without the presence of a local mine. Herders were well aware of Oyu Tolgoi and Tavan Tolgoi with some community members working at the mines.

Manlai herders stressed weather and climate change as challenges and did not have expectation of external assistance. In both soums herders do not regard the government as able to reduce herding challenges such as organization, water resources or infrastructure. Observation and surveys identified Manlai Soum had:

- lower vegetation levels,
- greater extreme weather events
- a more positive view on pasture quality, water supplies and animal health.
- the majority had <300 livestock whilst in Khanbogd the majority had >300 livestock
- water levels were somewhat lower

Climate varied over time, 70% of well tested were hand wells, more families shared wells than in Khanbogd and herders had fewer animals (Appendix 7). Movement, otor, perceptions of weather, dust and decline in wildlife were similar. Herding concerns in Manlai focused on environment and climate whilst in Khanbogd a range of environment and socio-economic were important.

Manlai Soum presented typical herding dynamics and environmental challenges and was more representative of herder conditions in Mongolia than Khanbogd Soum[42,43,44]. This highlights how the presence of the mine has affected herder perspectives in Khanbogd and created different perceptions than were found in a neighbouring soum.

2.6 Herder Environmental perception survey

Herders have a strong negative view of environmental factors. A short 24-question survey on environmental factors was completed by 53 herders in Khanbogd. The general findings identify climate conditions as worsening with:

- changing temperatures in winter (68% respondents) and summer (63% respondents),

[41] OT Daily Mean Dust Results, 2016.
[42] Sternberg 2012
[43] Middleton et al. 2015

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[44] Ahearn 2016

- decreased precipitation (94%) and increased dust (77%)
- 67% state there is not enough water for animals, 40% identify poor water quality
- 60% identify poor pastures.
- 91% of herders migrate, 72% move 3 or more times a year and 66% migrate more than 20 kilometres annually.
- Drought was seldom mentioned whilst 18% cited dzud in 2009 or 2010.
- Wildlife and biodiversity are felt to be decreasing.

Negative environmental perceptions are widespread across the soum though climate data shows weather is variable. Impacts on herding livelihood were several and diverse, with sixteen different factors identified. Climate and environmental issues predominated followed by socio-economic factors. There is an apparent contradiction between perception and landscape productivity as pasture and water levels have been sufficient for a doubling of livestock from 2003-2015. Continued mobility indicates that herders are able to find adequate pasture and to resolve land and water access issues.

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3. CHANGES TO PASTURE AND WATER IN KHANBOGD SOUM

There are several factors that affect the herding environment in Khanbogd Soum: climate and natural forces; herder behaviour; the decisions and actions of government and other private sector actors, and OT activities. We find that each of these has affected, or currently affects pasture and the water resources available to herders in Khanbogd Soum.

- The principal factor is that Khanbogd Soum is an arid desert environment averaging 95 mm of precipitation per year but with significant variability from year to year. The pasture and water resources available to herders are primarily determined by climate.
- Remote sensing data on vegetation compared with precipitation records shows high variability from year to year in precipitation and related vegetation and water levels.
- In some years, and in some locations, depending on rainfall and herder behaviour, there is acute pressure on pasture and water, but overall the increase in animal numbers shows that herding remains viable in the Soum.
- Herder behaviour also affects pasture and water resources. In particular the significant increase of livestock numbers since 2003 requires additional amount of water and vegetation. In addition, several factors lead to reduced mobility and a concentration of animals in some areas.
  - household splitting, sedentarisation, e.g. to be close to the soum centre
  - animal concentration around water points leads to pressure on some pastures
  - poor maintenance of wells
  - efforts by some herders to control resources though locked water points
  - possession of winter camps being used to protect perceived rights to use pastures access
- Disturbance or loss of 200 km^2 of pastureland to OT infrastructure, MLA and roads.

Alongside changing socio-economic factors (vehicles, increased expenses, migration to the soum for education and services) herding differs in Khanbogd from other Gobi and Mongolian soums.

We find that there has also been a significant transition in how herders use and perceive the environment in Khanbogd Soum since 2003. There is a widespread sense of disruption and uncertainty particularly related to the presence of the OT mine; changes in how people understand their and others' rights to water and land, and increased use of vehicles for herding (with related pressures to pay for fuel) and construction of fixed houses. Herding is shifting to maximising pasture and water use for personal advantage rather than following a customary, shared resource approach to land use. The increase in animals and decrease/changing mobility and changing household and labor organization places stress on pasture resources and requires more water. Herders need to acknowledge the environmental impact of changes in pastoral practices and recognize that their decisions affect long-term pastoral viability.

- National and local government and other companies have made investments that affect herding, for example, construction of the railway, the Tavan Tolgoi road and the Qatar wildlife reserve. In addition, the soum authorities appear to have limited ability to deal with forces affecting pastoralism and the environment. Factors beyond the soum's control (infrastructure)

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are coupled with limited planning and management that sees the soum react to events and pressures rather than organising efficient claims on pasture that enable mobility, maintaining water wells and accessing unused pasture. The soum's 2015 Livestock Sector Sustainable Development Program addresses relevant issues; its implementation should be strongly supported. Shortcomings of the government are reflected both in its local management role and an apparent lack of attention to the soum from the national government. Indeed, both the herders and soum look to OT for direction and money though it is not OT's role to organise herding and soum development beyond contracted responsibilities.

- In the recent past OT exclusion zone and infrastructure (MLA, airport, roads, water pipeline) displaced or inconvenienced herders (addressed in MDT Component 2 and 3). OT currently has limited known direct impact on pasture and vegetation. Mine interaction with the land is well organised and follows identified, standardised procedures such as no off-road driving. Impacts on the environment include risks to animals from traffic on the OT road and dust in the immediate vicinity of the Khanbogd road (now in the process of being paved).

- However, there is a potentially very significant issue of the possible connection between shallow and deep aquifers resulting from the 476 boreholes drilled on behalf of OT. A lack of baseline monitoring data means that there are no reliable, long term records of water levels in herder wells enabling present and past (before drilling) comparisons. The 2013 RPS Aquaterra report states that a few wells near Gunii Hooloi may be affected. Due to poor initial methodology for borehole construction and record keeping the potential for leakage cannot be negated beyond a reasonable doubt. Many herders are very concerned about damage to their water resources. Identification of 9 cascading boreholes, now being addressed by OT, establishes the possibility, however slight, of interconnectivity elsewhere in the soum. Uncertainty regarding water supply highlights the need for ongoing water monitoring.

  Monitoring - OT appears to have fragmentary knowledge of the local physical and social environment and has contracted out much work, e.g. on groundwater and pasture management, with limited oversight or involvement, to parties that lack a presence in the soum. As a consequence, OT lacks a cohesive approach to environmental engagement and can better integrate its environmental monitoring or pasture management processes. Staff are knowledgeable in their sub-field but a unified approach was not presented. The result is much data but poor explanation or justification, ineffective communication and low trust levels in the community. Some work is now being transferred to the soum though it lacks time and employees to adequately monitor pasture. Further, results of efforts to develop cooperative herding groups to strengthen pastoralism were not evident.

- Dust - Apart from the immediate transport corridors created by OT (roads) and the local community (tracks), dust is not a major environmental impact at this time. Dust generation in the soum peaked in 2010 and levels are now satisfactory on the large scale; at individual sites, primarily the Khanbogd road, dust is generated along the roadway but has limited dispersal and will cease when paving is completed. Traffic includes OT and non-OT vehicles, thus OT

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cause a part, not all, of the localised road dust. Herder vehicle tracks throughout the soum also generate dust.

- Overall, we conclude that whilst there are issues of concern – particularly relating to potential aquifer connectivity - and to monitoring, the principle impacts on pasture and herder water in Khanbogd Soum come from sources other than OT. Little credit or acknowledgment is given by herders to OT for developing and rebuilding some of the water sources that herders use. The lack of effective pastoral governance now sees OT cast in the role more commonly ascribed to government; this is in clear contrast with Manlai Soum.

4. RECOMMENDATIONS FOR 1) RESTORING/PRESERVING ECOSYSTEMS AND TRADITIONAL HERDING, 2) CAPACITY TO BEAR FUTURE IMPACTS OF OT

- Based on the analysis of pasture and water, we have the following conclusions and recommendations.
- In relation to pasture:
    - The principal source of variation in vegetation is precipitation.
    - Human decision-making by herders and the soum authorities have significant impacts on pasture use, distribution and grazing intensity. Efforts by the authorities to encourage traditional herder mobility and open access to water and land, and reduced actions by herders to restrict access to wells and land, are needed before high grazing levels in some areas will change. The soum needs to take an active role in promoting effective customary herding practices and in opening up new areas in the soum for herding. There is much unused pasture, particularly in the northern, eastern and southern areas that can be productive if water is available; the Strictly Protected Area is excluded. The definition of herder rights to possession (winter, spring camps, wells etc.) and what these rights mean for use of land and wells by other herders needs to be clarified.
    - Paving the Khanbogd road (now in process) will resolve dust along the road corridor and should be undertaken as scheduled during 2017-18.
    - Animal crossing areas on the OT road should have speed bumps on both sides of the crossings to slow down traffic. This will be particularly important as construction traffic ramps up and when production increases and will alleviate fragmentation effects.
    - Land fragmentation, as identified by the IEP report, to the northeast of the MLA is a concern that can be addressed through collective compensation.

- In relation to water:
    - The potential interconnectivity, however slight, of shallow and deep aquifers is an ongoing concern for herder water that needs to be mitigated by OT. Existing cases highlight that the issue remains a concern across the soum. As part of collective compensation (below) we recommend OT construct a series of shallow hand wells across the soum, particularly in areas where there is pasture but no wells. The wells should be shallow (not deep), robust and durable, provide community access and not

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lockable - *e.g.* the concrete shallow wells recently constructed by OT for herders are suggested.

The aim is to:
1) open up new and additional pasture across the 4 baghs to encourage migration and use of pasture resources and give the means for herders to continue customary livelihood practices.
2) fill gaps in usable water in currently used pasture areas.

The wells should be dispersed across the 4 baghs to encourage migration and use of new and alternate pastures and give the means for herders to continue customary livelihood practices. The soum and OT should cooperate on this programme to mitigate the impacts of OT on water resources, land fragmentation by OT, limited government organisation of soum infrastructure and ineffective herder land use planning. The soum needs to enable and ensure greater herder access to pasture.

Our expert view is that more hand wells of simple, solid design at lower per unit cost enables greater water and pasture access and is much more valuable than expensive and complex designs. Reports commission by OT in 2007[45] and 2010[46] identified approximately 320 hand wells; since that time livestock numbers have increased significantly. We suggest 75+ hand wells be constructed to encourage migration to outlying pastures. A series of wells enables small animal mobility; where pasture is only suitable for camels wells can be further apart.

The location of new wells should be based on groundwater studies to ensure productivity and that new wells do not affect existing wells. Siting should be done in conjunction with the soum to ensure greatest possible pasture access for all herders. Wells address gaps in prior collective compensation.

- We recommend monitoring and modelling of alluvial aquifers at geographically distributed sites and hydrological study focusing on alluvial resources that quantifies OT's past, current and future impacts. This will provide better understanding of shallow groundwater dynamics on which the herders depend, strengthen modelling and in the future can measure changes in water resources.

- Water delivery to herders is a temporary measure that should gradually stop because it creates dependency and anxiety (herders worry about if and when it will stop) and is not sustainable in the long term. Over an agreed timeframe the water resources around each site to which water is currently delivered should be assessed. If there are

[45] Perception Study on Water Use in the Khanbogd Soum. 2007. Center for Policy Research.
[46] Sustainable Pasture Management Project in Khanbogd Soum. 2010. Mongolian Society for Rangeland Management.

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existing functioning water wells then the delivery programme can end; if there are no wells, then one should be constructed as part of the proposed well building programme.
  - A well maintenance system is needed for existing herder wells in the soum and those proposed above. We believe this could be part of a collective compensation programme to fill gaps in compensation.
  - The lack of baseline water data affected the ability to identify the change over time in water resources.
  - We see no reason why water reports and data can not be made available to the community.

- In relation to monitoring and communications between OT, herders and the soum authorities:
  - The environmental monitoring programmes for herder wells, dust and pasture/vegetation should be redesigned and reorganised in order to provide robust long-term data credible to herders and others. Programmes should be suited to herding practices to enable participation and be verifiable by herders. The programme should include herder well water (quantity and quality); dust and vegetation/pasture quality and be designed and implemented using a joint fact finding methodology to ensure scientific rigour, accessibility and credibility. Local monitoring should replace outsourced monitoring.
  - OT should produce regular reports on the results of monitoring - and any actions taken or proposed as a result of monitoring - and present these regularly to herders and others in the community. Current communication may be well-intentioned by is unsatisfactory. Information should be direct, understandable and relevant to herders, reports to the soum should be comprehensible to staff. Methods used at other Rio Tinto sites, such as real time dust monitoring data for Pilbara, Australia (riotinto.com/documents/FAQ_air_quality_monitoring.pdf) should be applied in Khanbogd. OT should present findings at the bag centres throughout the soum as well as in the soum centre. Genuine involvement by herders is essential to monitoring success.
  - For vegetation monitoring, fenced plots are recommended. These should be done in cooperation with herders and soum officials.

- In relation to land use:
  - Khanbogd soum faces an array of current and likely future demands on land for new infrastructure and potentially for other mines and resource extraction. At present the soum administration lacks the capacity or powers to address the challenges these developments pose. There is an urgent need for comprehensive strategy implementation for land use and protection of rural livelihoods. We would like to see OT and its lenders (especially IFC as part of the World Bank Group) deploying their networks and leverage to work with national and local government and external (international) agencies on soum-level strategies and plans to maintain herder livelihoods in the context of these changes.

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- Collective compensation:
    - We recommend remedying a suite of OT impact issues, including interconnectivity and fragmentation, through community compensation. Specifically, a programme to build a series of shallow hand wells should be undertaken by OT in coordination with the Soum and after hydrological study for site location. Wells should be in underused areas of the soum including northern, eastern and southern regions. This serves to open potential new pasture and herding areas to encourage customary herding and addresses water and pasture issues. This addresses general OT impacts through collective benefit to the community that encourages customary herding viability in the soum.

2.7. APPENDICES

Appendix 1 – Terms of Reference

Appendix 2 – Documents reviewed

Appendix 3 - Climate

Appendix 4 - Livestock

Appendix 5 - Pasture

Appendix 6 – Remote Sensing

Appendix 7 - Water

Appendix 8 – Dust

Appendix 9 - Manlai Soum

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Appendix 1 – Component 1, Terms of Reference

Component 1: **Evaluation of quality and access to pastures and herd water**

The size and quality of available pasture, as well as access to water, is a major determinant of the number of animals that herders can raise, which in turn determines herders' standard of living from traditional nomadic pastoralism. Therefore, in order to assess OT's impacts on herders' livelihoods, the MDT must first assess impacts on pasture and water.

Component 1 focuses on these aspects of impacts on herders' livelihoods and has three parts:

Part A – With reference to primary and secondary data, complete a pasture count and a quantitative and qualitative assessment to determine, to the best extent possible, changes to Khanbogd soum pasture size, pasture quality and herd water from 2003 to present.

Part B – Specifically map, to the best extent possible, the changes to pasture and water that are attributable to the OT project.

Part C – Evaluate and develop recommendations regarding: (1) methods of restoring or preserving natural ecosystems and traditional livestock herding in Khanbogd soum as well as in Gobi region at large; and (2) whether there is capacity to bear the full scope of future impacts likely to be caused by the OT project.

Appendix 2 – Reports, documents and references

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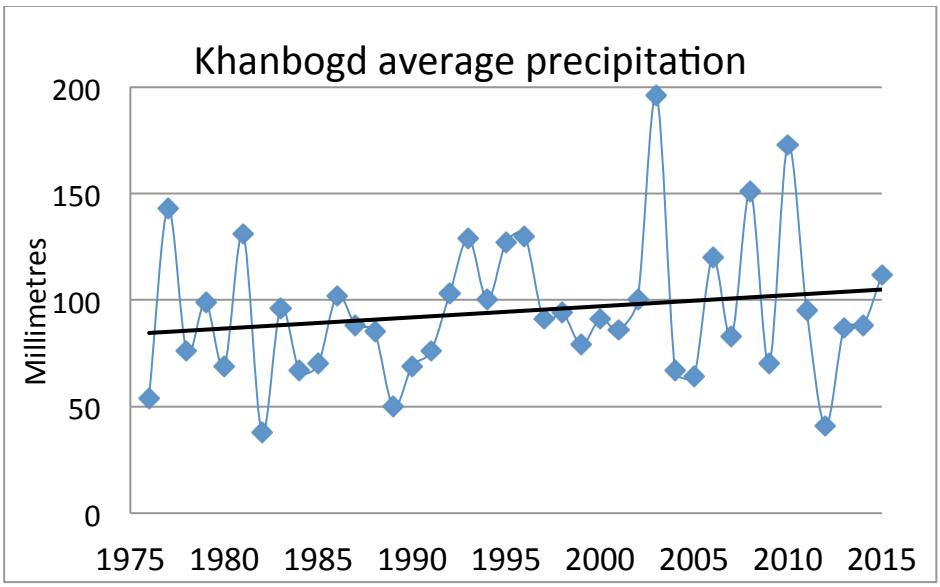
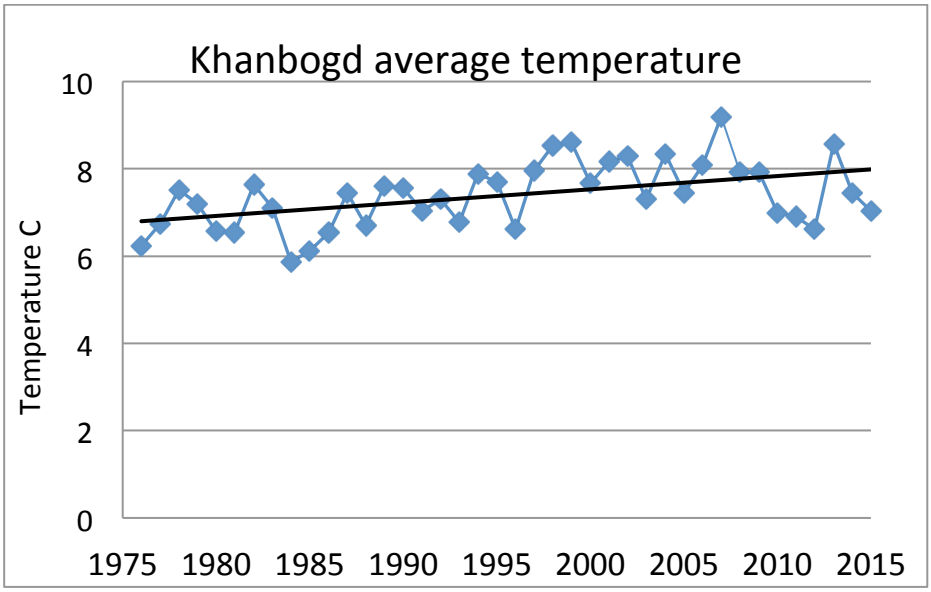
Appendix 3 - Climate

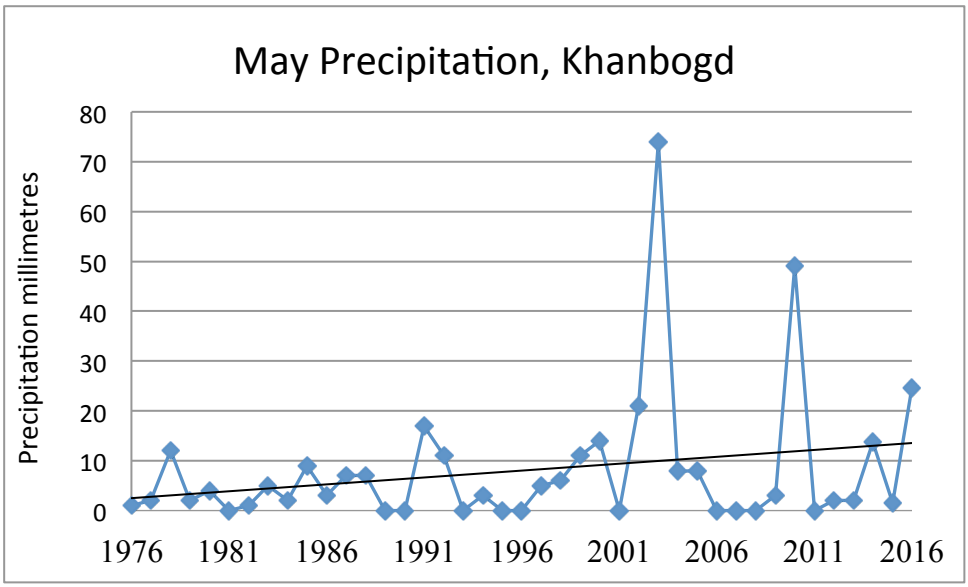
1. Average annual precipitation,1976-2015
Trendline (black) shows slight increase (r^2=0.03).



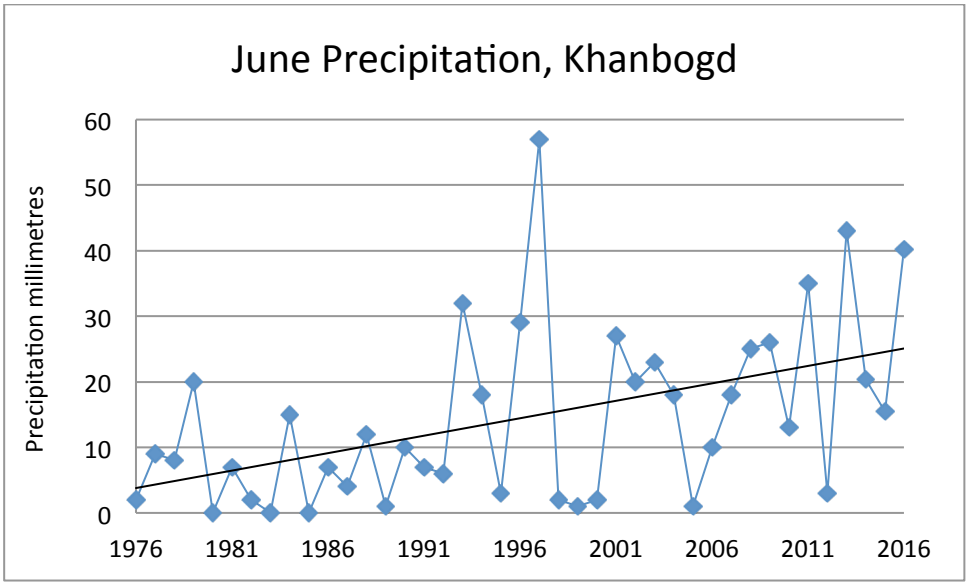
2. Average annual temperature,1976-2015.
Trendline (black) shows increase (r^2=0.22).



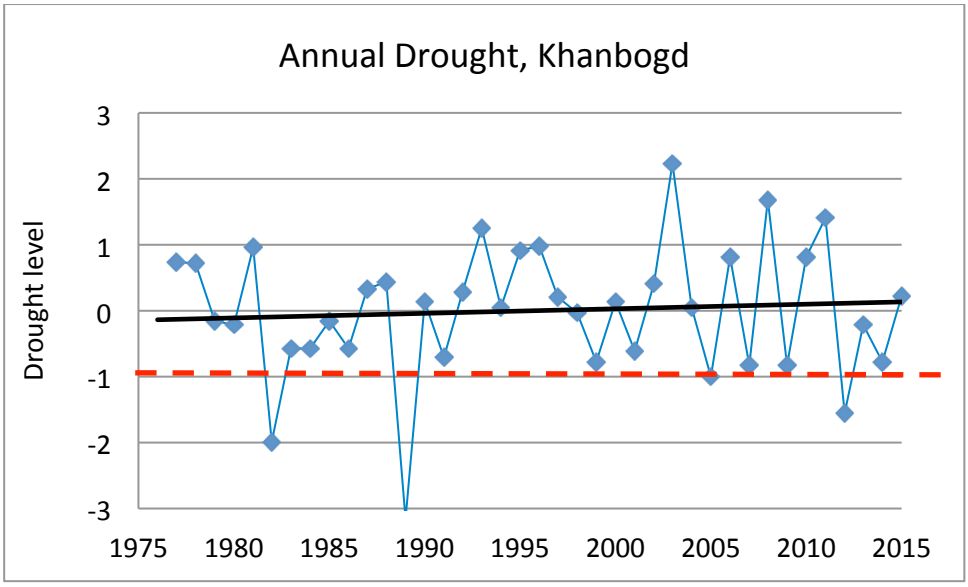
3. Precipitation, May, 1976-2016.
   Trendline (black) shows slight increase (r^2=0.05).



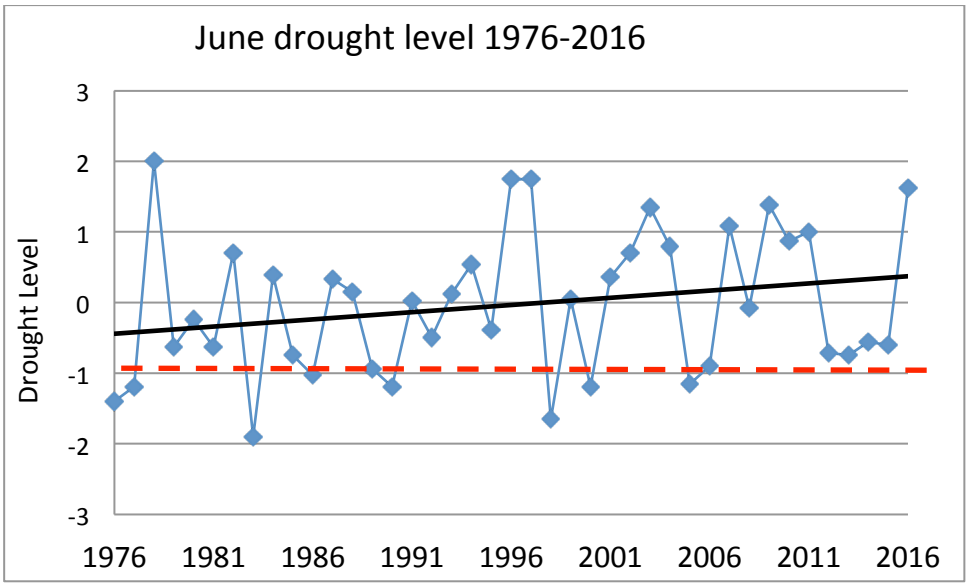
4. Precipitation, May, 1976-2016.
   Trendline (black) shows increase (r^2=0.22).



5. 12 month drought record through August for Khanbogd Soum, 1976 to 2015. Trendline (black) shows little change (r^2=0.00).
Below dotted red line (-1) indicates drought.



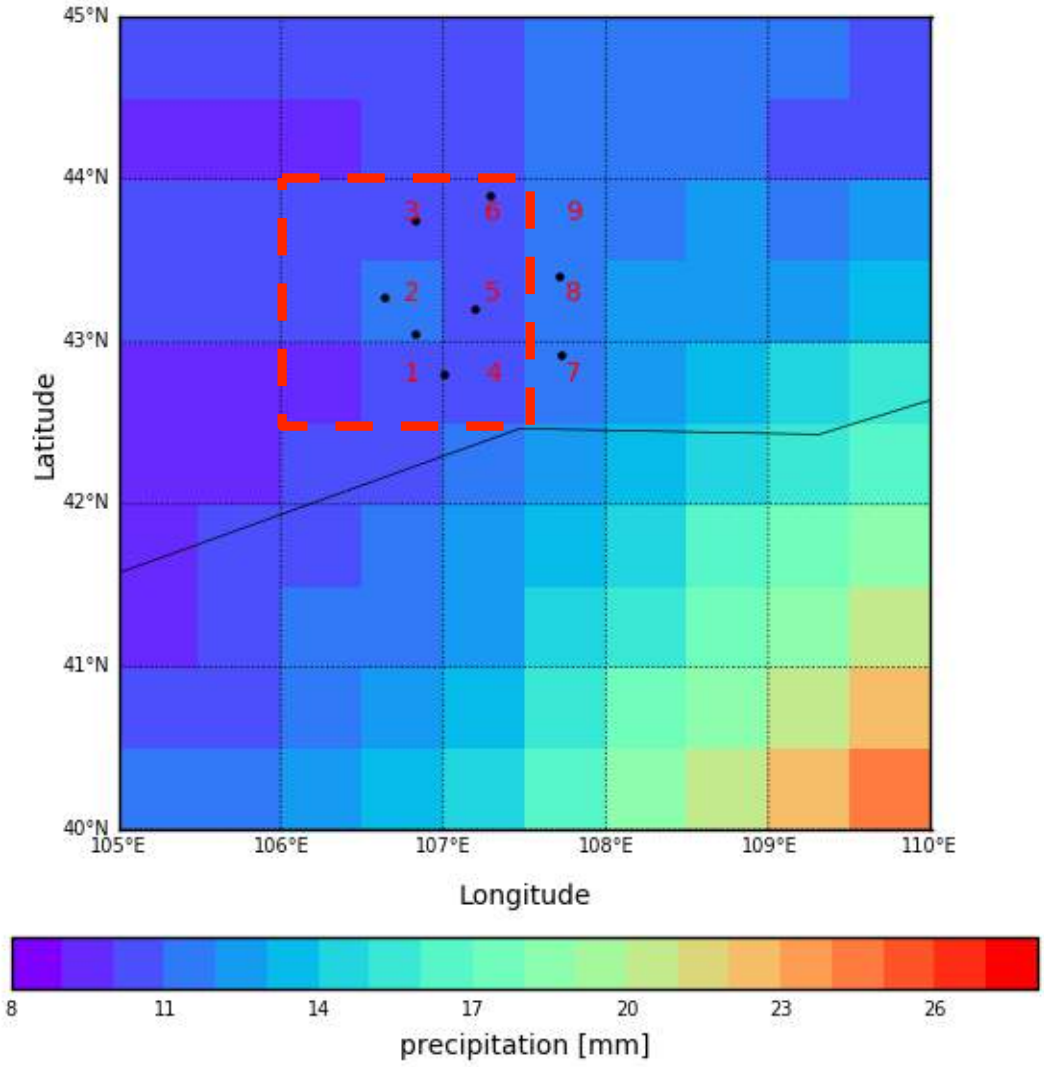
6. 12 month drought record through June for Khanbogd Soum, 1976 to 2014.
Trendline (black) shows increase (r^2=0.22).
Below dotted red line (-1) indicates drought.



7. Khanbogd and Manlai Soums. Gridded climate data by squares, 1960-2013.

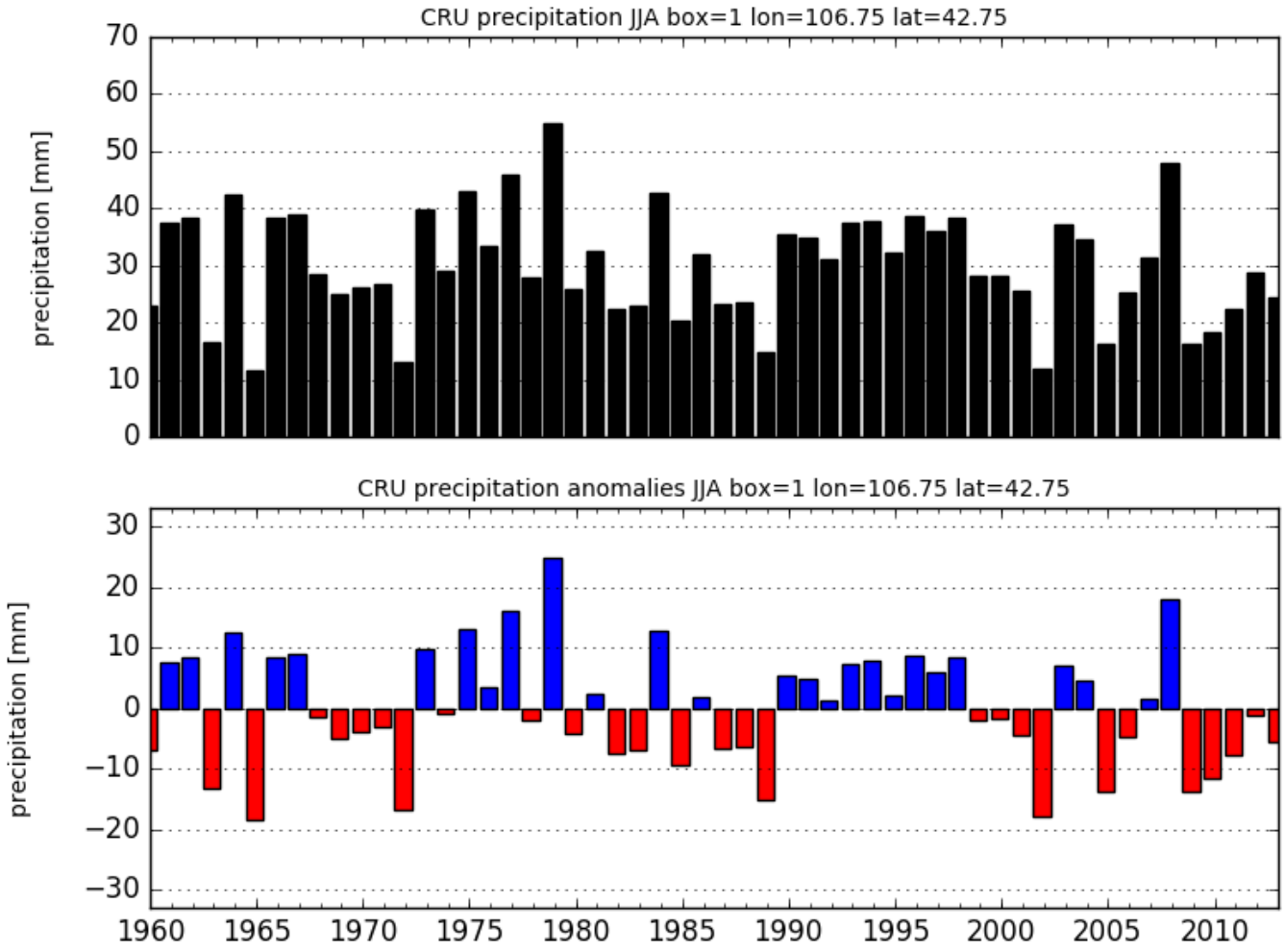
1.	Southwest Khanbogd	4.	Javalant Bag	7.	Nomgon Bag
2.	Gavaluut Bag, OT north gate	5.	Khanbogd	8.	Bayan Bag
3.	Manlai west	6.	Manlai	9.	Manlai east

Each gridded area is shown below.

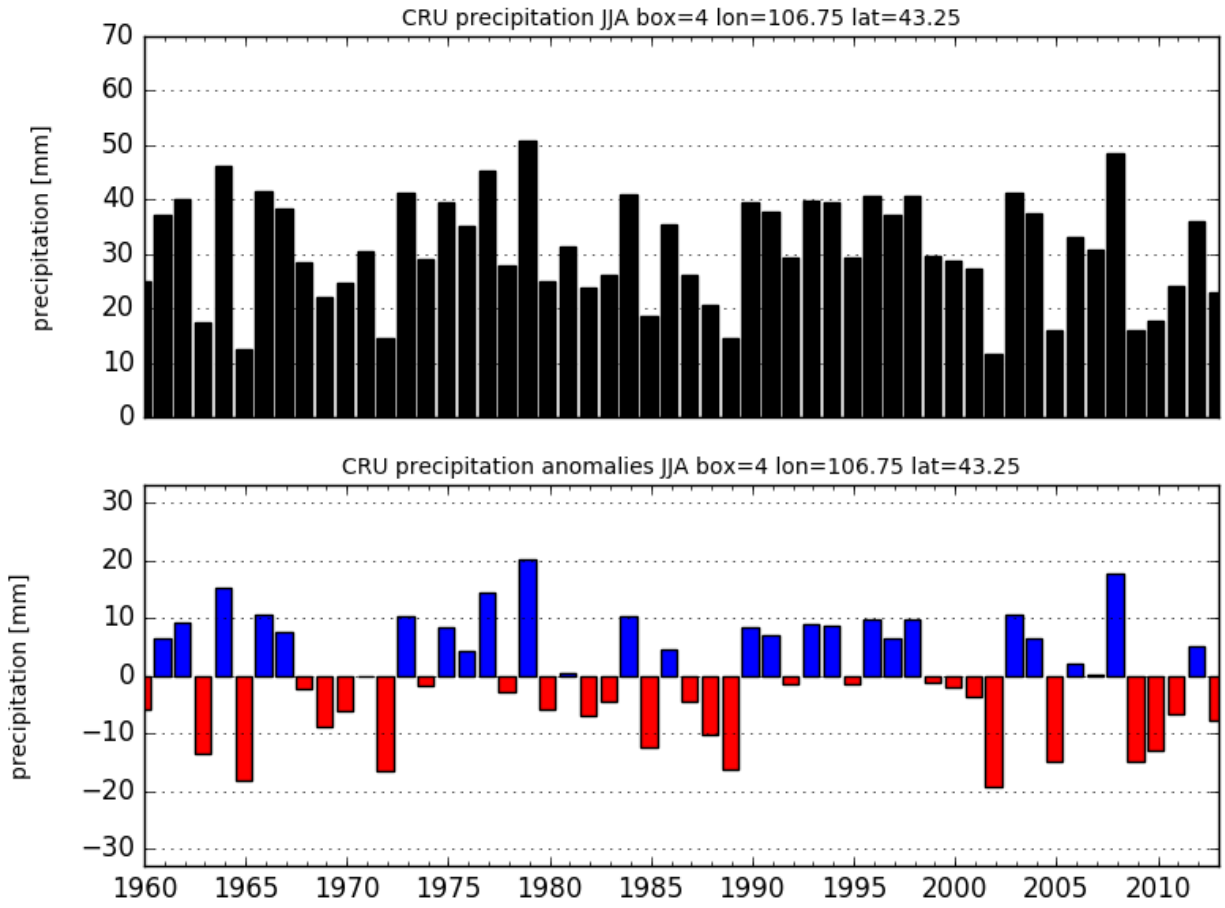


Source: NASA Giovanni web interface (http://giovanni.gsfc.nasa.gov/giovanni
Deep Blue Collection 6 Aerosol Optical Depth (AOD) data. Sayer et al., 2013.

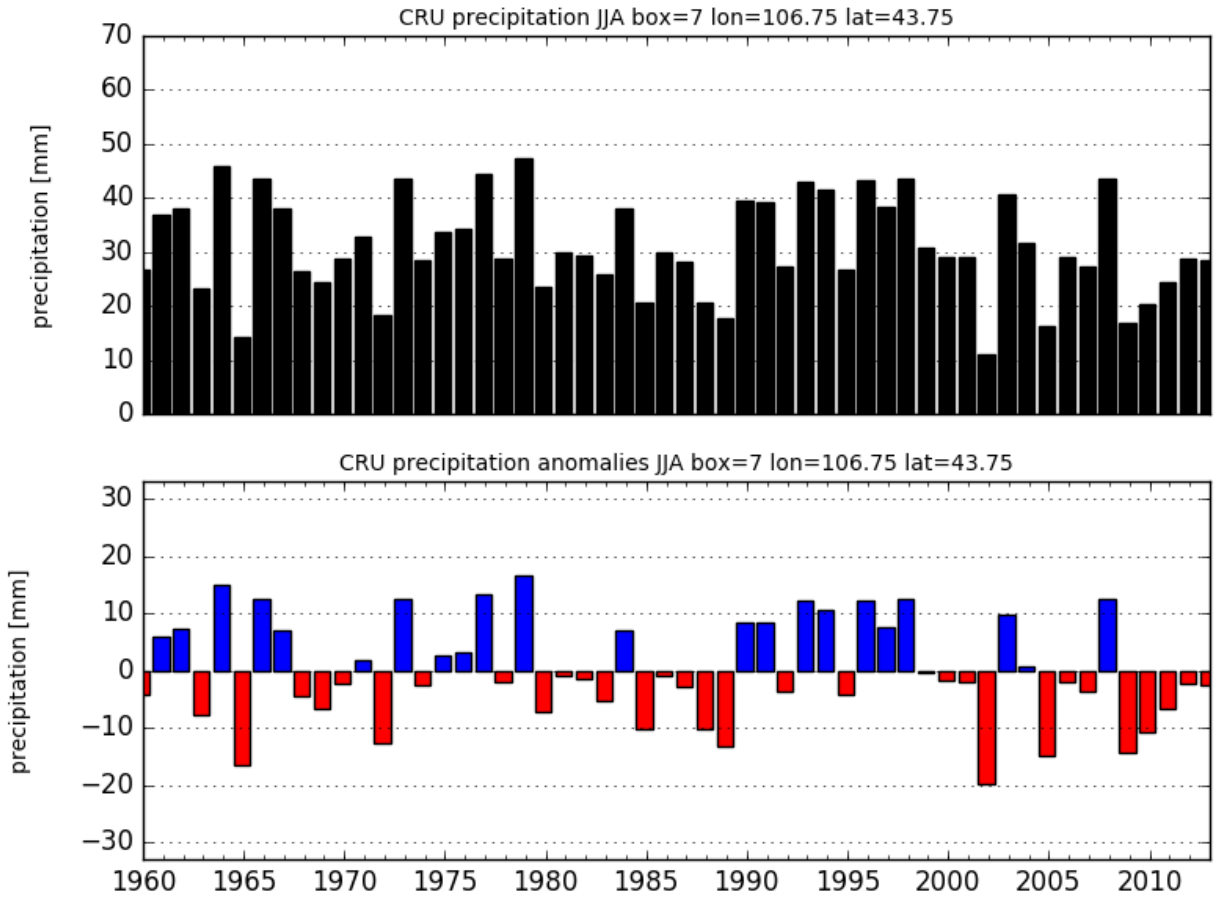
1. Southwest Khanbogd



4. Javalant Bag



7. Nomgon Bag


CRU precipitation JJA box=7 lon=106.75 lat=43.75
precipitation [mm]
70
60
50
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30
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10
0
CRU precipitation anomalies JJA box=7 lon=106.75 lat=43.75
precipitation [mm]
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1960
1965
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1985
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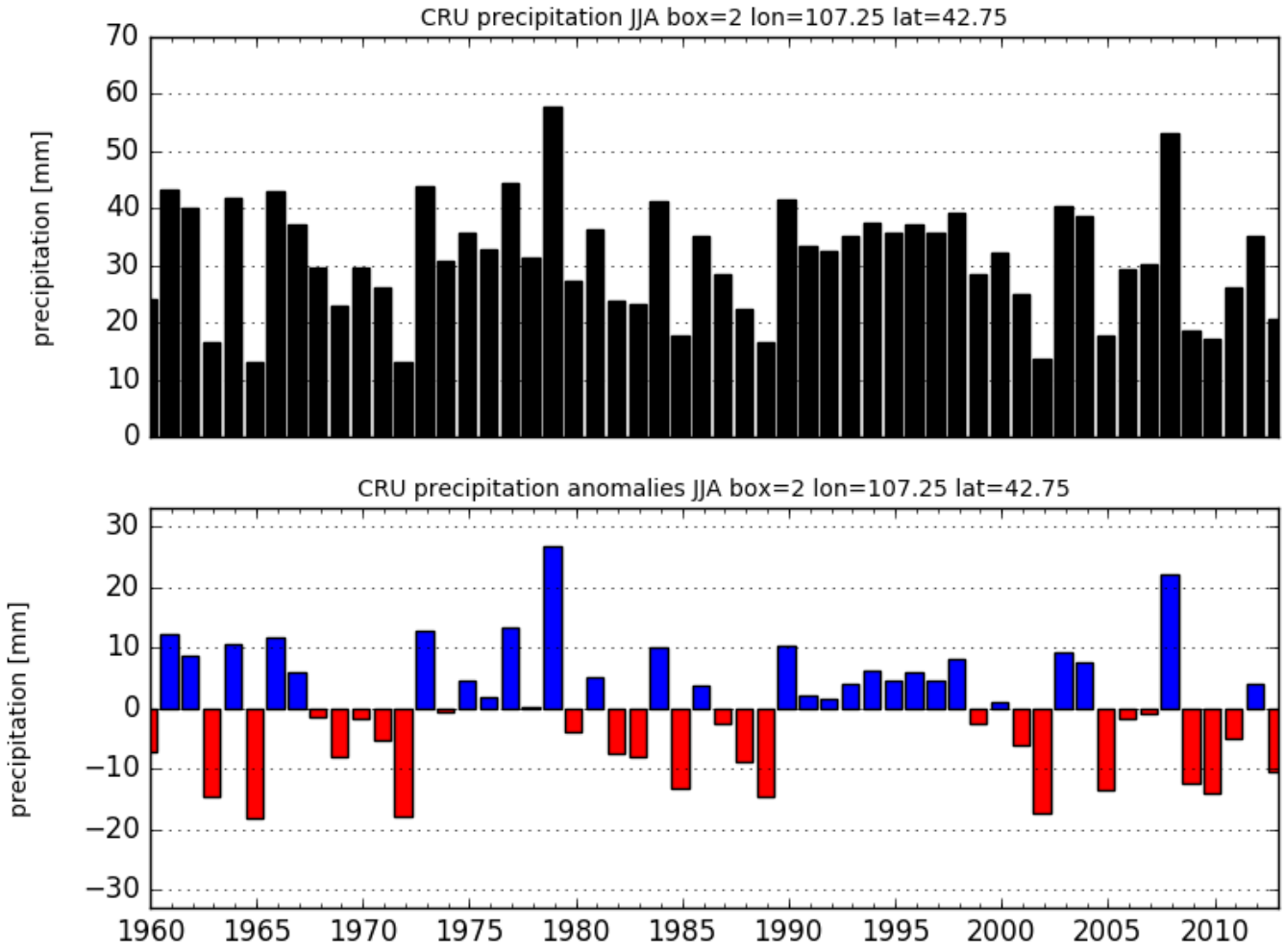
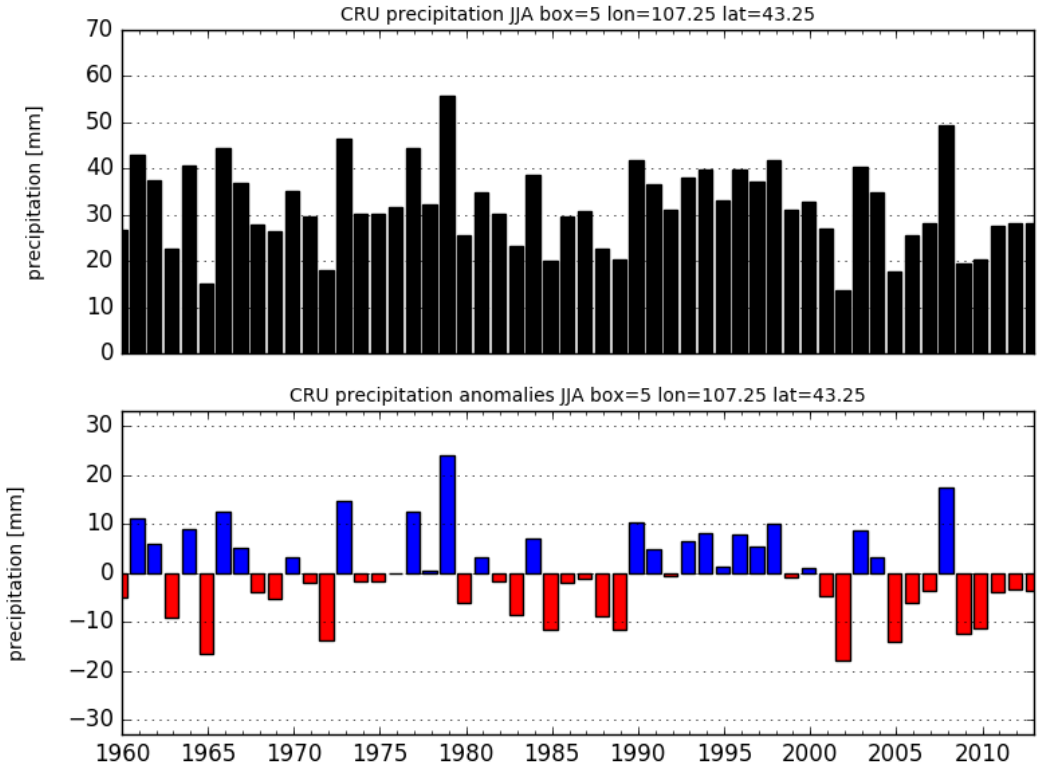
2005
2010

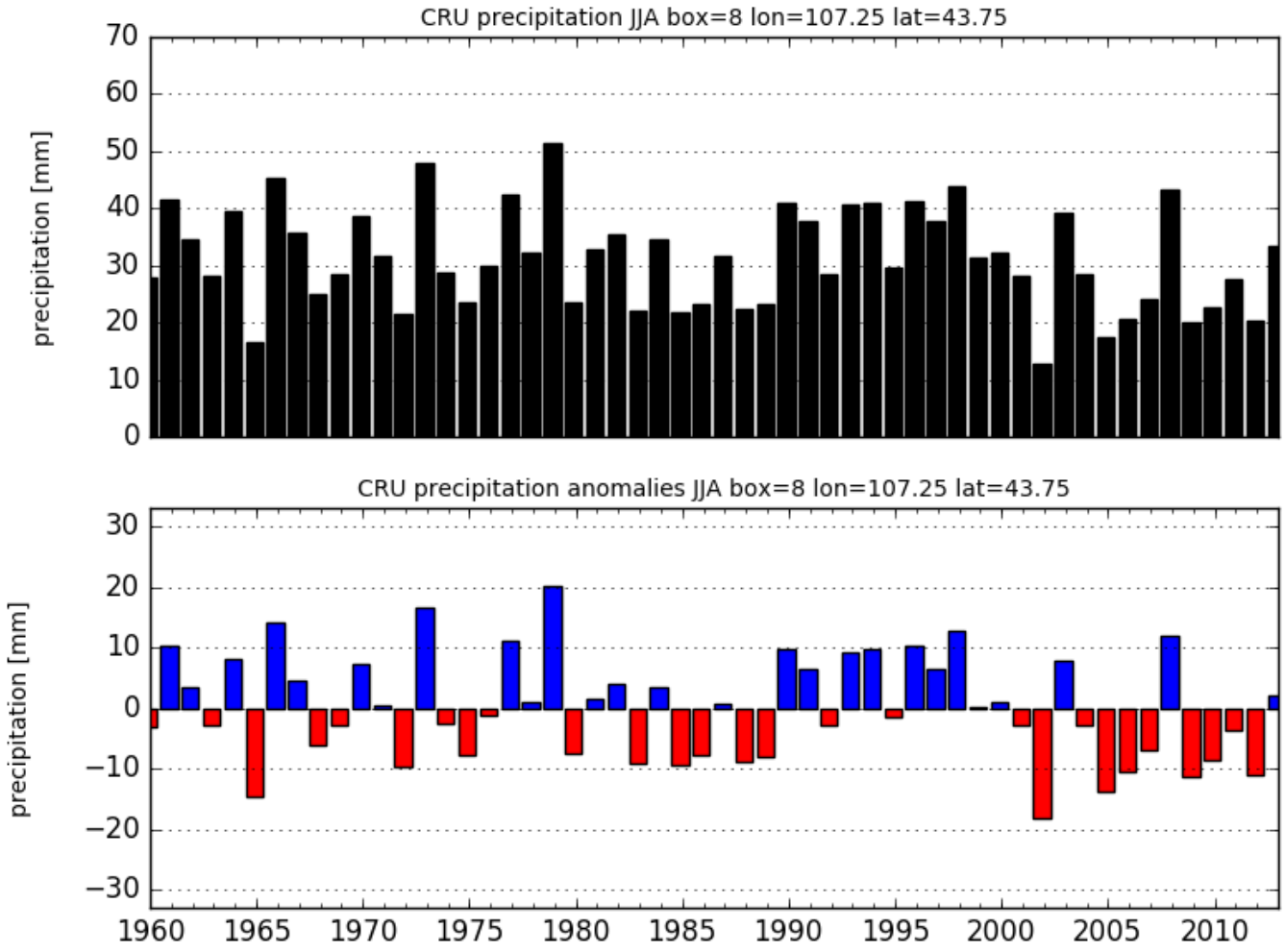
2. Gavaluut Bag, OT north gate



5. Khanbogd Soum



8. Bayan Bag


CRU precipitation JJA box=8 lon=107.25 lat=43.75
precipitation [mm]
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CRU precipitation anomalies JJA box=8 lon=107.25 lat=43.75
precipitation [mm]
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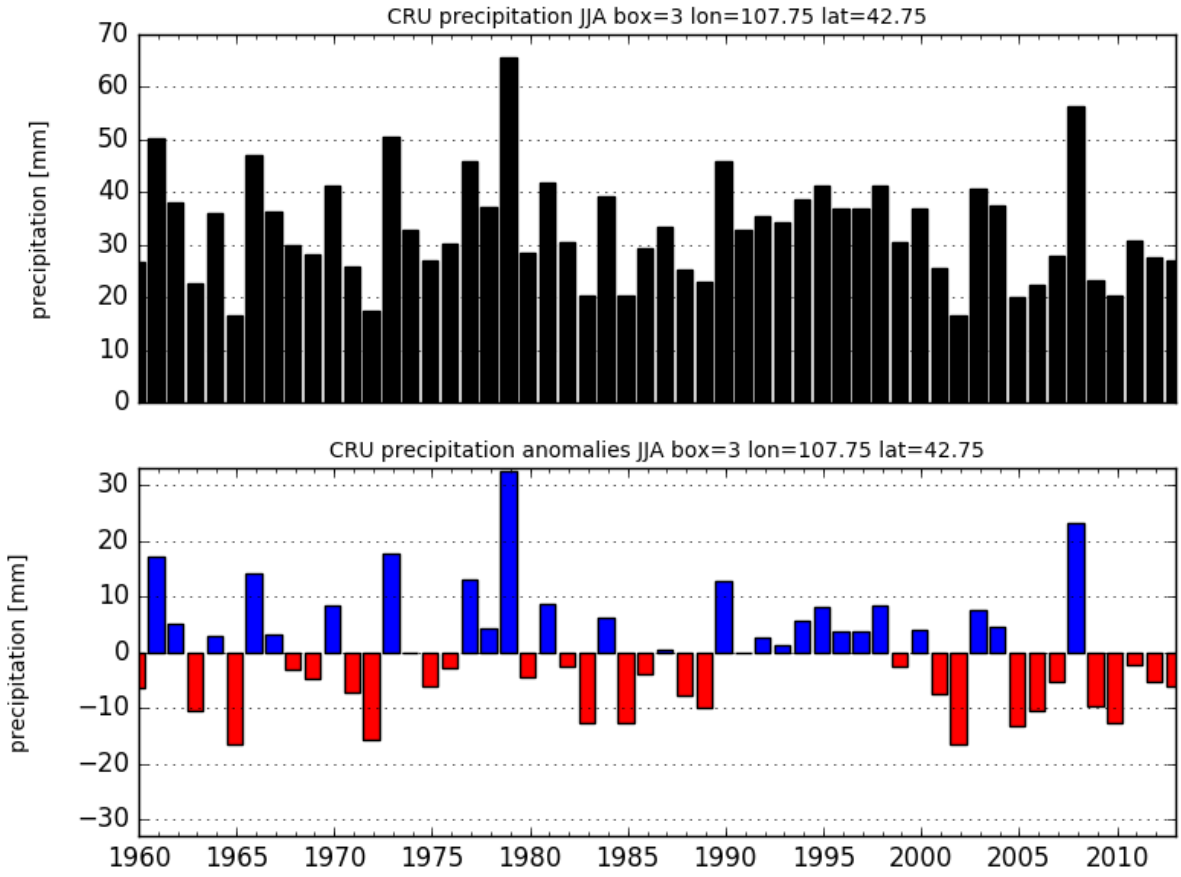
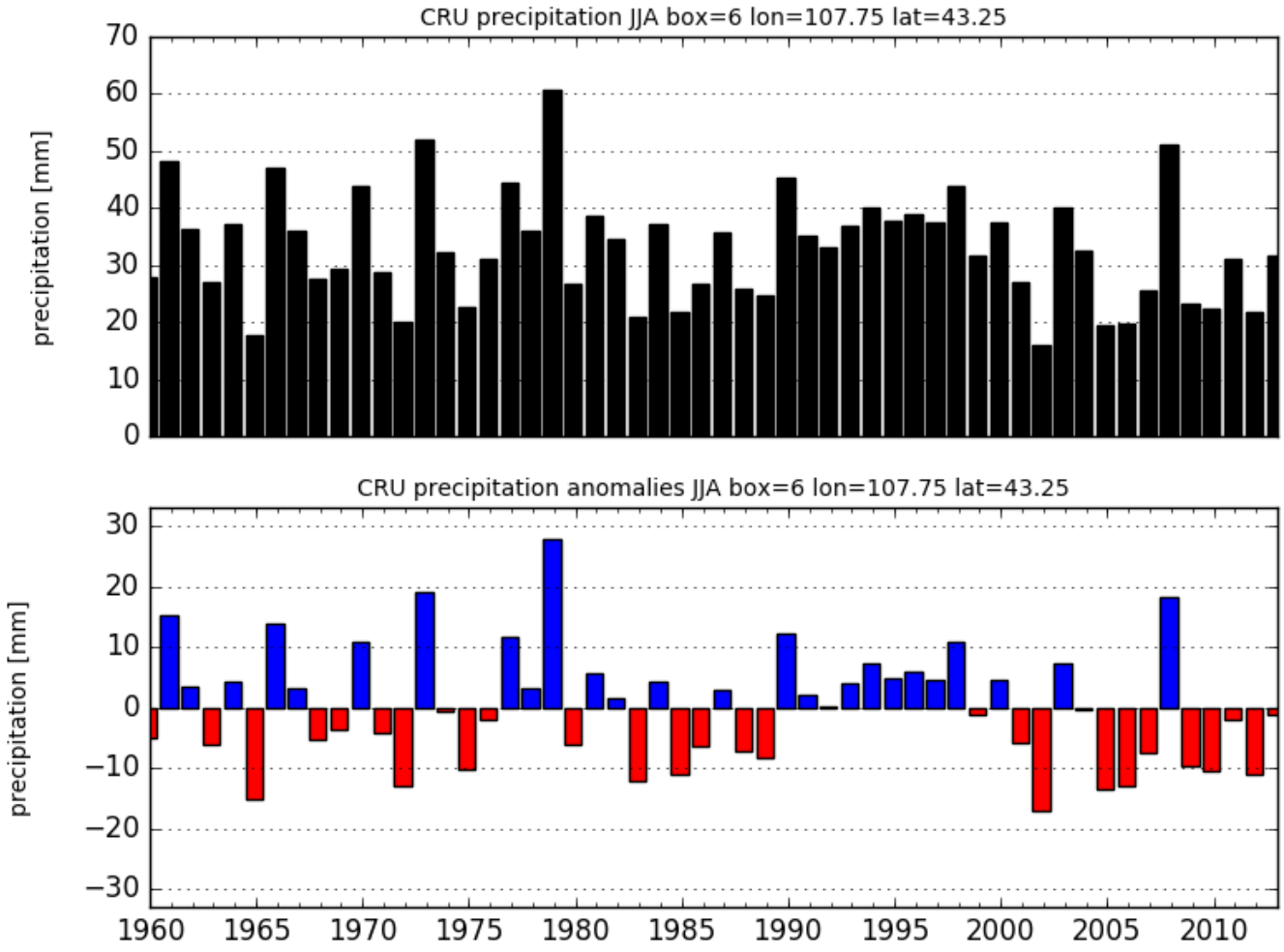
2010

3. Manlai West



6. Manlai


CRU precipitation JJA box=6 lon=107.75 lat=43.25
precipitation [mm]
70
60
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20
10
0
CRU precipitation anomalies JJA box=6 lon=107.75 lat=43.25
precipitation [mm]
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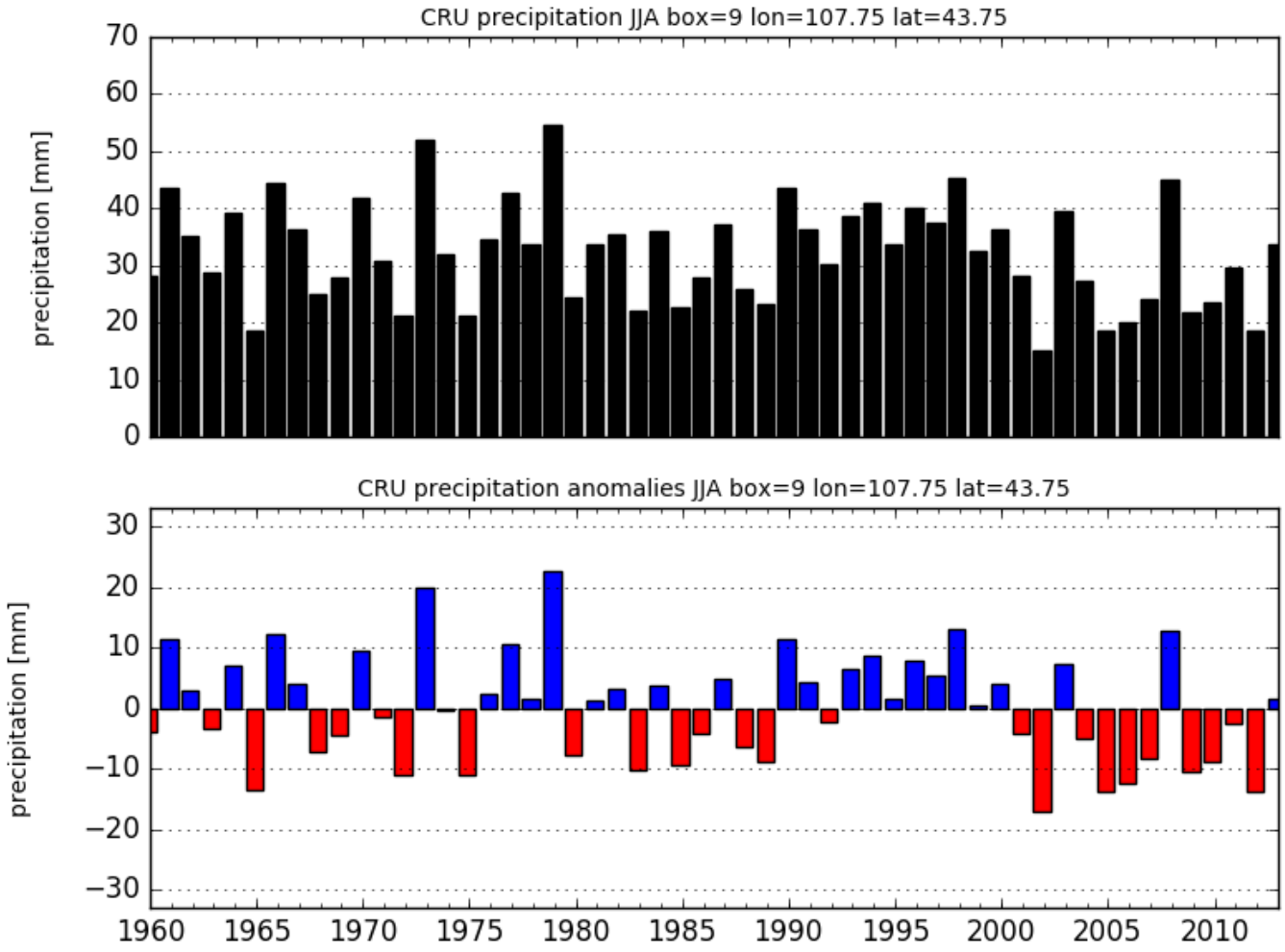
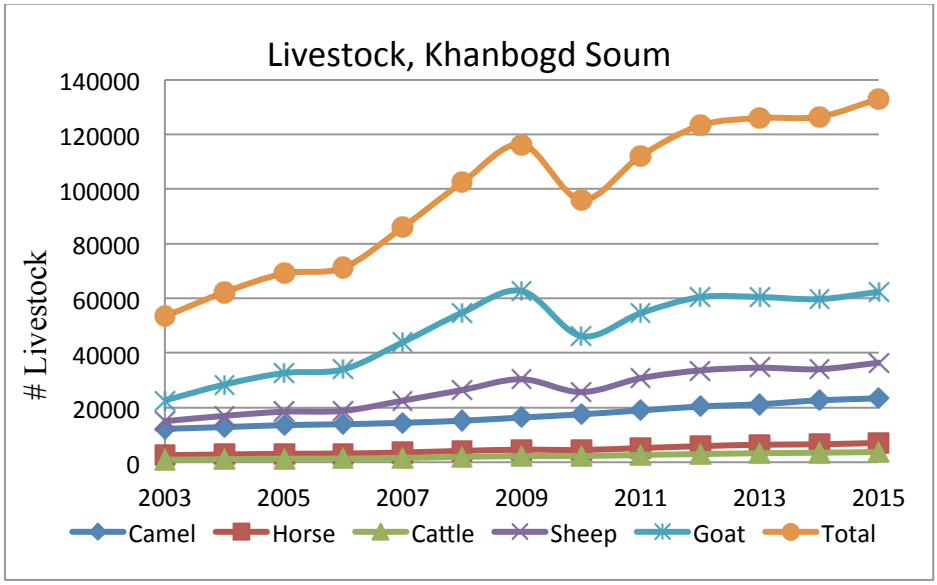
9. Manlai East

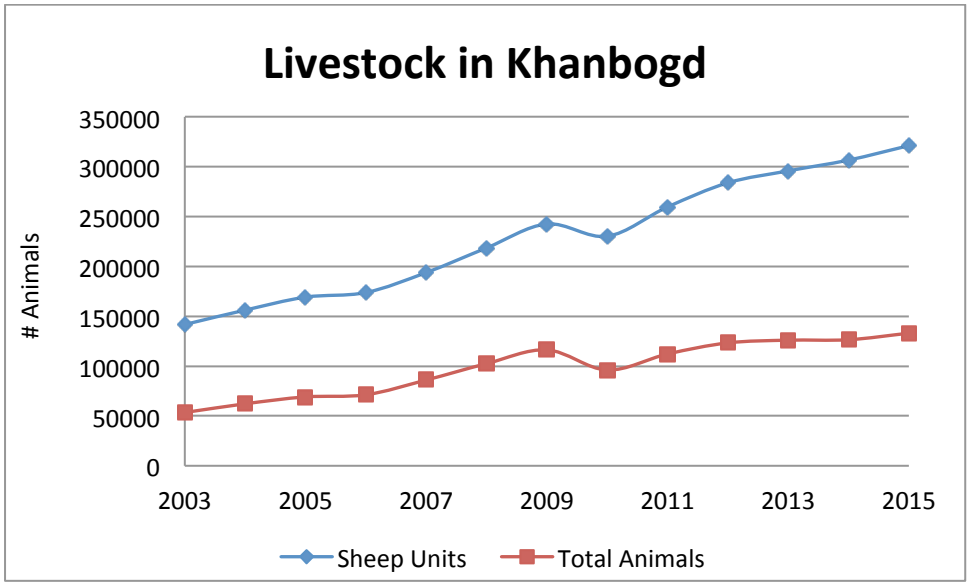


Appendix 4. Livestock in Khanbogd Soum.

1. Livestock numbers in Khanbogd Soum 2003-2015, from soum livestock records.

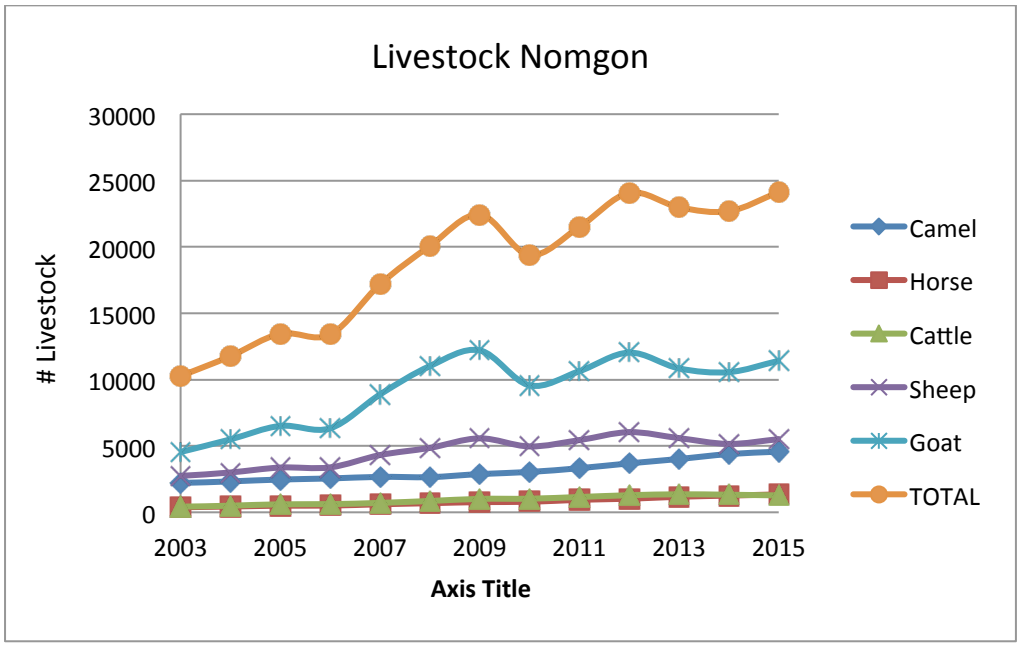


2. Livestock numbers, Sheep Equivalency Units, 2003-2015.
(camel = 7 sheep, horse, cattle = 6 sheep, goat = 0.9 sheep. See Sternberg 2012*a*)

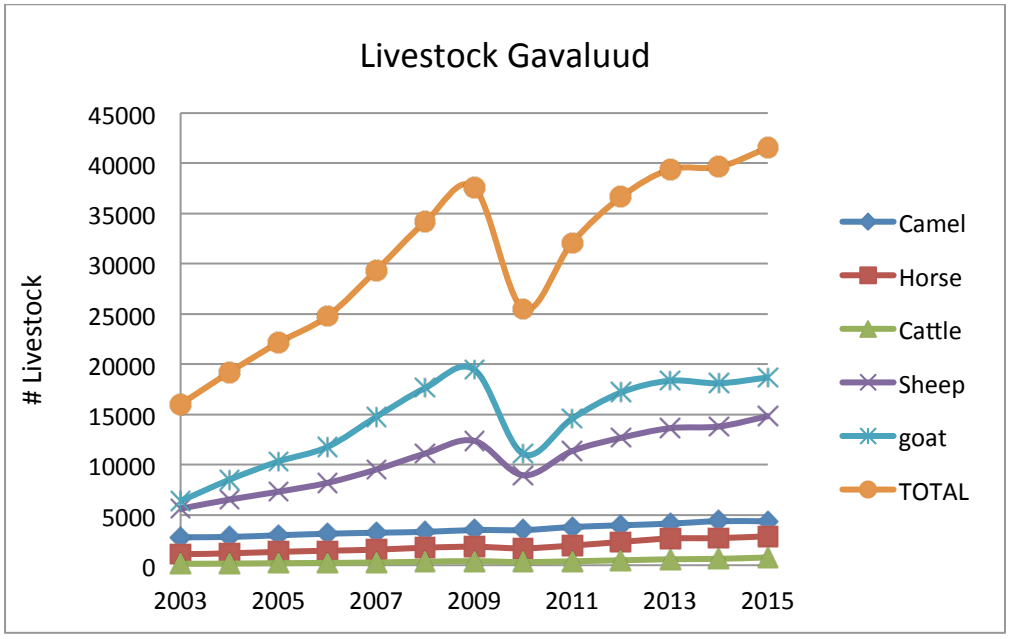


3. Livestock by bagh

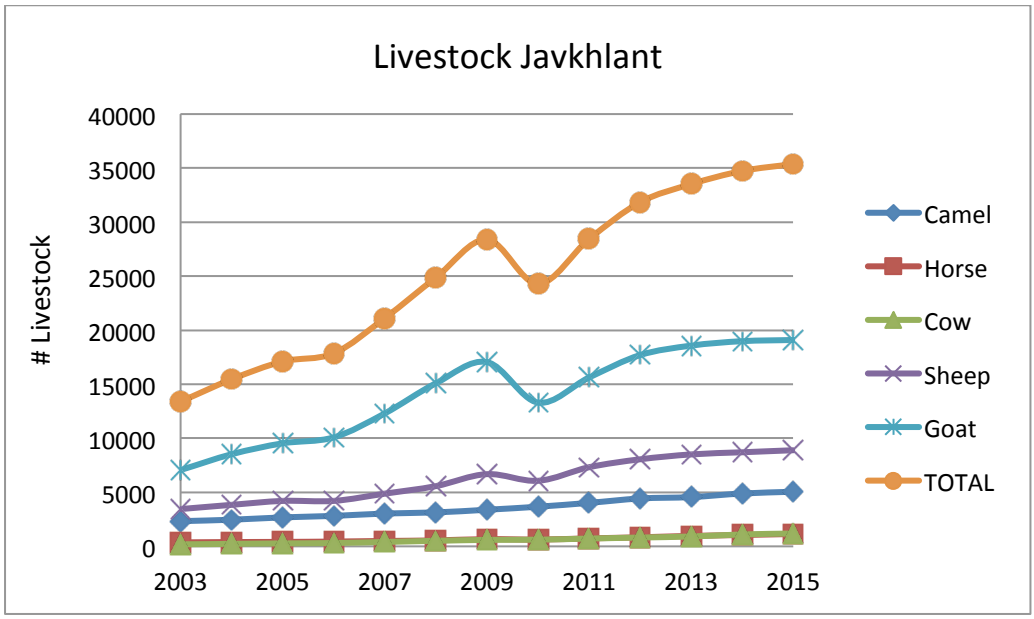
Nomgon Bagh



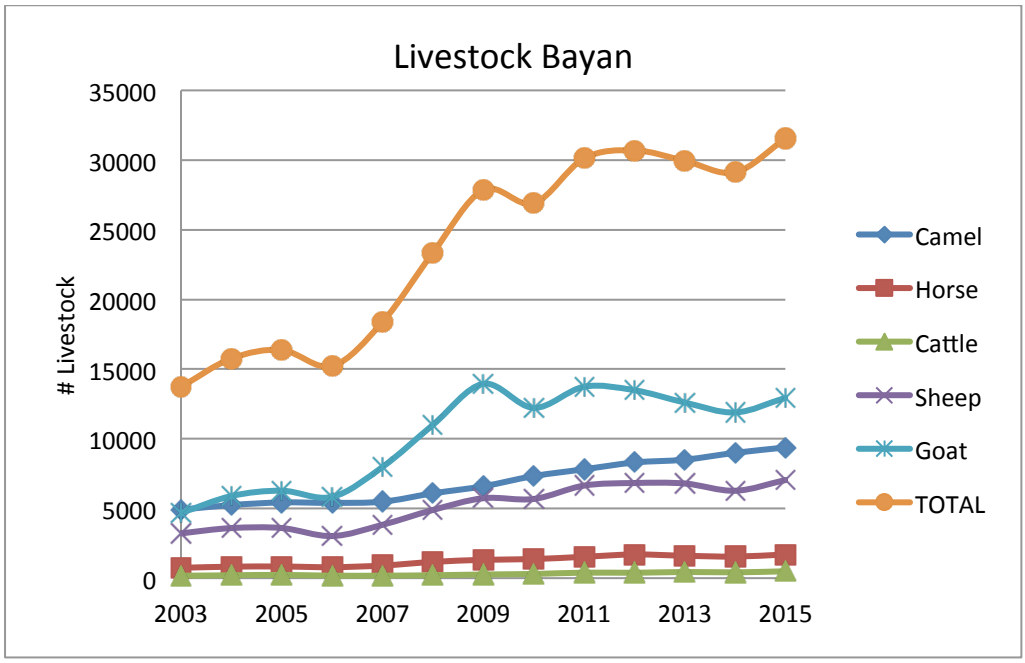
Gavaluud Bagh



Javkhlant Bagh

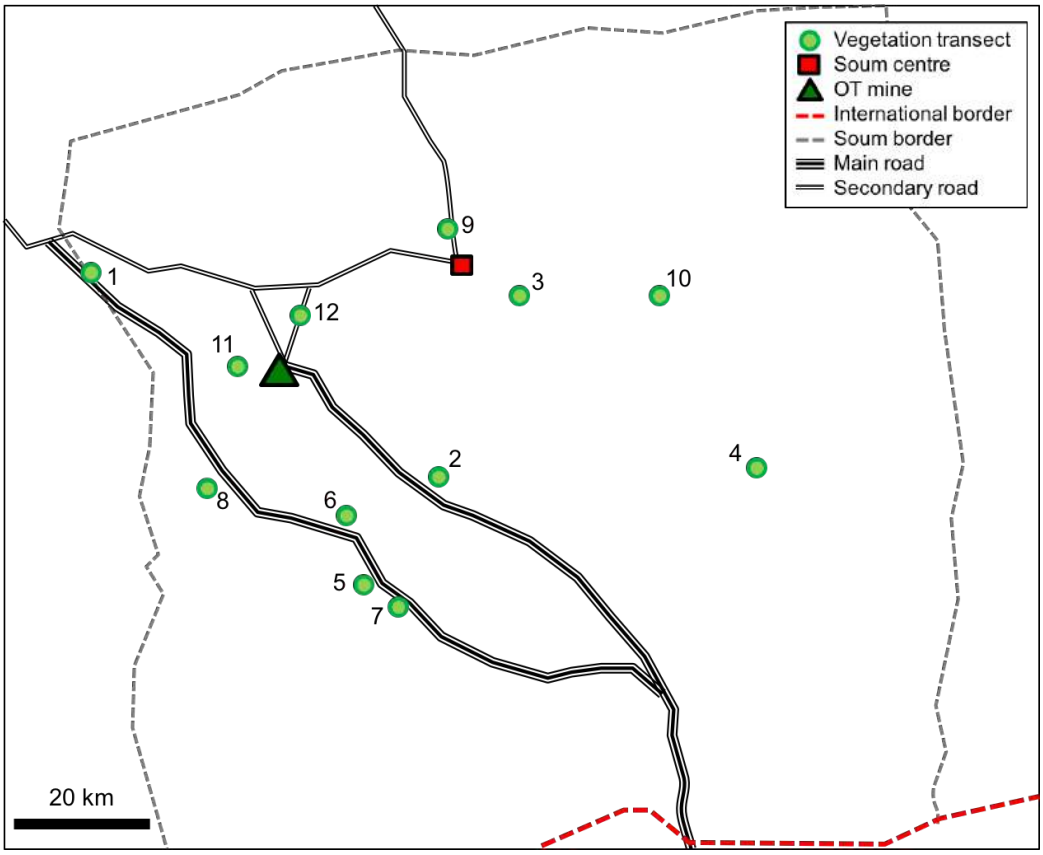


Bayan Bagh



Appendix 5 - PASTURE

Vegetation Transects



Vegetation transect sites in Khanbogd Soum.

Google Earth presentation of sites.

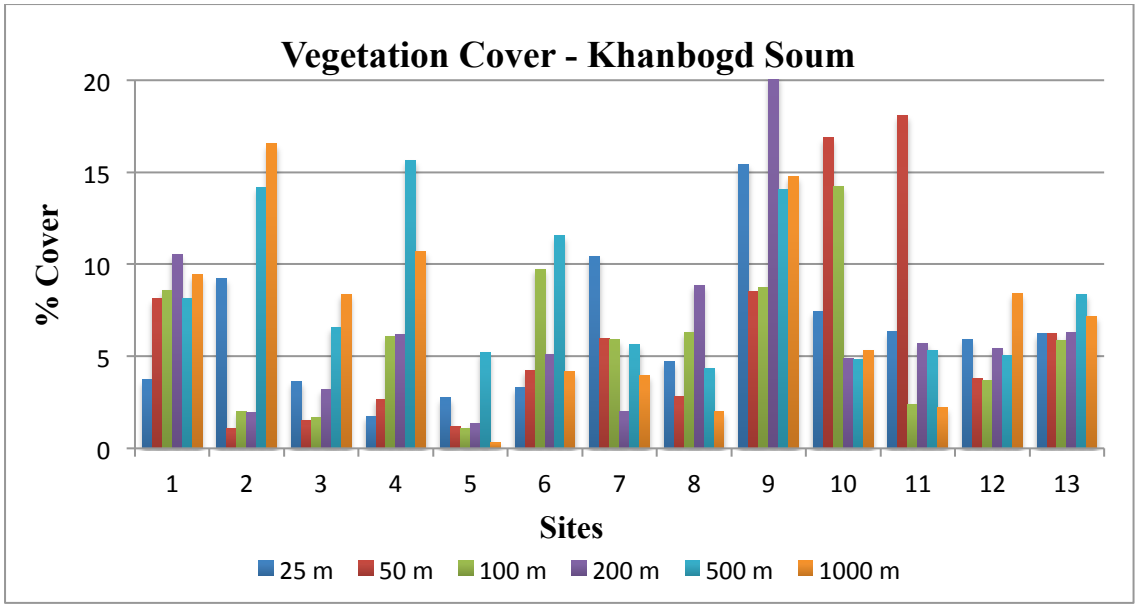
GPS location of vegetation transects.

KHANBOGD

Site	GPS	
	North	East
1	43.18819	106.51221
2	42.91961	107.13648
3	43.15496	107.29905
4	42.92044	107.72688
5	42.79624	107.00436
6	42.8802	106.97153
7	42.76279	107.06673
8	42.92419	106.71723
9	43.22588	107.18538
10	43.14161	107.55861
11	43.07145	106.77863
12	43.12420	106.90439
13	average of twelve sites	

Vegetation cover % at 12 transects Khanbogd Soum.

Site	Vegetation Cover % - metres from well					
	25	50	100	200	500	1000
1	3.7	8.1	8.6	10.5	8.1	9.4
2	9.2	1.1	2.0	1.9	14.2	16.5
3	3.7	1.5	1.7	3.2	6.6	8.4
4	1.7	2.7	6.1	6.2	15.7	10.7
5	2.7	1.2	1.1	1.3	5.2	0.3
6	3.3	4.2	9.7	5.1	11.5	4.2
7	10.4	5.9	5.9	2.0	5.6	4.0
8	4.7	2.8	6.3	8.9	4.3	2.0
9	15.4	8.5	8.7	20.2	14.0	14.8
10	7.4	16.9	14.2	4.9	4.8	5.3
11	6.3	18.1	2.4	5.7	5.3	2.2
12	5.9	3.8	3.7	5.4	5.0	8.4
Average per site	**6.2**	**6.2**	**5.9**	**6.3**	**8.4**	**7.2**



Vegetation cover at 12 sites in Khanbogd soum. Measurements were made from water points at 25, 50, 100, 200, 500 and 1000 metres north of the well.

Plant composition at Khanbogd Soum transects.

Site	Latin name	Mongolian Name	Palatability		Life form	Growth
Khanbogd 1	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 1	Oxytropis myriophylla		palatable	camel, goat, horse, sheep	perennial	shrub
Khanbogd 1	Cleistogenes squarrosa		palatable	camel, goat, horse, sheep		
Khanbogd 1	Achnatherum splendens		palatable	camel, goat, horse, sheep		
Khanbogd 1	Sympegma bunge					
Khanbogd 1	Nitraria					
Khanbogd 2	Ptilotrichum canescens		palatable	goat, horse	perennial	forb
Khanbogd 2	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 2	Zygophyllum xanthoxylon		palatable	camel, goat, sheep		shrub
Khanbogd 2	Amygdalus pedunculata		palatable	camel, deer, goat, sheep		shrub
Khanbogd 2	Lespedeza dahurica		palatable	cattle, goat, horse, sheep	perennial	forb
Khanbogd 3	Cleistogenes squarrosa		palatable	camel, goat, horse, sheep		
Khanbogd 3	Oxytropis myriophylla		palatable	camel, goat, horse, sheep	perennial	shrub
Khanbogd 3	Dracocephalum foetidum					
Khanbogd 3	Artemisia santolinifolia		palatable	camel, cattle, goat, horse, sheep	perennial	shrub
Khanbogd 4	Iris bungei		palatable	camel, cattle, goat, horse, sheep	perennial	forb
Khanbogd 4	Oxytropis aciphylla		palatable	camel, goat, horse, sheep	perennial	shrub
Khanbogd 4	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 4	Echinops gmelinii		palatable	camel, horse	perennial	forb
Khanbogd 4	Artemisa anethifolia		palatable	camel, goat, sheep	annual/biennial	forb
Khanbogd 4	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Khanbogd 4	Convolvulus ammanii		palatable	goat, sheep	perennial	forb
Khanbogd 5	Iris oxypetala		palatable		perennial	
Khanbogd 5	Artemisia santolinifolia		palatable	camel, cattle, goat, horse, sheep	perennial	shrub
Khanbogd 5	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 5	Pedicularis abrotaniflolia		palatable	camel, goat, horse, sheep		
Khanbogd 5	Achnatherum splendens		palatable	camel, goat, horse, sheep		
Khanbogd 5	Sympegma bunge					
Khanbogd 5	Ulmus					
Khanbogd 5	Nitraria					
Khanbogd 6	Iris bungei		palatable	camel, cattle, goat, horse, sheep	perennial	forb
Khanbogd 6	Arnebia guttata		palatable	camel, goat, sheep	perennial	forb
Khanbogd 6	Ptilagrostis pelliotii				perennial	
Khanbogd 6	Stipa gobica		palatable	camel, cattle, goat, horse, sheep		grass
Khanbogd 6	Raemuria soongorica		palatable	camel, goat, sheep	perennial	shrub
Khanbogd 6	Tournefortia sibirica		palatable	camel	perennial	forb
Khanbogd 6	Artemisia santolinifolia		palatable	camel, cattle, goat, horse, sheep	perennial	shrub
Khanbogd 6	Iris oxypetala		palatable		perennial	
Khanbogd 6	Amygdalus pedunculata		palatable	camel, deer, goat, sheep		shrub
Khanbogd 6	Kalidium foliatum		palatable	camel		shrub
Khanbogd 6	Olgeae leucophylla				perennial	forb
Khanbogd 6	Zygophyllum rosovii		palatable	cattle, goat, horse, sheep	perennial	shrub
Khanbogd 6	Scorphularia incisa					shrub
Khanbogd 6	Artemisia scoparia		palatable	camel, cattle, goat, horse, sheep	biennial	forb
Khanbogd 6	Zygophyllum xanthoxylon		palatable	camel, goat, sheep		shrub
Khanbogd 7	Raemuria soongorica		palatable	camel, goat, sheep	perennial	shrub
Khanbogd 7	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 7	lom		palatable	camel, goat, horse, sheep		shrub
Khanbogd 7	Artemisia scoparia		palatable	camel, cattle, goat, horse, sheep	biennial	forb
Khanbogd 7	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Khanbogd 7	Oxytropis aciphylla		palatable	camel, goat, horse, sheep	perennial	shrub
Khanbogd 8	Elymus paboanus		palatable	camel, cattle, goat, horse		grass
Khanbogd 8	Amygdalus pedunculata		palatable	camel, deer, goat, sheep		shrub
Khanbogd 8	Stipa gobica		palatable	camel, cattle, goat, horse, sheep		grass
Khanbogd 8	Convolvulus ammanii		palatable	goat, sheep	perennial	forb
Khanbogd 8	Salsola passerina		palatable	camel, goat, horse, sheep		shrub
Khanbogd 8	Raemuria soongorica		palatable	camel, goat, sheep	perennial	shrub
Khanbogd 8	Olgeae leucophylla					forb
Khanbogd 8	Zygophyllum xanthoxylon		palatable	camel, goat, sheep		shrub

Site	Latin name	Mongolian Name	Palatability		Life form	Growth
Khanbogd 9	Elymus chinensis		palatable	camel, cattle, goat, horse, sheep	perennial	grass
Khanbogd 9	Amygdalus pedunculata		palatable	camel, deer, goat, sheep		shrub
Khanbogd 9	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 9	Caragana leuncophloea		palatable	camel, goat, sheep		shrub
Khanbogd 9	Eurotia ceratoides		palatable			shrub
Khanbogd 9	Convolvulus ammanii		palatable	goat, sheep	perennial	forb
Khanbogd 9	Arnebia guttata		palatable	camel, goat, sheep	perennial	forb
Khanbogd 9	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Khanbogd 9	Salsola passerina		palatable	camel, goat, horse, sheep		shrub
Khanbogd 9	Oxytropis aciphylla		palatable	camel, goat, horse, sheep	perennial	shrub
Khanbogd 10	Suaeda corniculata		palatable	camel, goat, horse, sheep	annual	forb
Khanbogd 10	Elymus paboanus		palatable	camel, cattle, goat, horse		grass
Khanbogd 10	Raemuria soongorica		palatable	camel, goat, sheep	perennial	shrub
Khanbogd 10	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 10	Ptilotrichum canescens		palatable	goat, horse	perennial	forb
Khanbogd 10	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Khanbogd 10	Convolvulus fruticosus					shrub
Khanbogd 11	Scorzonera pseudodivaricata		palatable	goat, sheep		shrub
Khanbogd 11	Zygophyllum xanthoxylon		palatable	camel, goat, sheep		shrub
Khanbogd 11	Iris bungei		palatable	camel, cattle, goat, horse, sheep	perennial	forb
Khanbogd 11	Stipa gobica		palatable	camel, cattle, goat, horse, sheep		grass
Khanbogd 11	Panzeria lanata		palatable	goat, horse, sheep		forb
Khanbogd 11	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 11	Raemuria soongorica		palatable	camel, goat, sheep	perennial	shrub
Khanbogd 11	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Khanbogd 11	Atriplex sibirica				annual	forb
Khanbogd 11	Bassia dasyphylla		palatable	camel	annual	shrub
Khanbogd 12	Stipa gobica		palatable	camel, cattle, goat, horse, sheep		grass
Khanbogd 12	Eurotia ceratoides		palatable			shrub
Khanbogd 12	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Khanbogd 12	Anabasis brevifolia		palatable	camel	perennial	forb

Vegetation composition at Manlai Soum transects.

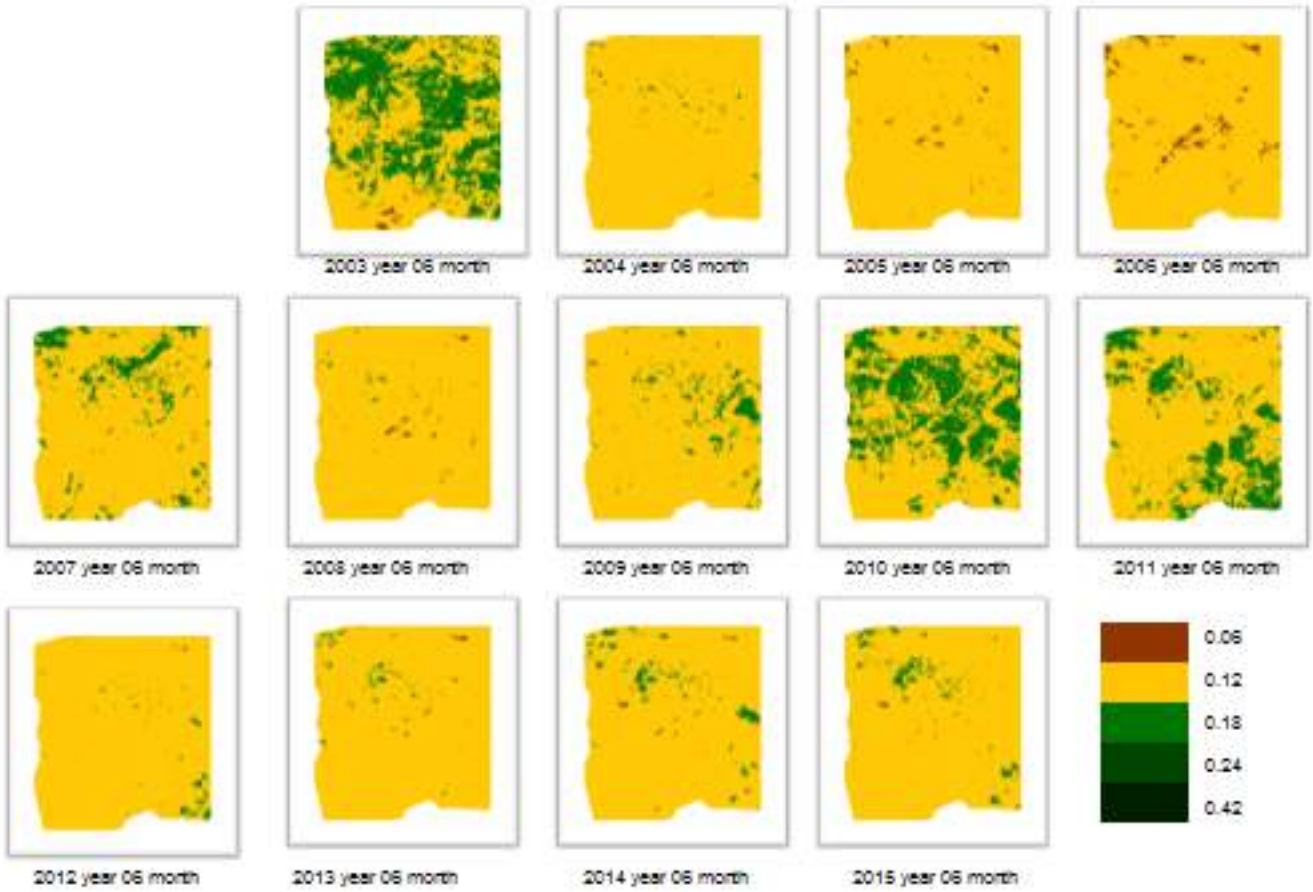
Site	Latin name	Mongolian Name	Palatability		Life form	Growth
Manlai 1	Leymus chinensis		palatable	camel, cattle, goat, horse, sheep	perennial	grass
Manlai 1	Convolvulus ammanii		palatable	goat, sheep	perennial	forb
Manlai 1	Ptilotrichum canescens		palatable	goat, horse	perennial	forb
Manlai 1	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Manlai 1	Nitraria sibirica		palatable	camel, goat, sheep		shrub
Manlai 1	Eurotia ceratoides		palatable			shrub
Manlai 2	Lappula stricta				annual	forb
Manlai 2	Peganum nigellastrum		palatable	camel, goat, horse, sheep	perennial	forb
Manlai 2	Reaumuria soongorica		palatable	camel, goat, sheep	perennial	shrub

Appendix 6 - Remote Sensing

Remote sensing using MODIS data presents a history of pasture vegetation from 2003-2015 in Khanbogd Soum. Using satellite information highlights land cover change through the Normalised Differential Vegetation Index (NDVI). Colours represent different cover classes (not actual landscape). In figures below yellow represents 6-12% vegetation cover, green shows 12-18% coverage.

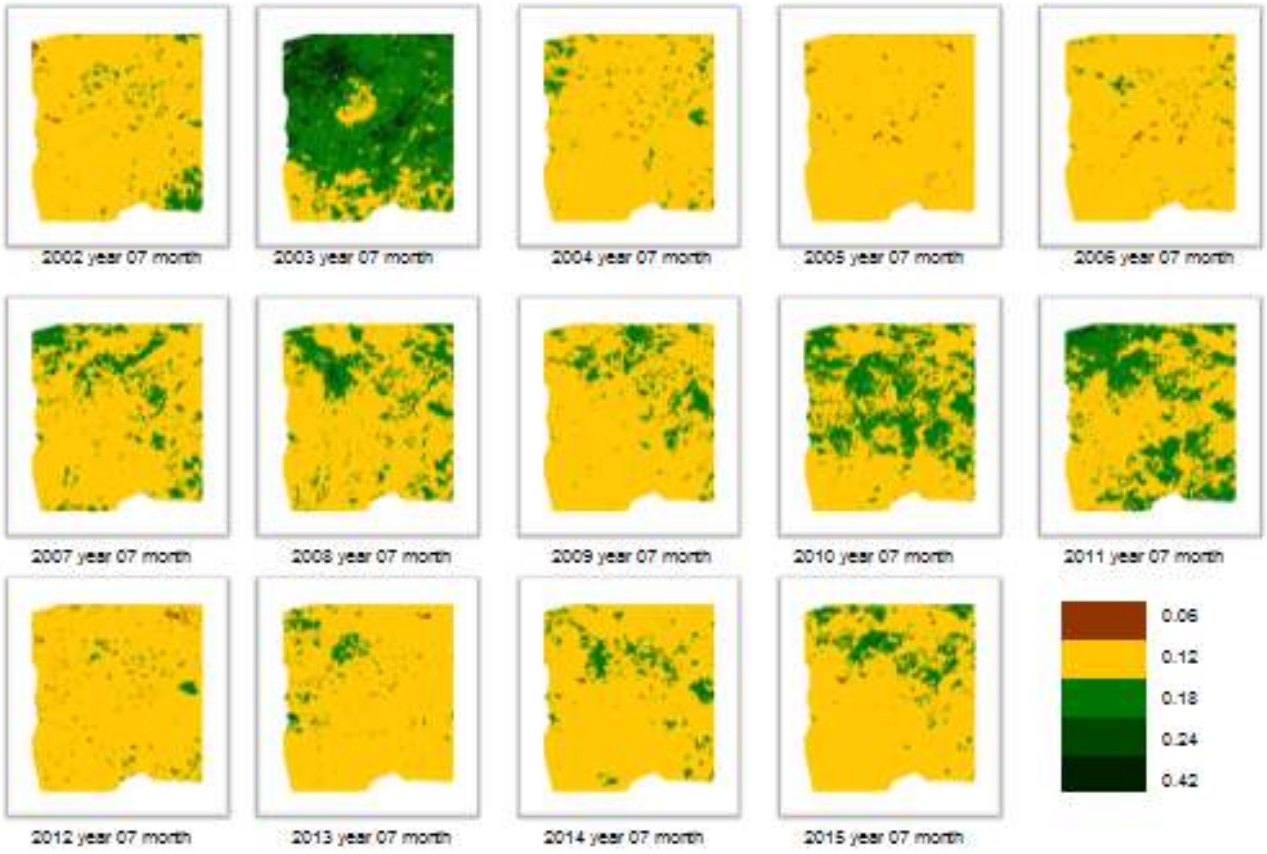
JUNE by year

Remote sensing using MODIS, Normalised Differential Vegetation Index (NDVI). June 2003-2015 in Khanbogd Soum.



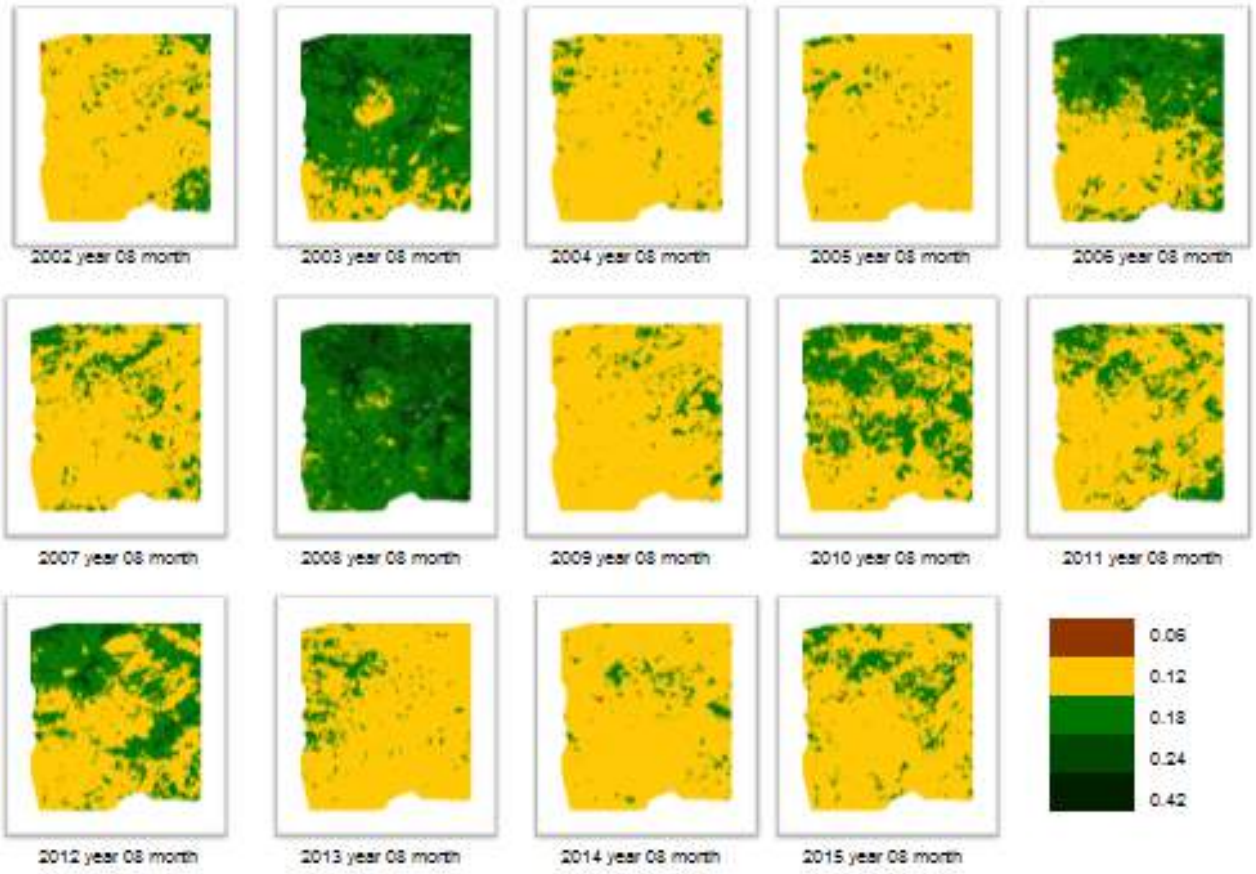
JULY by year

Remote sensing using MODIS, Normalised Differential Vegetation Index (NDVI). July, 2002-2015 in Khanbogd Soum.



AUGUST by year

Remote sensing using MODIS, Normalised Differential Vegetation Index (NDVI). August 2002-2015 in Khanbogd Soum.

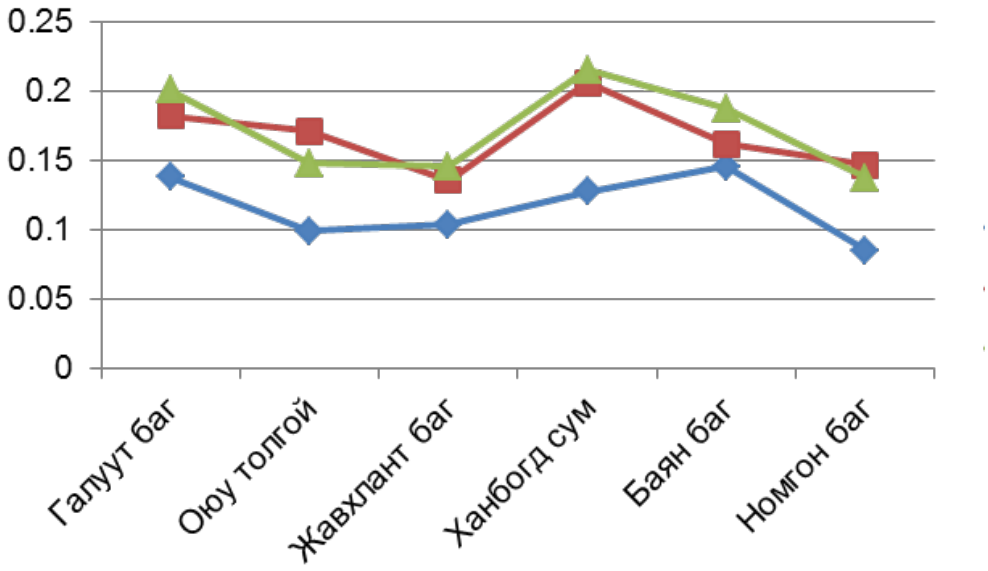


NDVI coverage at Bag level.

2002

NDVI at bags, soum and OT north gate.

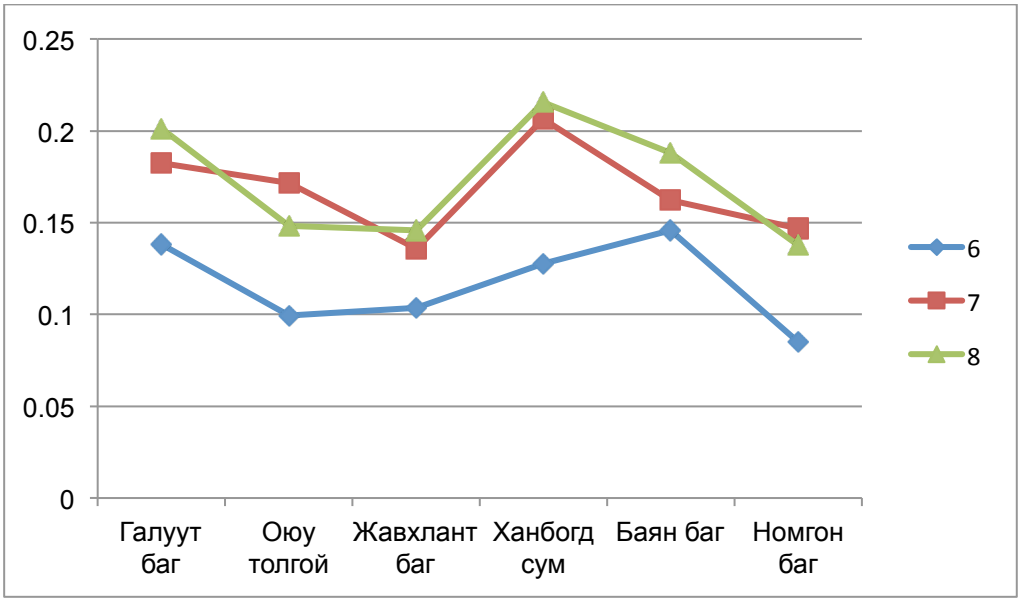
blue = June, red = July, green = August



2003

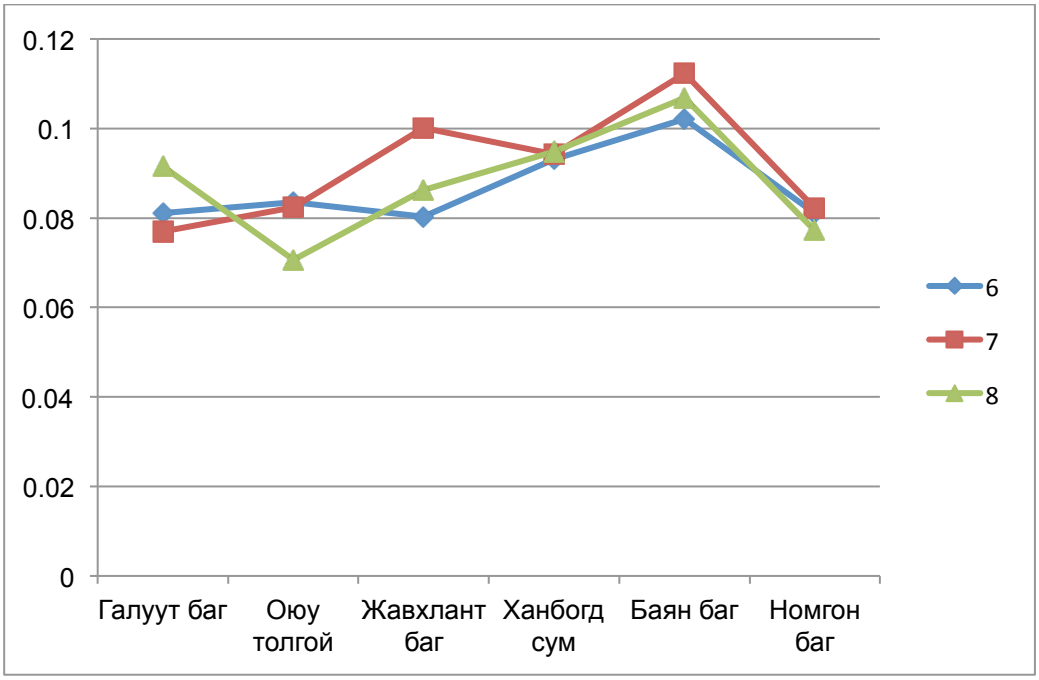
NDVI at bags, soum and OT north gate.

blue = June, red = July, green = August



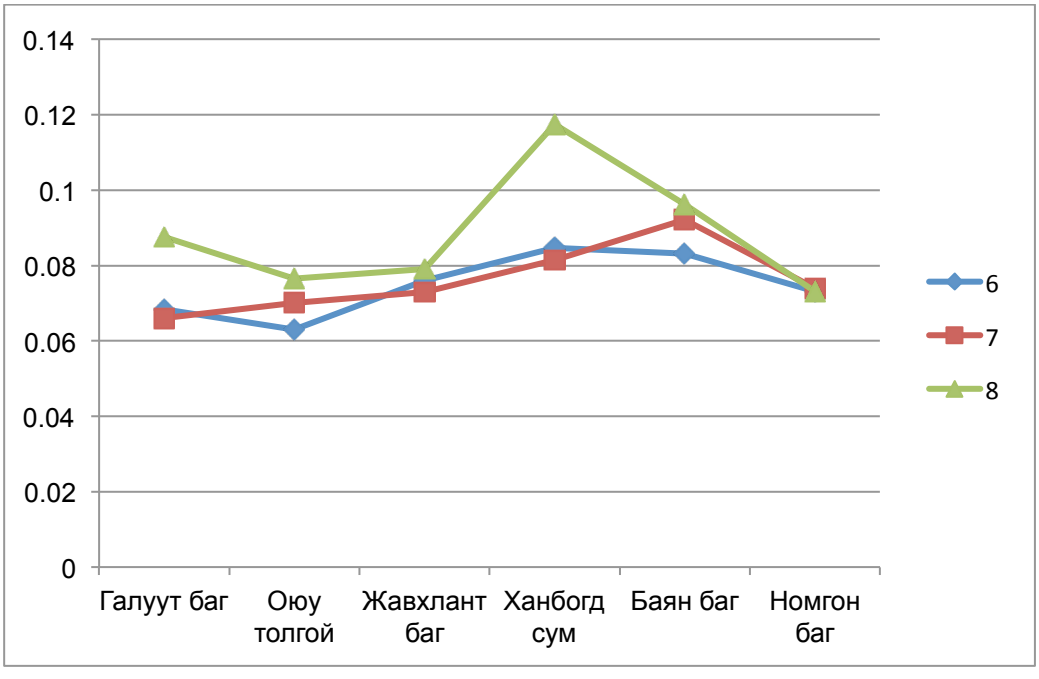
2004

NDVI at bags, soum and OT north gate.
blue = June, red = July, green = August



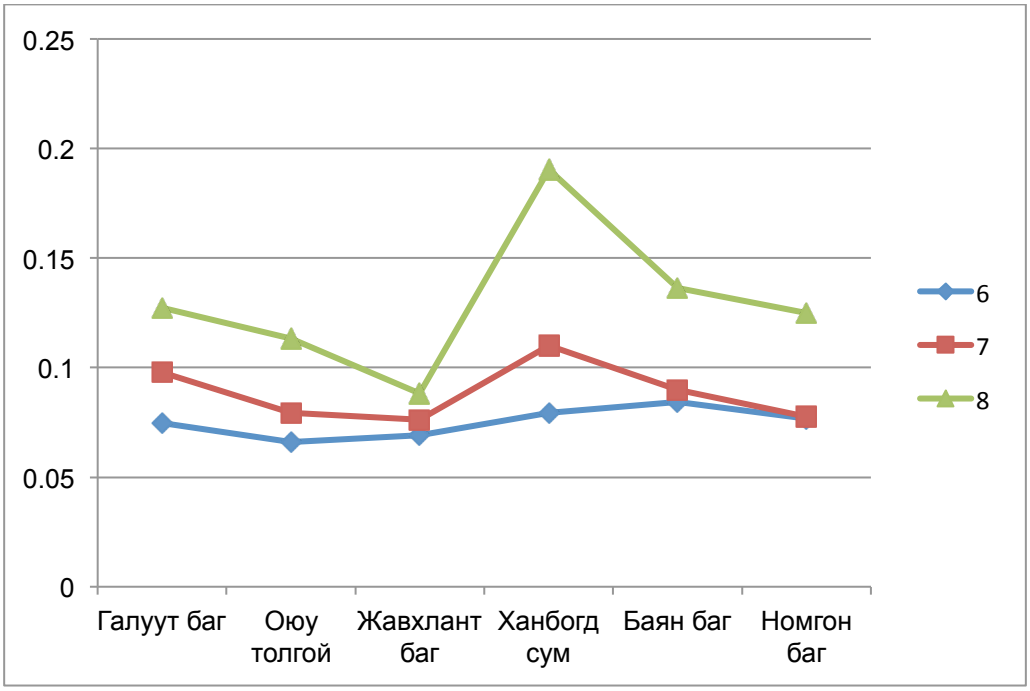
2005

NDVI at bags, soum and OT north gate.
blue = June, red = July, green = August



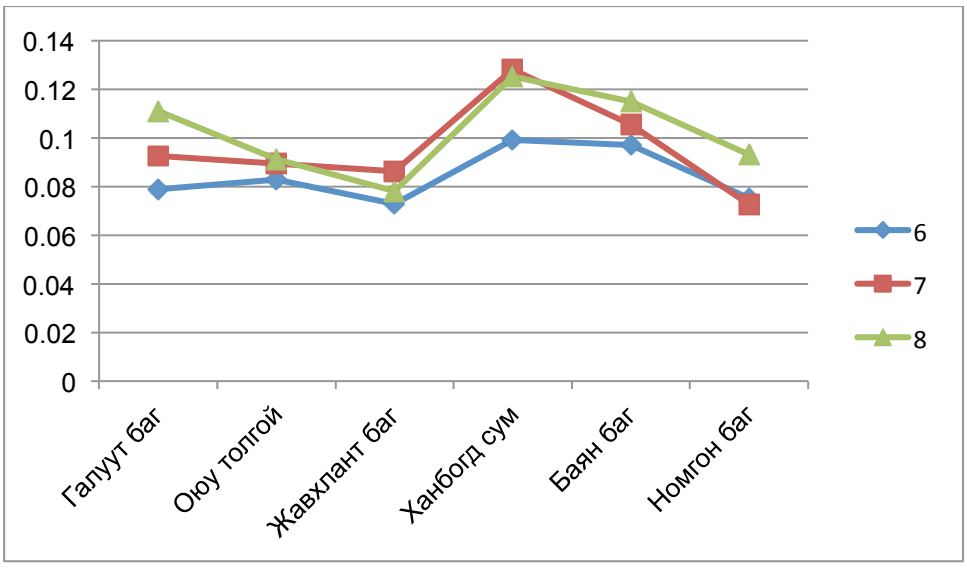
2006

NDVI at bags, soum and OT north gate.
blue = June, red = July, green = August



2007

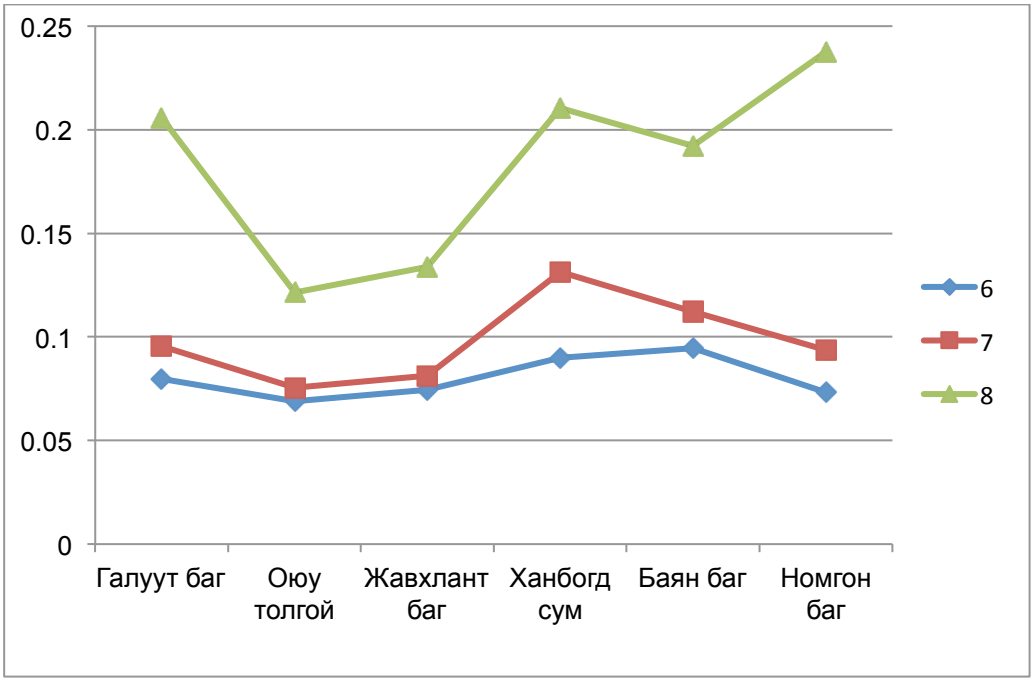
NDVI at bags, soum and OT north gate.
blue = June, red = July, green = August



2008

NDVI at bags, soum and OT north gate.

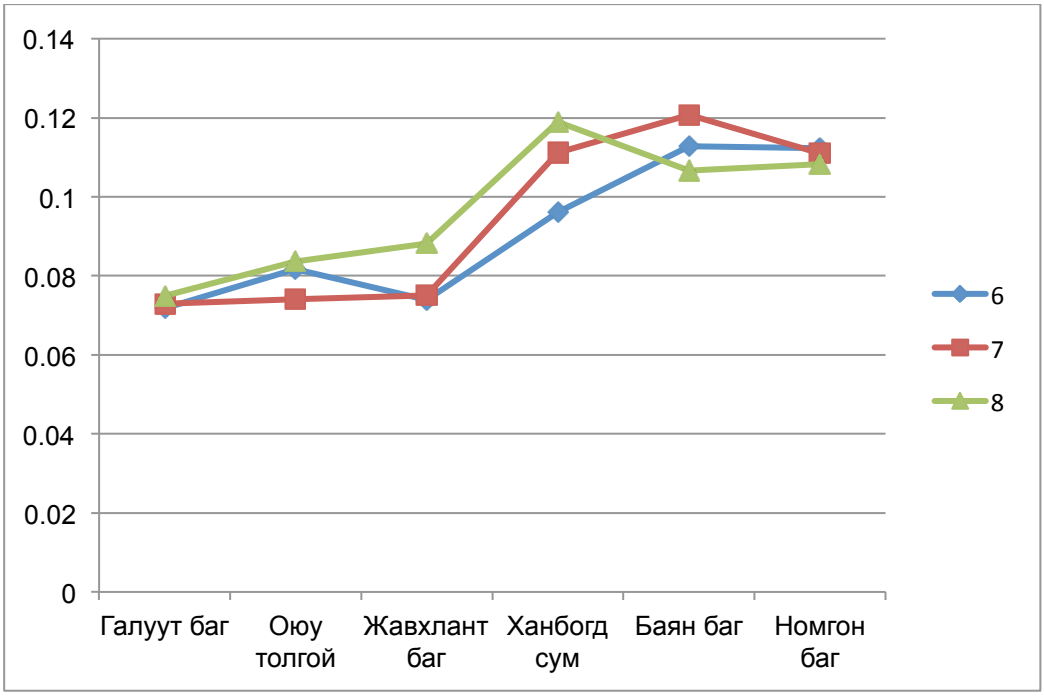
blue = June, red = July, green = August



2009

NDVI at bags, soum and OT north gate.

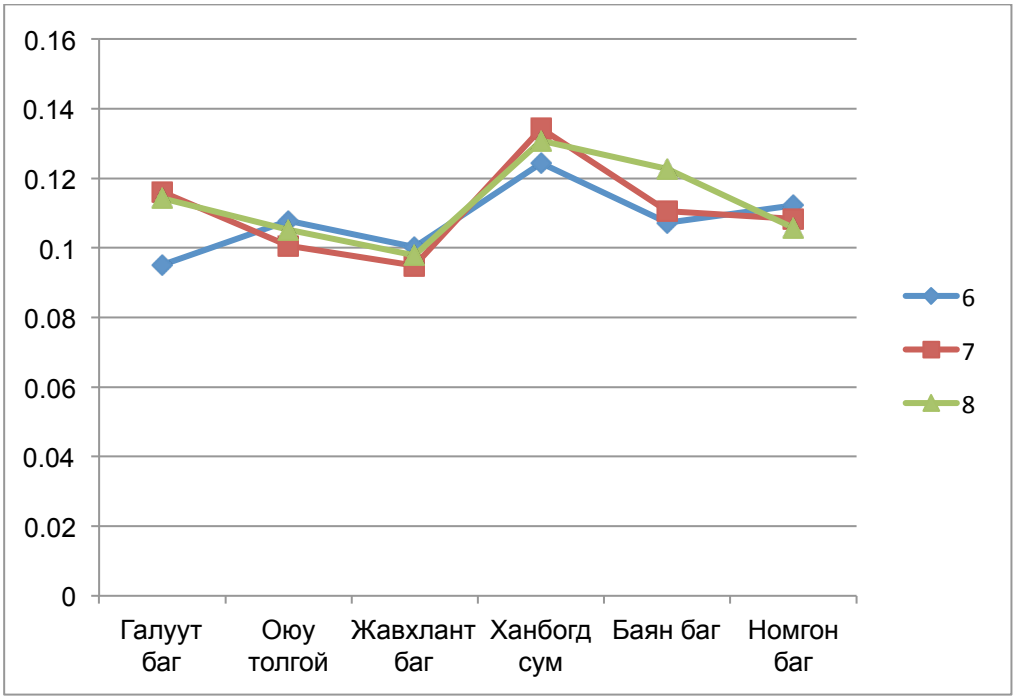
blue = June, red = July, green = August



2010

NDVI at bags, soum and OT north gate.

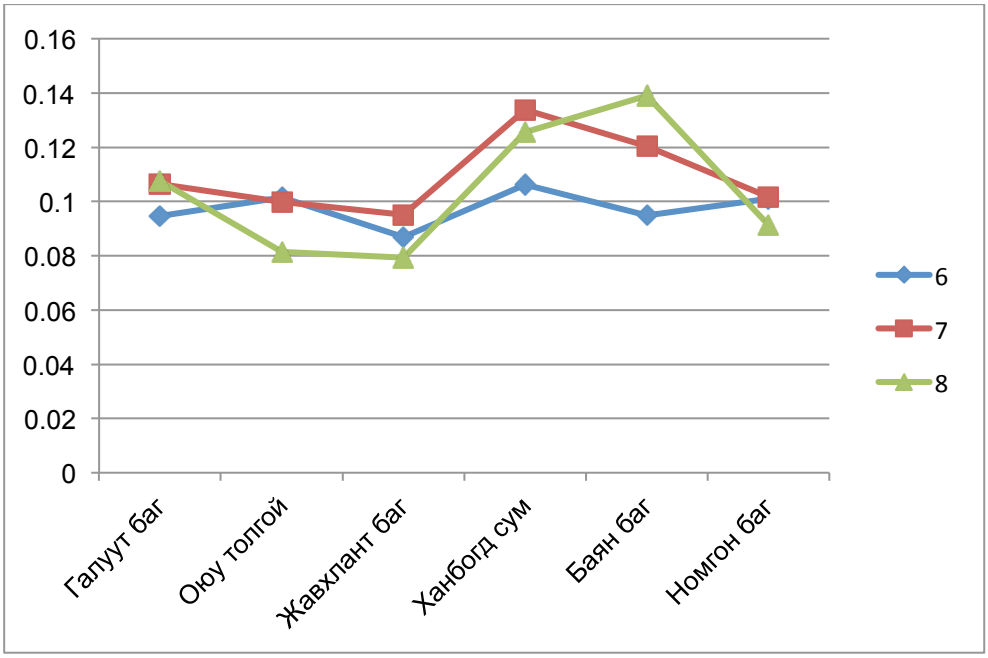
blue = June, red = July, green = August



2011

NDVI at bags, soum and OT north gate.

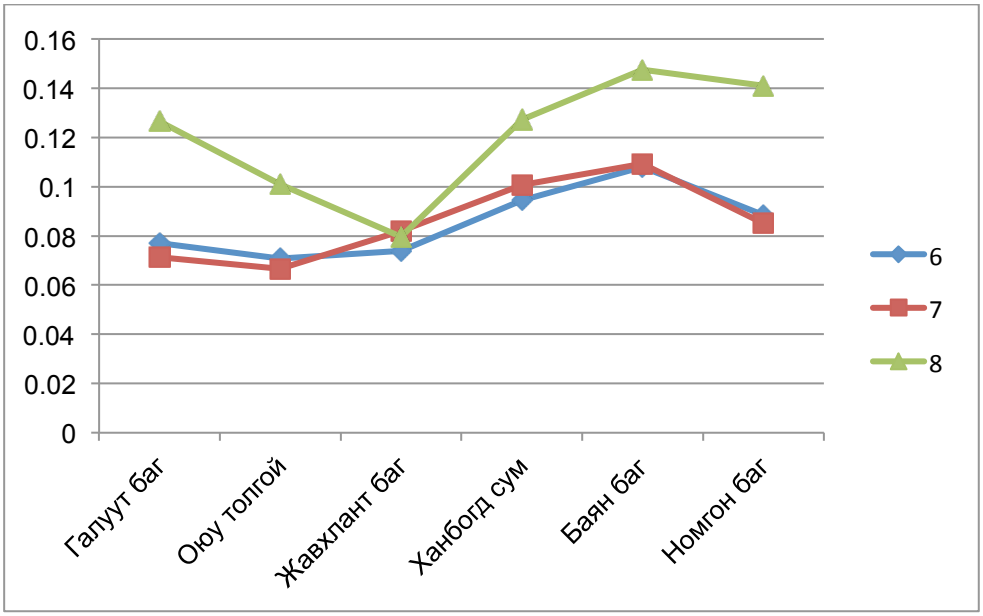
blue = June, red = July, green = August



2012

NDVI at bags, soum and OT north gate.

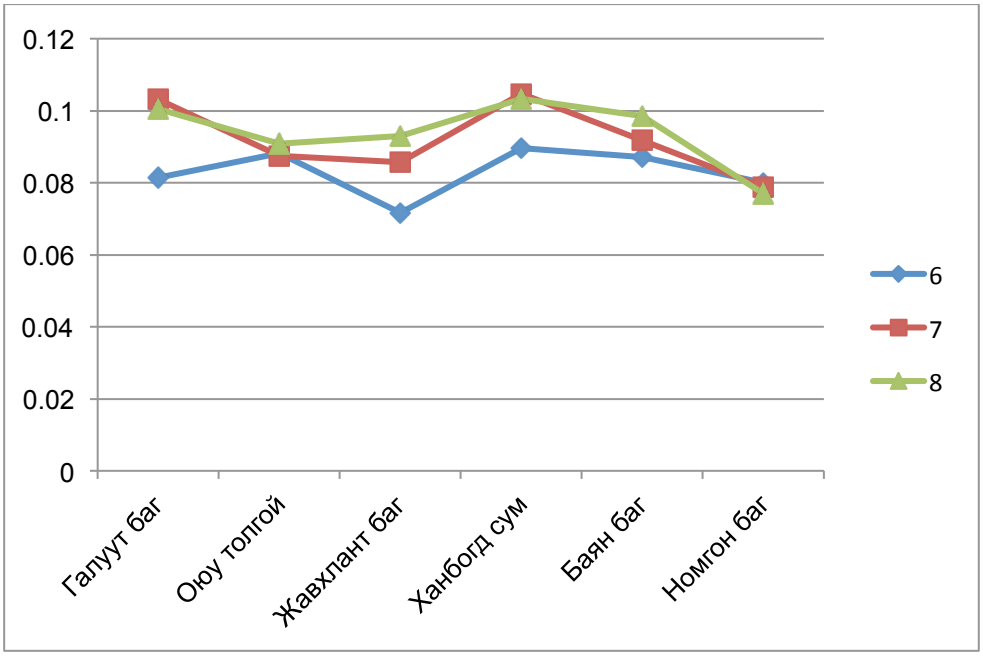
blue = June, red = July, green = August



2013

NDVI at bags, soum and OT north gate.

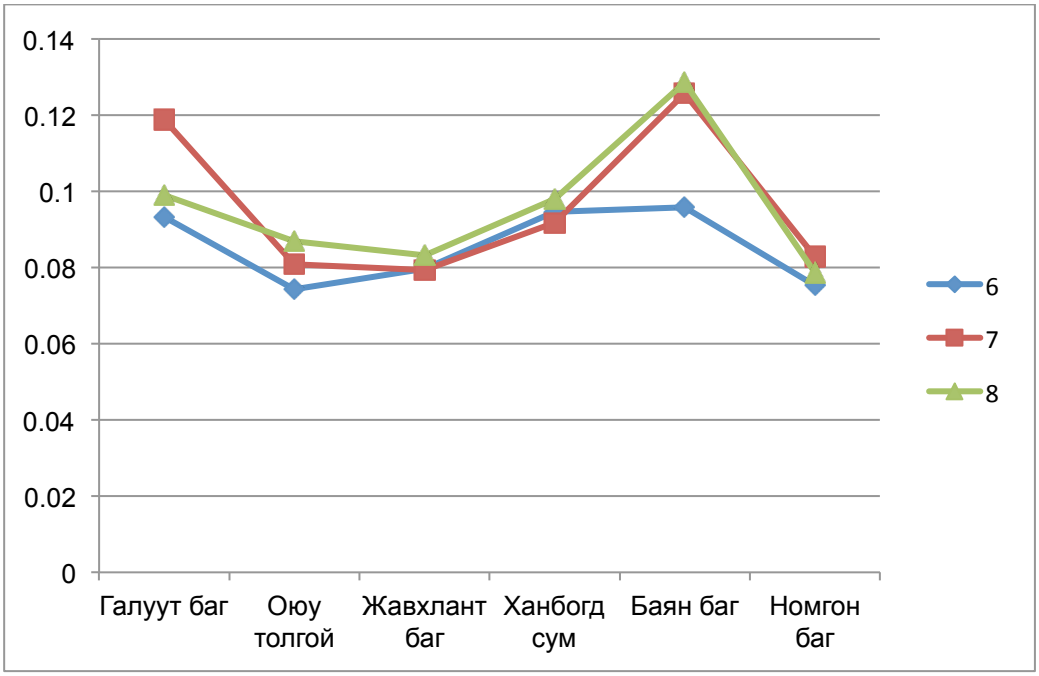
blue = June, red = July, green = August



2014

NDVI at bags, soum and OT north gate.

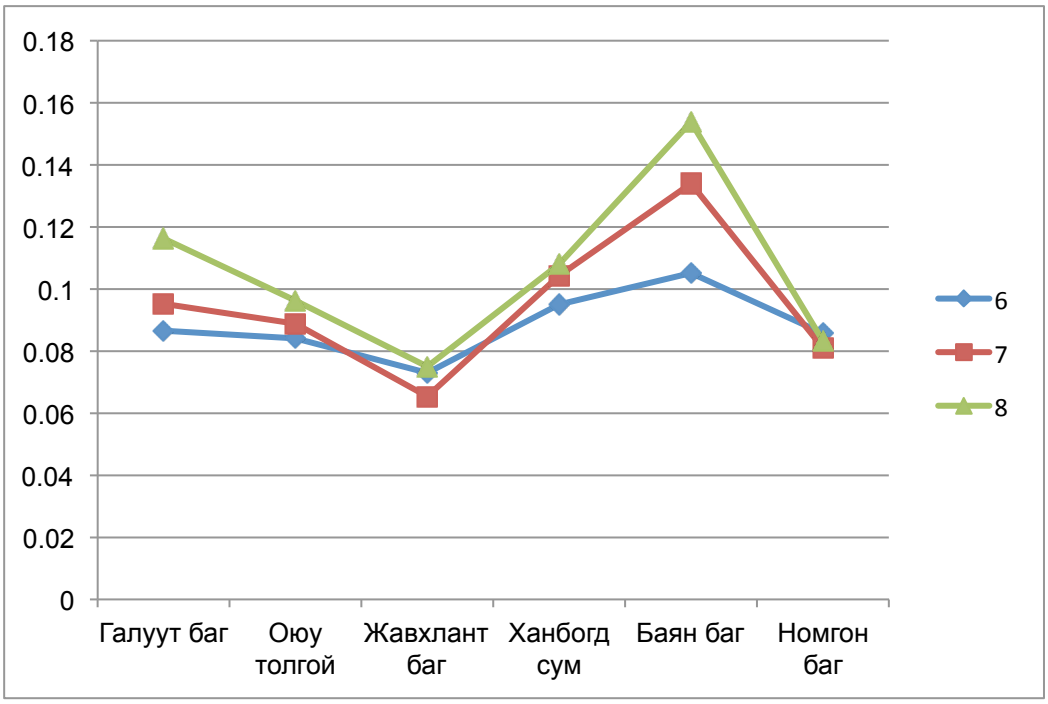
blue = June, red = July, green = August



2015

NDVI at bags, soum and OT north gate.

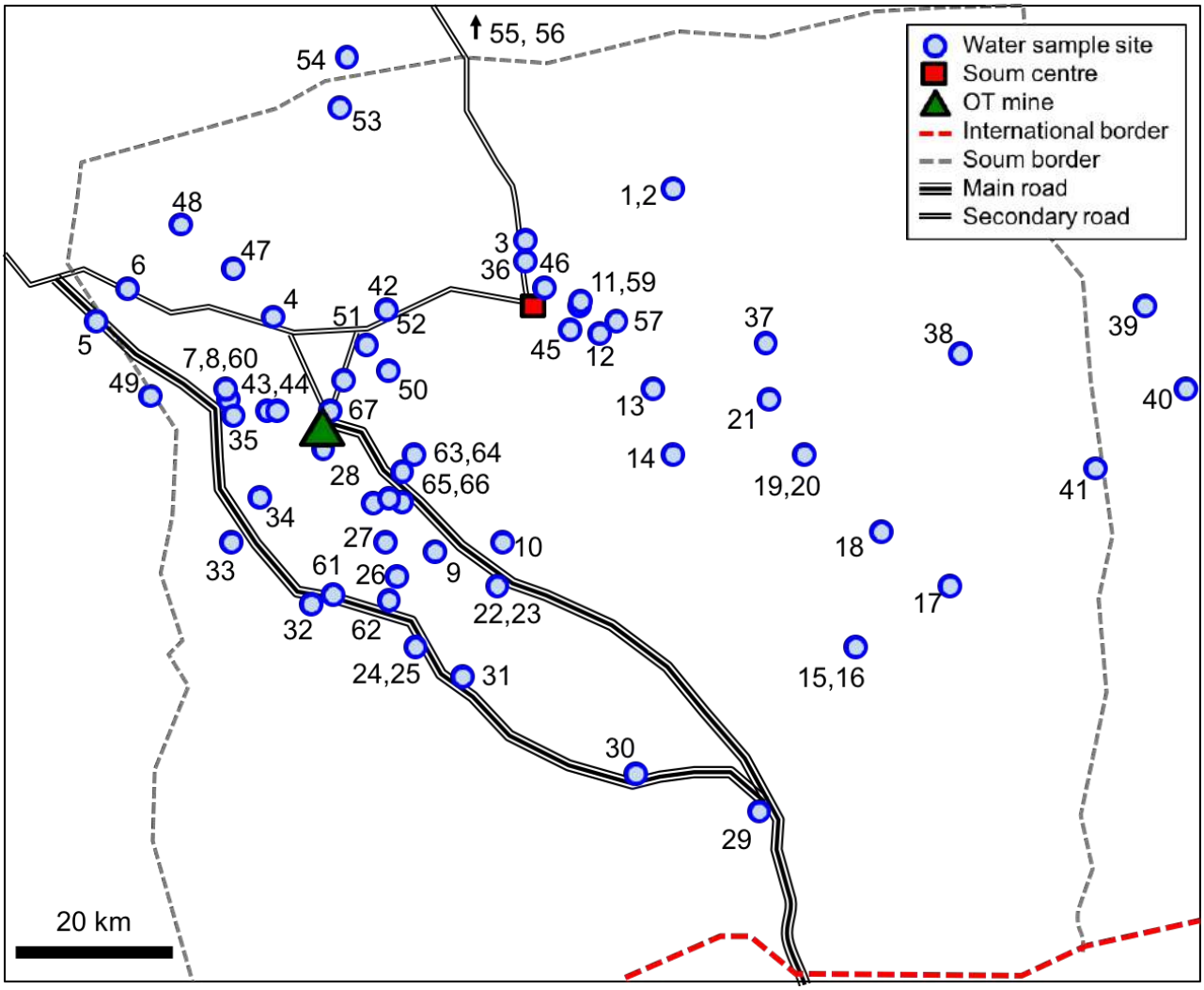
blue = June, red = July, green = August



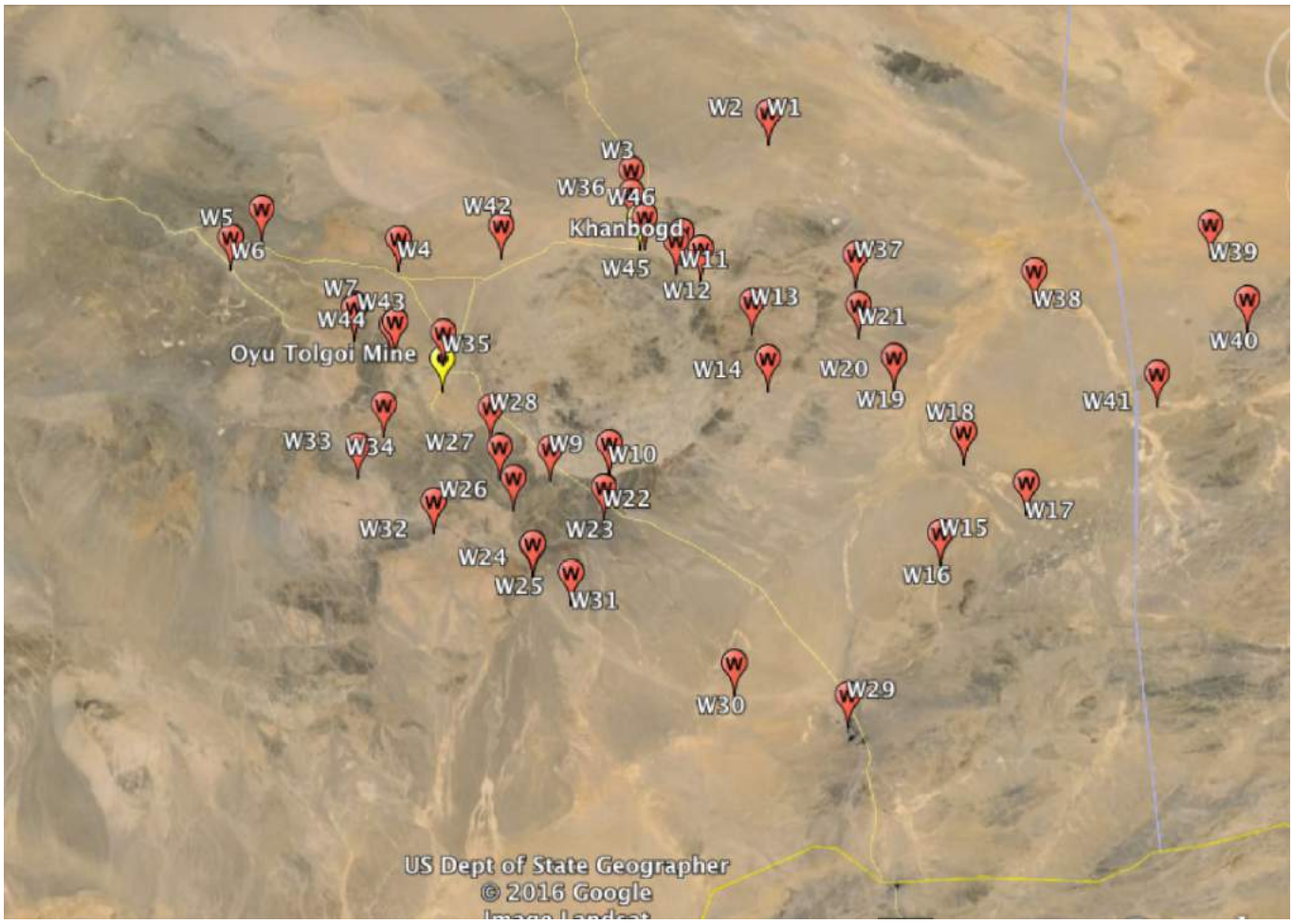
Appendix 7 - WATER

The data reflects water inspection and testing at 67 sites in Khanbogd Soum.

Testing sites in Khanbogd Soum



Google Earth map of testing sites in Khanbogd Soum.



Water test site data and test results Quality tests were done for pH, Total Dissolved Solids (TDS), Electro-conductivity (EC) and presence of heavy metals in the water. Tests were done by Hanna HI 98129 (the same meter used by OT in tests). The instrument provides an indicator of quality levels in the field but is not exact; it is approximate rather than exact. Sensafe Heavy metal test strips were used.

WATER / WELLS

Site	GPS North	GPS East	Altitude	pH	TDS	EC	Heavy Metals <	Water level	Bag	Type
W1	43.31950	107.42027	967	7.8	840	1585	10	~	Bayan	Hand pump
W2	43.31958	107.42017	966	6.3	775	1570	10	2.4	Bayan	Hand pump
W3	43.25381	107.18646	1051	7.7	350	690	20	~	Bayan	Deep, motor, locl
W4	43.17701	106.79328	1190	7.88	2000	4000	10	~	Gavalut	Delivery tank
W5	43.18319	106.51228	1318	8.07	2000	4000	20	~	Gavalut	Deep, motor, locl
W6	43.21725	106.56519	1240	8.3	404	680	20	8	Gavalut	Hand
W7	43.09357	106.71651	1237	7.8	1075	2180	10	1	Gavalut	Hand
W8	43.09642	106.71712	1230	7.9	415	820	10	~	Javalant	Deep, motor, locl
W9	42.91462	107.03757	1026	8.2	307	616	20	1	Javalant	Hand
W10	42.91961	107.13648	1070	8	338	678	10	~	Javalant	Hand pump
W11	43.17617	107.26743	1071	9.2	155	318	10	0	Nomgon	Surface
W12	43.15496	107.29905	1117	9.2	277	530	10	9	Nomgon	Hand
W13	43.08749	107.3819	1149	8.99	254	507	10	2	Nomgon	Hand
W14	43.01800	107.4055	1008	8.8	520	1040	10	~	Nomgon	Deep, motor, locl
W15	42.79673	107.6851	972	8.9	328	655	10	3	Nomgon	Deep, motor, locl
W16	42.79657	107.6839	946	8.65	221	444	10	~	Nomgon	Deep, motor
W17	42.85503	107.83115	946	8.6	1892	3785	10	6	Nomgon	Deep, motor, locl
W18	42.91978	107.72939	898	8.5	744	1492	10	~	Nomgon	Deep, motor
W19	43.01419	107.61688	906	8.45	592	1180	10	2	Nomgon	Hand
W20	43.01408	107.61692	906	8.35	582	1159	10	2	Nomgon	Hand
W21	43.07056	107.5606	939	8.6	362	722	10	1.9	Nomgon	Hand
W22	42.86559	107.12516	1080	8.38	673	1040	10	2	Javalant	Hand
W23	42.86559	107.12516	1080	8.64	684	1362	10	2	Javalant	Hand
W24	42.79624	107.00436	1066	8.84	519	1036	10	1	Javalant	Hand
W25	42.79891	107.00427	1043	8.68	396	793	10	1	Javalant	Hand, tire well
W26	42.88020	106.97153	1088	8.85	459	911	10	2	Javalant	Hand
W27	42.91832	106.95353	1113	8.62	340	664	10	2	Javalant	Hand
W28	42.96698	106.94002	1115	8.8	223	445	10	1	Javalant	Hand
W29	42.60195	107.5211	1008	8.53	202	401	50	0	Hairan	Surface
W30	42.64563	107.33379	935	8.54	122	247	10	0	Javalant	Surface
W31	42.76249	107.06673	1007	7.9	1907	3761	10	0.5	Javalant	Hand
W32	42.85447	106.84127	1098	8.38	485	971	20	2	Javalant	Hand
W33	42.92419	106.71723	1185	8.4	321	643	10	1.5	Javalant	Hand
W34	42.97373	106.76186	1178	8.62	306	618	10	2	Javalant	Hand
W35	43.06033	106.8642	1169	8.53	595	1210	10	1	Javalant	Hand
W36	43.22588	107.18538	1080	8.38	315	631	20	1.2	Javalant	Hand
W37	43.14161	107.55861	950	8.28	217	431	10	2	Bayan	Hand pump
W38	43.11412	107.8581	883	8.45	95	188	10	0	Bayan	Surface
W39	43.16365	108.15829	917	7.98	313	628	10	~	Bayan	Deep, motor, locl
W40	43.07008	108.2149	1000	7.74	797	1587	10	~	Bayan	Hand pump

W41	42.98248	108.05763	968	8.24	127	256	10	3	Bayan	Hand
W42	43.18951	106.96586	1128	7.04	1003	1997	20	2	Javalant	Hand
W43	43.07526	106.78434	1247.8	7.8	2000	4000	20	~	Gavalut	Delivery
W44	43.07145	106.77863	1225	8.08	579	1230	10	1	Gavalut	Hand
W45	43.16536	107.25797	1125	8.02	233	470	10	0	Nomgon	Surface
W46	43.19569	107.20698	1112	7.7	178	356	10	2	Javalant	Hand
W47	43.23434	106.72324	1251	8.3	440	879	20	2	Gavalut	Hand
W48	43.27888	106.63879	1284	8.1	722	1441	20	11	Gavalut	Deep, motor, loch
W49	43.11683	106.58518	1294	8.2	892	1790	10	1.5	Gavalut	Hand
W50	43.12420	106.90439	11655	7.8	638	1277	50	~	Javalant	Deep, motor, loch
W51	43.12989	106.97196	1186	8.38	507	1011	10	32	Javalant	Deep, motor, loch
W52	43.15605	106.94241	1159	8.05	455	906	10	~	Javalant	Deep, motor, loch
W53	43.38160	106.90309	1182	8.12	362	7.65	10	5	Gavalut	Hand
W54	43.42673	106.9164	1151	8.06	540	1076	10	2	Gavalut	Hand
W55	43.49045	107.22903	1047	7.9	637	1275	20	75	Bayan	Deep, motor, loch
W56	43.51740	107.31641	1014	7.9	788	1571	20	2	Bayan	Hand
W57	43.17165	107.34781	1090	7.85	260	520	20	3	Nomgon	Hand
W58	43.19236	107.29015	1078	8.5	158	318	20	2	Nomgon	Hand
W59	43.19203	107.29199	1078	8.1	542	1081	10	1.5	Nomgon	Hand
W60	43.09248	106.71868	1215	8.46	411	822	10	1	Gavalut	Hand
W61	42.91779	106.89711	1119	7.51	664	1306	10	1.1	Javalant	Hand
W62	42.90495	106.95992	1097	8.09	586	1156	20	1	Javalant	Hand
W63	43.04323	107.00906	1165	8.06	560	1158	10	3.5	Javalant	Hand
W64	43.02590	106.99588	1158	7.58	539	1079	20	1.8	Javalant	Hand
W65	43.01889	106.98788	1157	7.58	813	1623	20	1.2	Javalant	Hand
W66	43.00198	106.97397	1148	7.92	411	821	10	1	Javalant	Hand
W67	43.06033	106.86422	1174	8.47	669	1340	10	1	Javalant	Hand

Well parameters in Khanbogd – water level and source type.

Water Well Type	**#**	**%**
Hand	46	69
Motor	14	21
Surface	5	7
Delivery	2	3

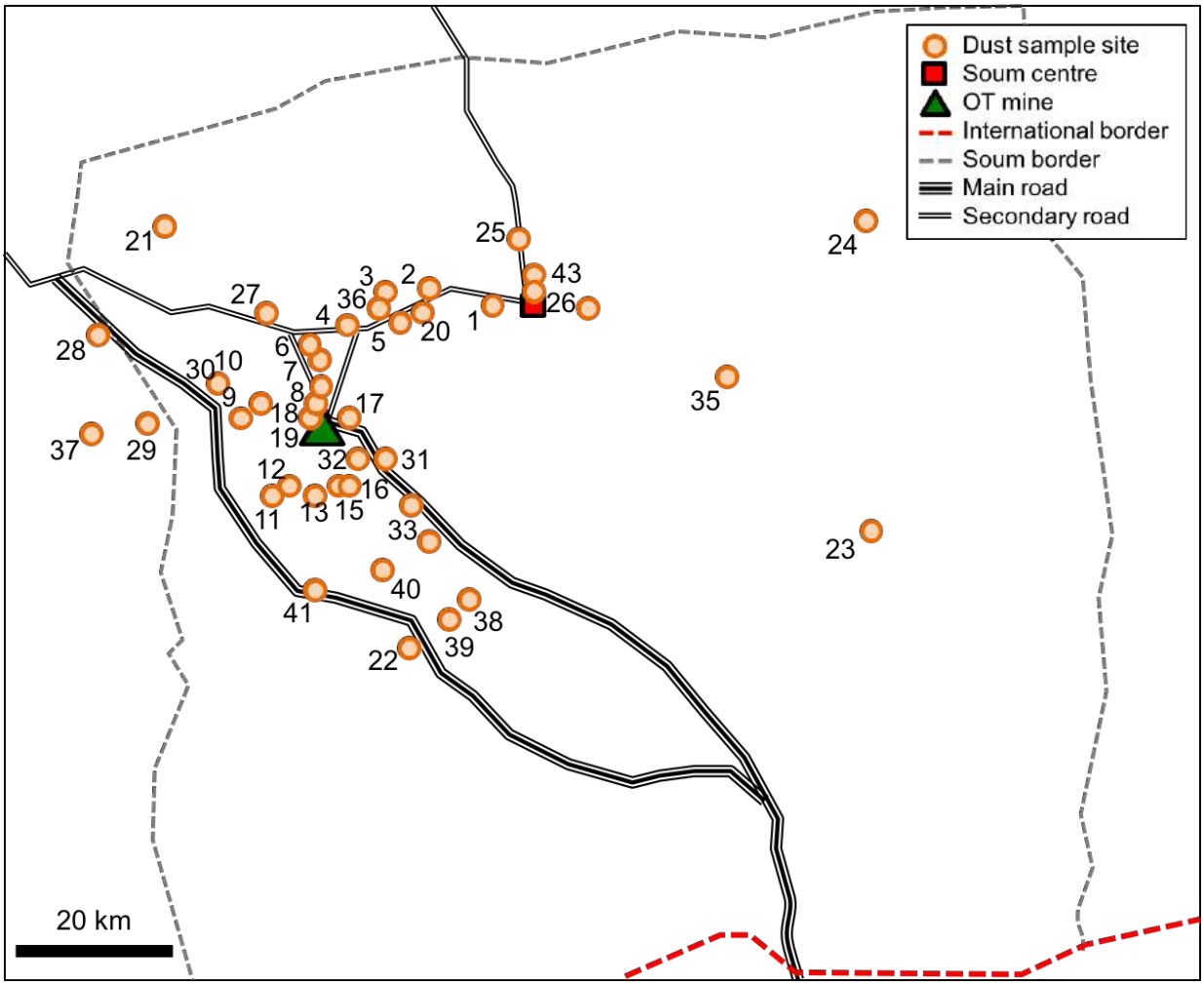
Hand Well - Level		
Metres	#	%
≤ 1	12	26.1
≤ 2	24	52.2
≤ 3	4	9.0
≤ 5	2	4.3
≤ 9	2	4.3
unknown	2	4.3

Appendix 8 - DUST

Dust traps

Each dust trap box was identical with dimensions of 100 x 60 x 30mm and contained one ultra-fine filter paper (to retain micro-particles) and one absorbent sponge to retain larger particles. The traps were placed at 1.5 to 2 metre height with open tops to catch ambient dust in the air rather than ground-level saltating particles.

Map of dust sites in Khanbogd Soum.



Google Earth map of dust sites in Khanbogd Soum.

Dust trap monitoring sites in Khanbogd Soum. GPS site identification, date set and collected, number of days exposed to dust.

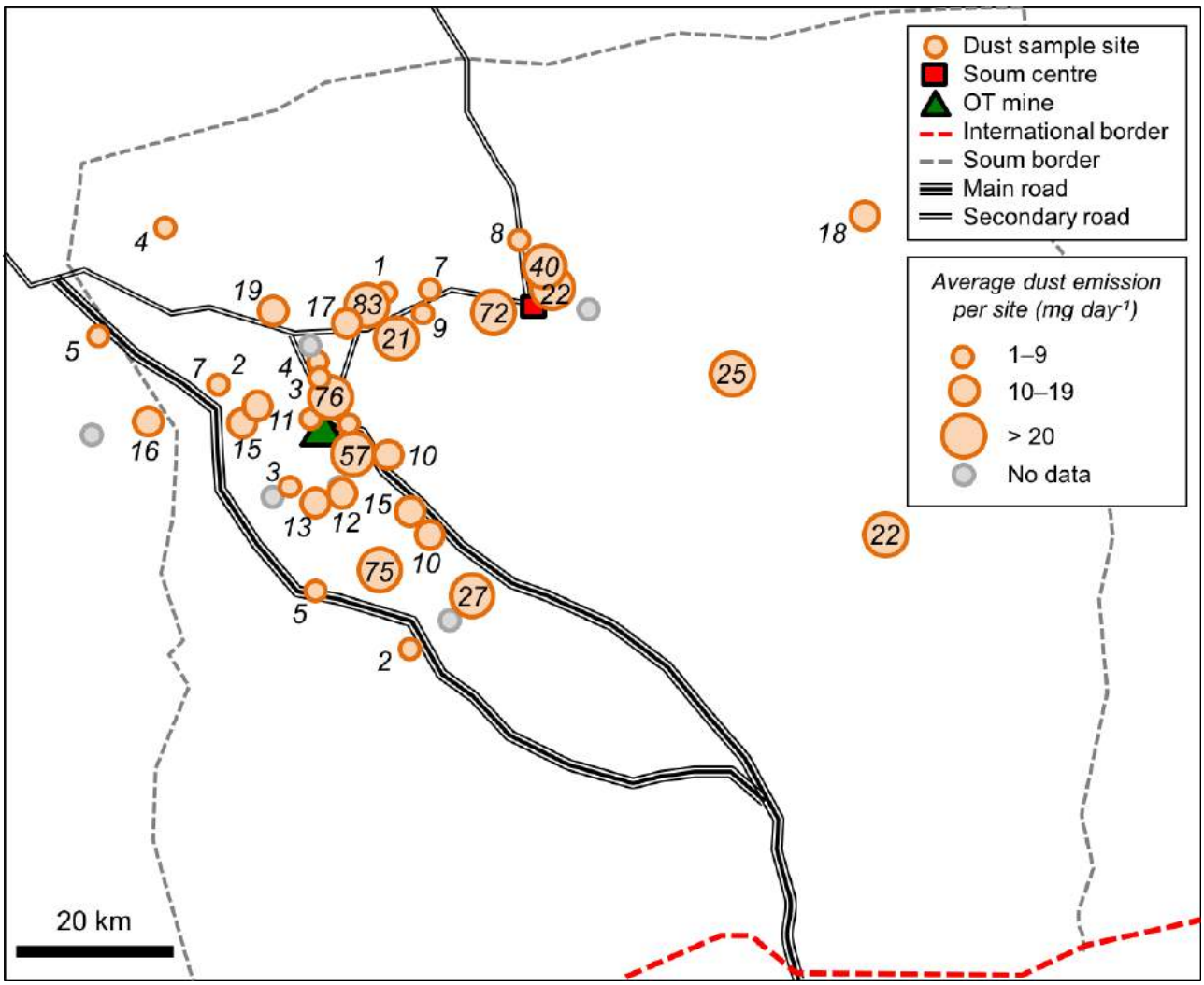
Site	GPS - North	GPS - East	Altitude	Location	Collected	Date Set	Date collected	# Days
D1	43.19917	107.19048	1126	Khanbogd soum	Yes	14/05/2016	28/05/2016	14
D2	43.19970	107.03368	1136	Khanbogd road, sign	Damaged	14/05/2016	24/05/2016	10
D3	43.18467	106.97574	1147	Powerline	Yes	14/05/2016	28/05/2016	14
D4	43.20186	106.97574	1132	Road sign - Manlai	Yes	14/05/2016	28/05/2016	14
D5	43.15783	106.92345	1161	Khanbogd road, sign	Yes	14/05/2016	28/05/2016	14
D6	43.12724	106.86305	1152	Airport runway fence	Damaged	14/05/2016	28/05/2016	
D7	43.10941	106.85931	1204	Old airport fence	Yes	14/05/2016	28/05/2016	14
D8	43.05914	106.86218	1193	Khanbogd 'Y' road sign	Yes	14/05/2016	28/05/2016	14
D9	43.05970	106.74934	1234	Demchog sign	Yes	14/05/2016	28/05/2016	14
D10	43.07526	106.78434	1224	Herder Outbuilding	Yes	14/05/2016	28/05/2016	14
D11	42.97305	106.79822	1176	Powerline	Gone	14/05/2016	x	
D12	42.97412	106.82232	1165	South of OT fence	Yes	14/05/2016	28/05/2016	14
D13	42.96853	106.86301	1152	South of OT fence	Yes	14/05/2016	28/05/2016	14
D14	42.97522	106.90356	1148	Khanbogd road	Yes	14/05/2016	28/05/2016	14
D15	42.97522	106.92249	1149	Metal shed by OT	Gone	14/05/2016	x	
D16	43.00618	106.92978	1159	OT dust - 2 monitors	Yes	14/05/2016	28/05/2016	14
D17	43.04656	106.51973	1183	Tree, animal crossing	Gone	14/05/2016	x	
D18	43.08515	106.88133	1200	Khanbogd road, sign	Yes	14/05/2016	28/05/2016	14
D19	43.08675	106.87778	1200	250m Khanbogd road	Gone	14/05/2016	x	
D20	43.19468	107.03985	1142	250m Khanbogd road	Yes	14/05/2016	28/05/2016	14
D21	43.27930	106.63961	1283	Gavaluut Bag centre	Yes	15/05/2016	03/01/1900	19
D22	42.79774	107.00747	1064	Javalant Bag centre	Yes	16/05/2016	04/06/2016	19
D23	42.91951	107.72535	910	Nomgon Bag centre	Yes	16/05/2016	23/05/2016	7
D24	43.26874	107.73740	1062	Bird reserve fence	Yes	18/05/2016	29/05/2016	11
D25	42.25381	107.18646	1051	Well house	Yes	18/05/2016	29/05/2016	11
D26	43.19338	107.14759	1117	Tree, Khanbogd road	Damaged	19/05/2016	29/05/2016	10
D27	43.17701	106.79328	1190	Water delivery tank	Yes	19/05/2016	30/05/2016	11
D28	43.16065	106.53893	1313	Shed - herder	Yes	19/05/2016	30/05/2016	11
D29	43.05522	106.60793	1355	Antenna base	Yes	19/05/2016	30/05/2016	11
D30	43.09642	106.71712	1130	Shed - herder	Yes	19/05/2016	30/05/2016	11
D31	43.00673	106.97853	1052	Fence by house	Yes	20/05/2016	04/06/2016	15
D32	42.95782	107.01209	1073	OT road milemarker	Yes	20/05/2016	04/06/2016	15
D33	42.91517	107.03750	1107	Fence corral	Yes	20/05/2016	04/06/2016	15
D34	43.14167	106.83903	1062	Tree in riverbed	Yes	23/05/2016	02/06/2016	10
D35	43.09559	107.50632	975	Tree, Nomgon road	Yes	23/05/2016	02/06/2016	10
D36	43.18405	106.99002	1120	KB road, yield sign	Yes,	24/05/2016	04/06/2016	11
D37	43.04656	106.51973	1183	Tree, animal crossing	Gone	24/05/2016	x	
D38	42.84344	107.09692	1076	Tree, east Javalant	Yes	24/05/2016	04/06/2016	11
D39	42.82198	107.06467	1072	Powerline	Damaged	24/05/2016	04/06/2016	11
D40	42.87949	106.96329	1100	Powerline	Yes	24/05/2016	04/06/2016	11
D41	42.85907	106.85654	1117	Tavan Tolgoi road	Yes	25/05/2016	04/06/2016	10
D42	43.06691	106.86554	1134	Airport road, sign	Yes	25/05/2016	04/06/2016	10
D43	43.22588	107.18538	1080	NE of soum, shed	Yes	26/05/2016	04/06/2016	9

Results of dust monitoring in Khanbogd Soum. This highlights 'dust per day' as a comparable measurement.

Site	Dust in box	Dust in sponge	**TOTAL DUST**	Dust per day
D1	0.857	0.147	**1.004**	0.072
D2	0.073	0.021	**0.094**	0.007
D3	0.000	0.015	**0.015**	0.001
D4	0.210	0.029	**0.239**	0.017
D5	0.196	0.093	**0.289**	0.021
D6				
D7	0.000	0.050	**0.050**	0.004
D8	0.000	0.048	**0.048**	0.003
D9	0.160	0.048	**0.208**	0.015
D10	0.000	0.023	**0.023**	0.002
D11				
D12	0.000	0.040	**0.040**	0.003
D13	0.088	0.095	**0.183**	0.013
D14	0.030	0.138	**0.168**	0.012
D15				
D16	0.131	0.081	**0.212**	0.015
D17				
D18	0.049	0.104	**0.153**	0.011
D19				
D20	0.078	0.054	**0.132**	0.009
D21	0.031	0.053	**0.084**	0.004
D22	0.000	0.045	**0.045**	0.002
D23	0.017	0.140	**0.157**	0.022
D24	0.105	0.098	**0.203**	0.018
D25	0.056	0.035	**0.091**	0.008
D26				
D27	0.044	0.162	**0.206**	0.019
D28	0.024	0.029	**0.053**	0.005
D29	0.120	0.054	**0.174**	0.016
D30	0.029	0.053	**0.082**	0.007
D31	0.133	0.017	**0.150**	0.010
D32	0.825	0.028	**0.853**	0.057
D33	0.117	0.032	**0.149**	0.010
D34	0.128	0.091	**0.219**	0.022
D35	0.184	0.063	**0.247**	0.025
D36	0.865	0.049	**0.914**	0.083
D37				
D38	0.277	0.024	**0.301**	0.027
D39				
D40	0.808	0.018	**0.826**	0.075
D41	0.000	0.049	**0.049**	0.005
D42	0.705	0.050	**0.755**	0.076

D43	1.478	0.017	**0.358**	0.040

Distribution of dust emissions (mg day^{-1}) across the survey sites in Khanbogd *Soum*. Larger circle identities more dust per day.



Appendix - MANLAI SOUM

GPS location of vegetation transects.

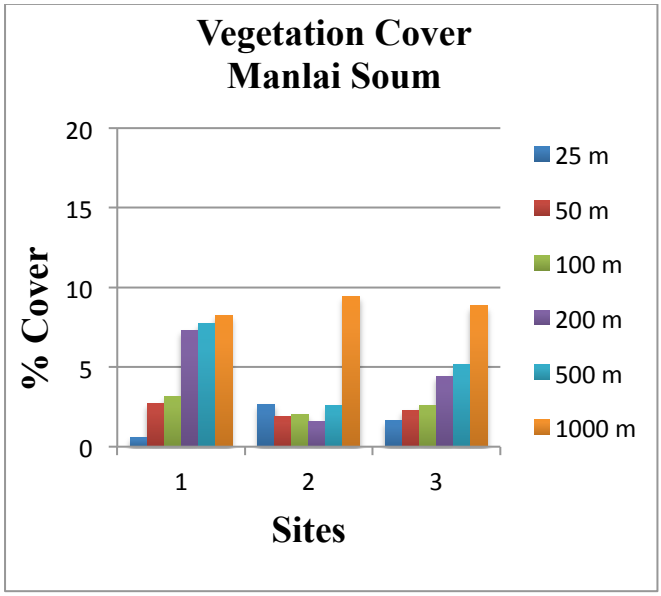
MANLAI

Site	GPS	
	N	E
1	43.53825	106.79850
2	43.89782	107.28889
3	average of two sites	

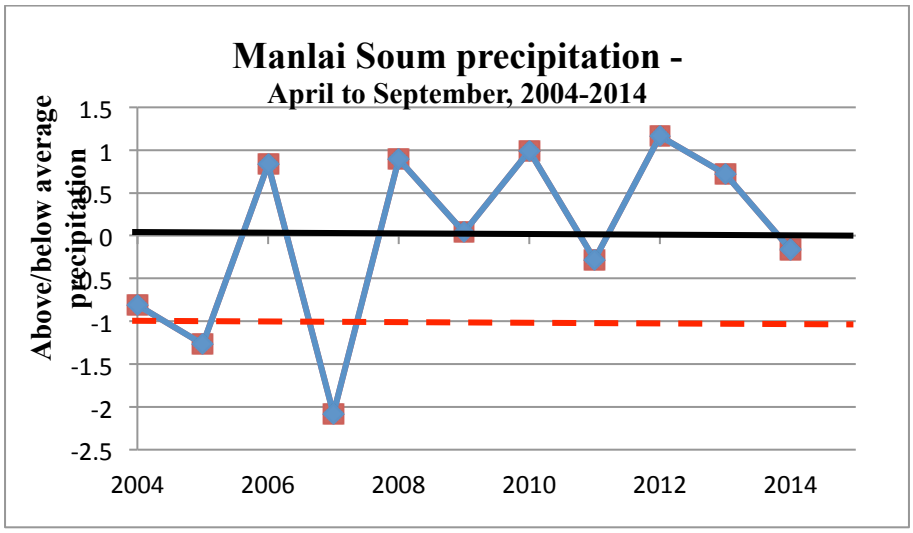
Vegetation cover at 12 transects Manlai Soum.

Site	Vegetation Cover - metres from well					
	25.0	50.0	100.0	200.0	500.0	1000.0
1	0.6	2.7	3.2	7.3	7.7	8.2
2	2.7	1.9	2.0	1.6	2.6	9.4
Average per site	**1.6**	**2.3**	**2.6**	**4.4**	**5.2**	**8.8**

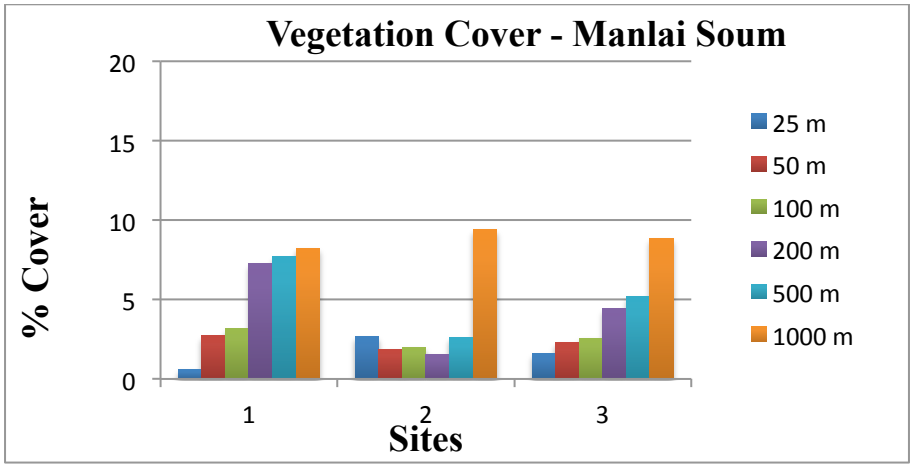
Vegetation cover at 12 sites in Manlai soum. Measurements were made from water points at 25, 50, 100, 200, 500 and 1000 metres north of the well.



Manlai Soum precipition from soum records



Comparison – vegetation cover Manlai Soum and Khanbogd Soum. Manlai average (#) is lower than Khanbogd average (#13).



MANLAI Soum - Water

Site	GPS North	GPS East	Altitude	pH	TDS	EC	Heavy Metals	Water level	Source
1	43.74299	106.79925	1277	8.24	268	535	10	2	Hand
2	43.75262	106.83018	1267	8.28	354	706	10	5	Hand
3	43.92392	106.87753	1328	8.52	951	1920	10	4	Hand
4	43.98947	106.75434	1314	8.4	704	1408	10	~	Deep, locked
5	43.98601	107.75423	1308	8.21	1093	2180	10	3	Hand
6	44.03298	106.71527	1352	7.9	610	1221	10	~	Motor
7	44.10026	106.60374	1310	8.5	858	17	20	3	Hand
8	44.10325	106.59893	1307	8.57	1090	2174	20	2	Hand
9	44.05958	106.40535	1301	7.73	497	993	10	~	Deep, locked
10	43.98005	106.51575	1323	8.2	633	1267	20	~	Deep, locked
11	43.89782	107.29889	1176	8.2	766	1531	50	~	Deep, locked
12	43.75057	107.24842	1182	7.74	422	844	10	5	Hand
13	43.70855	107.22156	1181	8.5	688	1370	20	5	Hand
14	43.66231	107.72988	1189	8	374	746	50	4	Hand
15	43.66192	107.2285	1189	7.8	1361	2707	20	4	Hand
16	43.58891	107.1952	1086	7.7	1723	3451	20	5	Hand
17	43.92331	106.87783	1299	7.23	1552	3015	20	7	Hand
18	43.75162	106.83173	1259	7.91	566	1116	10	2	Hand
19	43.53009	106.80237	1220	7.97	556	1786	10	~	Deep, locked

Manlai Soum – water sources

Well	#	%
Hand	14	70
Motor	6	30

Hand Wells - water level

Metres	#	%
≤ 2	3	23
≤ 3	2	15
≤ 4	3	23
≤ 7	5	38

1. Introduction

This report presents the findings of a socio-economic survey that investigated the following questions:

- Changes in herder household livelihoods from 2003 to present and the extent of loss of traditional livelihoods and culture.
- Herder household capacity to sustain traditional livelihoods into the next generations.
- What impacts are attributable to OT.

The full terms of reference for Component 2 are shown in Appendix 1.

2. Methodology

2.1 Approach

The socio-economic survey process involved:

- Literature review
- Focus group meetings with herders
- Semi-structured interviews with 106 herder households (often included more than one household member)
- Participant observation as part of the herder interviews
- Meetings with soum officials and OT representatives
- Collection of data from the soum.

Reflecting the Joint Fact Finding approach, and in agreement with TPC, the original in-depth anthropological methodology (see proposal) was changed to increase the number of interviews to 100 households and reduce the time spent on participant observation.

A literature review was conducted in April followed by fieldwork from the beginning of May to mid-July 2016. Interviews were held across the soum. For the first 81 interviews the team travelled to each herder's seasonal camp in the countryside; in the latter stage, herders met us in soum and bagh centres. Fourteen of the households interviewed were living in the soum centre at the time of interview.

Herders were very positive about the home visits and even after we achieved 100 interviews, additional households asked to be included.

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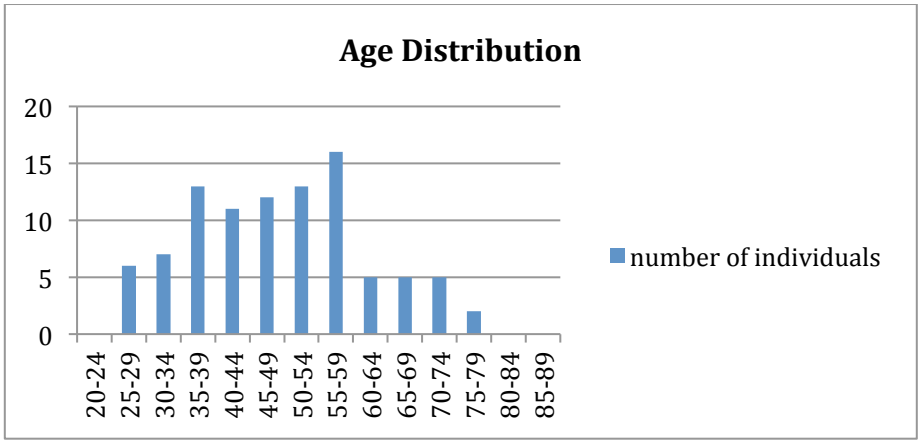
Table 1: Interviews

Herder Households Interviewed	Javkhlant	Gaviluud	Bayan	Nomgon	Totals
Total	42	32	19	13	106

2.2 Population Sample

Research participants were selected using a random sampling method. TPC provided a list of herder households divided into three groups: compensated households (32 interviewed households), households identified by TPC as considering that they are entitled to compensation (22 interviewed households), and all other herder households in the *soum*. Each household was assigned a number. A random selection of numbers was drawn using a computer program. Additionally, at TPC's request, specific interviews were conducted with elderly herders located in the soum center.

Table 2: Age Distribution



2.3 Semi-structured Interviews

Interviews consisted of 73 questions[1] which cover topics on household organization, mobility, seasonal grazing and watering practices, household income and expenditure, land tenure practices, belief systems and values, and perceptions of social change. Interviews were between 30 minutes to three hours in length and often involved input from both heads of household depending on who was at home during the interview visit. Not all participants answered every question. Households were given an information sheet including the researcher's contact information.

The sample is weighted towards Javkhlant and Gaviluud baghs because the three lists of households from which we drew the sample include more households from these two baghs.

[1] See Appendix 2.

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Government administrators such as the bagh governors, the soum vice governor, environmental officers, and land management officials were interviewed as well as the OT environment monitoring team and social engagement team. Informal short interviews were conducted with local residents, shop-keepers, doctors and nurses at the hospital, and individuals working at the OT community center.

Some herders expressed concerns about participating in the socio-economic survey for one or more of the following reasons:

- Because they felt that they never see any benefits from participating in research.
- Frustration at not having access to any reports that people write about them.
- Scepticism about TPC.
- A view that TPC only focuses on herder problems in Javkhlant and Gaviluud baghs.

2.4 Participant Observation

Participant observation involved two months living amongst residents in Khanbogd soum centre, visiting herder households throughout the soum territory, attending local events such as the Khanbogd mountain worshipping ceremony and the summer Nadaam festival, as well as observing camel wool shearing and milking, travelling with herders to visit their wells and water points, and travelling extensively across the landscape.

2.5 Focus Groups

Four focus groups at *bagh* centers were arranged in May 2016 at the start of fieldwork. The Javkhlant and Gaviluut focus groups were well-attended by both male and female participants. The MDT team scheduled meetings with Nomgon and Bayan bagh herders at the bagh centers but the Nomgon meeting was cancelled due to a mountain worshipping ceremony and camel wool shearing activities. A meeting with Bayan bagh herders occurred in the soum center.

2.6 Comparison with Manlai

Research was undertaken in Manlai soum in order to investigate any commonalities or differences with Khanbodg. Herders and local citizens were included in the survey. We interviewed 20 people during our comparative research in Manlai.

3 How have traditional livelihoods changed since 2003?

3.1 Context

One of the core elements of mobile pastoralism, or nomadic animal husbandry, is mobility. Mobility is enabled by institutions, technology, knowledge and skills, as well as the availability of environmental resources. Technology includes mobile housing (the *ger*), seasonal movements such as autumn *otor,* and specialist knowledge of local landscapes and climate patterns. In addition to individual skills and knowledge, governance institutions pay a role in enabling mobility by providing public access to resources such as pasture and water. Administrative laws prescribe

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that local governments adhere to herders' traditional land use practices[2] based on custodial land ownership (see section on tenure and land use practices below).
Since 2003, many innovations have been introduced to Mongolian pastoralism. The way that people achieve mobility has changed with the introduction of new technology, but the practice of mobility should be considered a central feature of traditional livelihoods. For example, improvements on heating and cooking stoves, technology such as solar panels, television, and cell phones as well as motorized vehicles and mobile trailers. Even with these innovations, mobile pastoralism in Mongolia has maintained certain features which might be called 'traditional.' These features, recognized in the Mongolian State Herder Diploma, are:

- Mobility.
- Knowledge and skills to train transport animals (horses and camels).
- Knowledge and skills to produce livestock produce such as Mongolian dairy products, wool, cashmere, meat, leather, etc.
- Social customs of hospitality and respect.
- Custodial land use practices and attitudes towards nature.
- The presence of institutions to enable and manage mobility and access to pasture.

3.2 Introduction of Mining to the Region

Prior to 2003, the agricultural sector constituted 40% of Mongolia's GDP, with mobile pastoralism dominating this sector. From 2003 onward, there has been a steady increase in mining as a percentage of GDP and a relative decline in the agriculture sector.[3,4,5] This rapid economic growth and expansion of mining constitutes a significant change for Mongolia as a whole, in particular for Omnogovi *aimag*, which is home to major mines.

Eastern Umnugovi is home to two of Mongolia's largest mines- Tavan Tolgoi and Oyu Tolgoi, as well as the mines of Nariin Sukhait, Baruun Naran and Ovoot Tolgoi[6], amongst others being developed.[7] The development of these mines has rapidly introduced changes to the landscape of Khanbogd, including the construction of roads, increased traffic, population increases in the soum center, construction of railroad and power plants, etc. Oyu Tolgoi operates in Khanbogd.[8]

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[2] Fernandez-Gimenez, M. & B. Batbuyan. 2004. Law and disorder: local implementation of Mongolia's Land Law. *Development and Change* 35(1): 141–65.

[3] Suzuki, Yukio. 2013. Conflict between Mining Development and Nomadism in Mongolia. In The Mongolian Ecosystem Network: Environmental Issues Under Climate and Social Changes. P 269

[4] Sharma, V. 2016. Human Security for Mongolian Herders: Evolving Risks and Opportunities. In *Understanding the Many Faces of Human Security* (pp. 230-250). Brill.

[5] P 10 Oxford Business Group Report 2014.

[6] Cane, Isabel. 2015. Social and gendered impacts related to mining, Mongolia. Adam Smith International.

[7] Suzuki, Yukio. 2013. Conflict between Mining Development and Nomadism in Mongolia. In The Mongolian Ecosystem Network: Environmental Issues Under Climate and Social Changes. P 269

[8] Jigjsuren et al. 2015. Evaluating the impact of climate change based on herders' observations and

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Construction has brought many sub-contractor companies to the area. The Tavan Tolgoi Company transports coal along a road that crosses the Khanbogd territory and reported numbers of trucks can be up to 400-500 per day depending on the season.[9]

The mining activities that have affected the soum are not only large-scale mining. The 2008 Umnogovi Social Baseline Survey[10] identified Khanbogd as being affected by "serious cases of water and soil contamination by chemicals due to unregulated artisanal mining activities (p19)" including mercury and arsenic (p.13). In our interviews, herders described the influence of artisanal mining in Nomgon bag in Khanbogd, between Nomgon and the Dornogovi boundary area. It is colloquially referred to as "Iraq" or "Iraq hill"; some local herders report working as artisanal miners at various points during this time period[11]. This region was a site of artisanal mining between 2000 and 2004, which followed one of Mongolia's most severe *dzud* years of 2000-2001. The loss of livestock due to *dzud* opened up awareness of and interest in non-herding opportunities as a way to diversify income and recover from *dzud* losses.

Mining has affected the natural environment, the national and local economy, is a major aspect of national and local politics, and has greatly expanded Khanbogd, creating a new social and cultural atmosphere. The transformation of society and physical space as a result of mining in Khanbogd has initiated change on multiple scales. These changes have affected the lives of citizens of Khanbogd positively and negatively, directly and indirectly. The dynamics of changes brought about by the introduction of small and large-scale mining to rural Umnogovi is complex because of its multiple scales and dimensions, including psychological and political aspects.

3.3 Mobility practices in Khanbogd *soum*

Khanbogd herders report mobility to be largely a function of the weather and the availability of pasture and water. As of 2014, mining licenses (not all exploited) occupied 38.2% of total soum territory.[12] During times of drought, herders move more frequently to access pasture and water. The age of the household and the availability of labour affect the frequency of seasonal movement and practices of daily graze and browse. Availability of and access to pasture and water affects the

comparing it with hydro-climatic and remote sensing data. Proceedings of the Transdisciplinary Research Conference: Building Resilience of Mongolian Rangelands, Ulaanbaatar.

[9] S. Chuluun and G. Byambaragchaa. (2014) Satellite Nomads: Pastoralists' Tactics in the Mining Region of Mongolia. Inner Asia 16, 409-426.

[10] Center for Policy Research. 2008. "The Umnugobi aimag social, economic and environmental baseline study."

[11] According to the World Bank's 2006 Review of the Environmental and Social Impacts in the Mining Sector, herder participation in artisanal mining grew as a result of heavy livestock losses following *dzud* years (see pg. 1).

[12] Jigjsuren et al. 2015. Evaluating the impact of climate change based on herders' observations and comparing it with hydro-climatic and remote sensing data. Proceedings of the Transdisciplinary Research Conference: Building Resilience of Mongolian Rangelands, Ulaanbaatar.

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ability of herders to practice seasonal movement. More than 90% of herders in Javkhlant and Gaviluud *baghs* report that "there is no place to move" (*nuukh gazar baihgui*). Herders in these baghs report that movement has been altered or impeded due to: the OT MLA fence, the airports, the large holes created during construction of a power line, and the density of winter camps in Javkhlant and Gaviluud baghs.

"If we don't move and stay in one place, our herds will not grow. In the last few years we have been moving a lot. In 2013, we stayed north east of Tsogttsetsii during the winter, but the kids have school here and bringing the kids back and forth was expensive. Also, the well pump is expensive too. So many expenses. In the places we move to, people sometimes have good attitude, sometimes a bad attitude. Some people let us drink their water, some won't." – Bayan bagh herder

In many cases, herders report moving more frequently due to lack of places to camp with good quality pasture and water resources available[13]. On the other hand, we observe herders who do not move at all and stay close to the pasture and water resources available to them. For example, instead of moving to a spring camp after Tsagaan Sar, some herders remain in their winter camps and move once to their summer camps (see appendix 2.1). We see a pattern of herders who report that they move more frequently than in the past due to lack of places to move and a pattern of other households who do not move due to lack of places to move. The contradictory patterns are reactions to insecurities around land tenure.

In Bayan bagh herders report that pasture is available but there are few wells, which restricts long distance mobility. The herders in Bayan bagh near the Gunii Holoi bore fields explained that water is no longer available in higher elevations and families have moved to lower elevations in order to cluster around wells with available water. In Nomgon bagh, herders report that good pasture is available for camels and also suitable for small livestock if trained to eat the vegetation in that area. In Nomgon, herders report critical problems with water and a lack of wells, especially deep wells.

Between the time period of February 2016 to July 2016, herders reported moving camp between one and three times. The number of times per year that herders move varied widely.[14] Generally herders with greater numbers of livestock reported moving more frequently, with a minimum of 10 times per year. Households who reported not moving at all are located in Javkhlant and Gaviluut *baghs*.

[13] See appendix 2.1 for herder quotes.

[14] This is corroborated by Sarah Jackson (2015) Dusty roads and disconnections: Perceptions of dust from unpaved mining roads in Mongolia's South Gobi province. *Geoforum*. 66, p. 94-105.

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Table 3: Mobility by Number of Livestock, Household Sample, 2015

Number of Livestock	Number of Moves per Year
>100	0-2
100-250	1 to 10 times
250-500	2 to 6
500-800	3 to 12 times
800 +	Up to 20 times

Factors affecting herder movement are:

- Fear of retaliation, conflict or '*hel am'* (malicious gossip) from other households.
- Experiences of conflict with households in other parts of the soum as a result of moving away from local area.
- Difficulty in moving around infrastructure.
- Being trapped by the railroad and the coal road.
- Lack of government policy and management.
- Availability of water (see below).
- Availability of pasture (see below).
- Type and number of livestock (i.e. camels vs. goats).

Table 4: Reported distance between winter camps and moves per year by Bagh, 2015

Bagh	**Reported Distance Between Winter Camps**	**Reported Moves per Year**
Javkhant	Varies greatly, some are 2-4 km from closest neighbour and others 10 km away	Varies greatly, some households do not move, others vary up to 10 or more times.
Gaviluud	Generally 2-5 km away	Varies greatly, some households do not move, others 2 to 10 times per year.
Bayan	Least is 5 km and greatest distance 20 km	Varies, 2 times to more than 10 times per year.
Nomgon	Varies greatly, some 1 km distance and others 7 km and up to 20	Varies, depends on weather and availability of water

Additional changes are:

- Herding by motorized vehicle

In Khanbogd, the vast majority of households surveyed herded their animals by motorcycle or motorized vehicle. Traditional mobility involves herding by draft animals such as horses and camels. Herding livestock by motorized vehicles changes the way that the landscape is used as well as the pace by which livestock are herded. Additionally, herders report that the number of households with the skills in training camels and horses to ride has greatly decreased.

- Permanent houses at winter campsites

The presence of permanent houses at winter campsites indicates a change in traditional mobility, as the indigenous mobile felt tent, or *ger* is an important tool to enable frequent seasonal moves.

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Alternatively, some families in Khanbogd have adopted a different style of mobile home- a house with wheels on the bottom which is pulled by a truck or SUV. About 15 % of the households we visited lived in a permanent dwelling in the countryside. In other parts of Mongolia, less than 1% of households live in a permanent house in the countryside.

Table 5: Types of dwelling for all herder households in Khanbogd, year 2015 (soum data)

Багийн нэр	HH living in houses		HH with ger		HH with houses in soum center		TOTAL
Nomgon	7	12%	46	78%	6	10%	59
Gaviluud	21	20%	85	79%	1	1%	107
Javkhlant	9	10%	69	73%	17	**18%**	95
Bayan	23	26%	63	72%	2	2%	88
TOTAL	60	17%	263	75%	26	7%	349

*Overall 17% of all Khanbogd herders have a house in countryside.

- Land tenure practices with a focus on winter camp sites (see section below).
- Conflicts between herders: Fear of retaliation, malicious gossip or conflict from herders in other soums or regions of Khanbogd was given as a reason declining practices of mobility.
- Herders from other areas charging outside households money to use pasture.
- Changes in household organization (Household splitting, mother and children in soum, loss of labour and increased expenses).
- Infrastructure.
- Climate and environment.
- Resettlement of compensated households.

Changes in traditional mobility are impacted by climate, changes in the physical environment due to manmade construction and infrastructure, changing land use patterns due to government policy and economic change, and changing social relations. Herders in Gaviluud report that the 2004 relocation of households within the MLA in combination with new infrastructure development has put pressure on their grazing lands and caused difficulty in finding suitable places to move with available pasture and water.

3.4 Access to productive pasture

Access to productive pasture in Khanbogd is different for each household depending on their age and experience, their location within the soum and the amount and type of livestock they own. The ability of households to access productive pasture includes power dynamics between households. All herders located in Javkhlant and Nomgon report problems with access to pasture and some herders report lack of pasture in parts of Bayan and Nomgon baghs. No hayfields were discussed. Reasons given for lack of access are human and environmentally driven:

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- More than 90% of herders report that climate (i.e. the weather, amount of precipitation) and infrastructure (mining-related infrastructure as well as the presence of other household camps) are the primary impacts on pasture availability.
- 100 % of herders report that access to pasture is impacted by whether water is available.
- Herders report that finding pasture for small livestock is a particular problem across the soum. During times of drought, some families place their small livestock with friends or family in Bayan-Ovoo, Tsogtsegee, or Dundgovi.
- Pastureland crowded by winter campsites owned by households.
- Pastureland being occupied, utilized, fragmented or damaged by: the OT license area, the old and new airport sites, the OT-KB road, the coal road from Taivan Tolgoi, the railroad construction, quarries (soum environmental officer reports 30 quarries located in the soum for use of railroad construction only), the Qatar Bird Sanctuary, the Strictly Protected Area, other companies operating in the area, the power station, a camp for railroad workers, a reported OT holiday camp site, a water treatment centre near the Khanbogd soum centre, the deep water pipeline, construction of a power line between OT and Tsagaan Suvraga, amongst other entities operating in the area.
- Loss of summer pasture areas due to OT mine.
- Pastureland which cannot be utilized due to lack of water in the area (i.e. Nomgon and Bayan *bagh*).
- Pastureland covered by dust.
- Large packs of wild dogs and wolves.
- Use of vehicles for herding livestock that degrade pasture.
- Lack of rain causes lack of pasture.
- Too many livestock grazing for too long in one area.
- Large herds of wild ass in Nomgon.
- Too many households with large numbers of livestock.

3.5 Access to water sources traditionally used

100% of households in all *baghs* interviewed reported problems with access to water. The majority of herders interviews perceived their access to water as limited due to lack of water in streams and standing water as well as slow recharge of wells, e.g. 24 hours or more. Additionally, herders complained that wells, which are customarily used as public resources, are being locked to prevent theft of motors or use of fuel in the motors. (The MDT team observed a new well in Bayan bagh as locked during time of visit). A herder explained, “I lock the well, otherwise people will steal the motor. If other people come and ask to drink from the well, I give the key to them. It is a private well. Energy Resources made the well for us. The well passport is at Energy Resources.”

Herders cite the reasons for lack of water as:

- OT activities impacting the shallow ground water.
- OT’s cascading bore holes are causing water from higher elevations to drain to lower elevations.
- Former areas around *bor ovoo* are no longer available for use.

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- Not enough wells in areas with productive pasture such as Nomgon and Bayan baghs.
- Wells are being locked.
- Well recharge is very slow and not enough to supply the same number of livestock of the past.
- Not enough rain.
- Too many herders with more than 1000 livestock

Table 6: Water Issues Reported by Sample Group, 2015

Bagh	**Water Issues Reported**
Javkhlant	-slow recharge of wells -disappearance of standing water and springs -locked wells
Gaviluud	-slow recharge of wells -disappearance of standing water and springs -loss of operational wells
Bayan	-lack of water in highland areas -slow recharge of wells -not enough wells in area with good pasture -lack of water in higher elevations
Nomgon	-lack of shallow ground water -need for more deep wells because shallow wells do not yield water -well recharge takes 24 hours or more -not enough wells in areas with good pasture

Nearly 100% of households interviewed perceive their water shortage problems as caused either entirely or partially by OT mining activities. For example, OT's water delivery is perceived as an admission of damage to the water supply.

There is evidence to suggest that herders are relying more on wells for all-year-round water use. One herder explained that in the past, they only used a well for three months out of the year and used a spring or stream (*bulag*) as a water source for much of the year. Now they are relying on the well to water their livestock for the entire year. These changing patterns of use puts more pressure on wells to fulfill all water needs. A Javkhlant herder corroborated, "Long ago, we used to move a lot. The water and pasture were enough. The *Bor ovoo* water was spread everywhere in all of Javkhlant bagh. We did not use a bucket [to get water], we only used the water spread on the ground." Understanding how herders use water and documenting these patterns is an important step in being able to identify the root causes of water shortages.

Regarding well maintenance, herders report that wells are maintained in two ways: by removing the mud at the bottom of wells and by doing complete renovations. Many or most wells have not been renovated since the early 1990s, though herders report doing annual or bi-annual removal of

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mud from shallow wells. Deep wells are difficult for herder households to maintain on their own and require more specialized equipment.

We generally had fewer shallow ground water wells. Usually water is at the aquifer level in our area... So hand wells are fewer. Most hand wells have dried out, it may be caused by OT, all dried. Years ago, we had a well that camel turned, and water came out. We don't know how many years it has been there. At the bottom, stone and dirt falls down and it may have blocked the recharge. So we used OT bore holes. There was one bore hole, which had water coming out. But they capped it. The most important thing is if it is possible to re-dig the old wells. I have been requesting it for five years. I told the soum government, too. And OT. - Nomgon bagh herder

3.6 Tenure and Land Use Practices

3.6.1 Mongolia's Land and Administration Laws

In addition to constitutional designation of rural land as public land open for utilization by all Mongolian citizens, the Land Law states that the local government should operate in coordination with herder 'traditions' of land use through citizen's councils[15] [16]. Herders can obtain winter camp (*övöljöö)* land possession (*gazar ezemshil*) rights as well as spring camp (*havarjaa)* possession rights, which are defined in the 2002 Mongolian Land Law[17]. Part 30 of the Land Law states that the period of land usage for individuals or organisations is 15-60 years[18]. In Khanbogd, herders can obtain possession contracts for a period of 60 years while in Manlai soum they can obtain contracts for a period of 30 years. The amount of land included in the winter license for a household in Khanbogd is from 700 to 1600 m^2 (as shown on the winter camp lease).

3.6.2 Camp rights in Khanbogd Soum

The Land Law designates that summer, fall and *otor* pastures are to be shared publically (*hot ailaar khuvaarij, niiteer ashiglana*); the *soum* governor (*zasag darga)* is designated to decide how late herders can use the summer and fall pastures (sections 51 and 52 of the 1994 and 2002 *Mongol Ulsiin Khuuli Gazariin Tuhai*). Soum data shows that patterns of camp possession contracts vary between baghs.

[15] Mongol Ulsiin Khuuli Gazariin Tuhai 1994, 2002, Electronic resource, www.legalinfor.mn/law/details/216, accessed 7 August 2016.

[16] Mongol Ulsiin Zasag Zakhirgaa, Nutag Devcgeriin Negj, Tuunii Udirdlagin Tuhai 1992, 2006, Electronic Resource, http://legalinfo.mn/law/show/Print/7116, accessed 7 August 2016.

[17] Fernandez-Gimenez, M. and B. Batbuyan. 2004. Law and Disorder: Local Implementation of Mongolia's Land Law. Development and Change 35, 1, 141-165.

[18] Mongol Ulsiin Khuuli Gazariin Tuhai 1994, 2002, Electronic resource, www.legalinfor.mn/law/details/216, accessed 7 August 2016.

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Table 7: Possession of Winter and Spring Campsites in Khanbogd soum, year 2015 (soum data)

Bag name	TOTAL HH	Only Winter campsites		Only Spring campsites		Winter & Spring campsites		Neither winter nor spring campsites	
Nomgon	59	18	31%	1	2%	23	39 %	17	29%
Gaviluud	107	77	72%	4	4%	15	14 %	11	10%
Javkhlant	95	39	4%	0		48	51%	8	8%
Bayan	88	19	22%	1	1%	49	56%	19	22%
Total	349	153	44%	6	2%	135	39%	55	16%

Bag name	HH with more than TWO winter camp sites	HH with more than TWO spring camp sites
Nomgon	2	1
Gaviluud	5	1
Javkhlant	0	0
Bayan	2	0

Sixteen percent of households have neither winter nor spring campsites, which indicates that there are a number of herders who depend on pasture and water in Khanbogd soum that do not have formal possession rights for these seasonal pastures but rely on custodial land tenure use rights. This implies ineligibility for compensation. The highest percentage of households without winter or spring sites are in Nomgon and Bayan baghs, which also have less infrastructure impacts.

3.6.3 Traditional and New Land Tenure

Traditionally, rights to use land were based on occupation and use. These rights were framed by obligations between herders and higher authorities, including the belief in land spirits *(gazariin ezen)* that are considered to reside in certain important places.

Currently in Khanbogd soum, there is conflict between herder's traditional land tenure which allows for mobility across the landscape on public land and the issuance of land leases by the national government (e.g. Qatar bird sanctuary, Railway, OT mine) and local government (herder camps, companies) to various entities for exclusive use.

Herders' rights to use land, which were more secure when pastoralism was the main economic practice, are subordinate to these private leases issued by government authorities. Traditional land tenure systems, which the Land and Administration Laws are designated to protect, appear to be ineffective as the national and local government issue licenses.
In Khanbogd as these two land tenure systems clash, there is evidence that more wealthy households attempt to secure their rights to use pasture by building permanent buildings and

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obtaining more than one winter and spring camp site. For example, one household reports having three winter camps and two spring camps. They own 991 livestock. The problem of insecure land tenure for herders in Khanbogd has been documented. An external evaluation of Oyu Tolgoi's HSS Impact Assessment [19] states:

> "…herders are vulnerable, but not only because they are cash-poor or are "stressed-out" due to loss of tradition, etc, but because their social and economic contributions have been marginalized by poor public policy. Mining development exacerbates the impact of failed policies. Simply put, these policies have negatively affected herders' rights to pasture and water (i.e. herders have none beyond indefensible customary rights)."

Large scale mining in the already marginal environment of the South Gobi desert intensifies the risks faced by herders as they have insecure rights as resource users. The remote nature of pastoralist work makes it more difficult for herders to gain information and opportunities to participate in decision-making forums and processes.

3.7 Government Capacity

3.7.1 National Government

The national government has a major impact on the local herders and the soum government. The negative consequences of mining and other development in Khanbogd is largely a result of lack of effective government policy, regulation, oversight, and implementation. Factors include: lack of mining revenue sharing locally, infrastructure imposition such as railway and Qatar bird reserve, neglect of local dynamics, lack of consistent enforcement of regulations, especially of water use, by OT and other mines. Herders feel that the national government has sacrificed them for national development; the local government does not have sufficient professional expertise, legal regulation, human resources, hardware and software resources, etc. to resolve or remedy pastoral issues.

3.7.2 Local government

Capacity to monitor the environmental issues across Khanbogd, including OT, is limited. Herders identify this as a major issue. Our assessment found that despite good intent, the soum is not able to remedy herder issues which relate to the activities of large-scale mining. These issues should be addressed by the national government. If it is the soum government's responsibility to remedy herder issues which relate to large-scale mining, then the soum needs more resources to do this properly. If it is a national responsibility, then the national government needs to create a presence in Khanbogd in order to monitor, evaluate, and rectify any issues that may develop. Currently, the roles of each party needs to be clarified and made known to the general public. As the environmental officer explained, the government's job is to do quality control but the soum team

[19] Craig R. Janes and Meghan Wagler 2011 (February), Evaluation of the OT Community Health, Safety, and Security Impact Assessment.

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lacks the skill, knowledge or personnel. "Sometimes my team learns from OT more than it controls them."

Soum level governance issues include:

- Budgeting- conflict with *aimag*
- Winter camp and mobility management
- Data sharing amongst all levels of government
- Lack of processes and resources for well maintenance
- Lack of planning.
- Communications with remote herders.

3.8 **Access to social services, government resources, and regional infrastructure**

Herders report a general lack of access to social services, which are located in provincial and soum centers, many kilometres from herder camps. Services, such as health care, are expensive and many herders report receiving treatment for serious issues in the provincial hospital or in Ulaanbaatar, choosing not to use the Khanbogd hospital. This involves a significant cash investment, time away from the rural home and employment of others to do the work of the sick person. Herders do not see any significant improvements in the quality of Khanbogd hospital staff despite a new hospital building and modern equipment.

The population of Khanbogd soum has increased dramatically in the last 10 years. According to the soum vice governor, from January to May 2016, the soum population grew by 1000 people and in 2015 the population was 5,300. There are concerns about the school being overcrowded, three times over its capacity, according to the soum government. The school has a capacity for 400, but currently 900 students are enrolled and 100 children do not have space at kindergarten.

There were no reports from herders to corroborate OT's ESIA Audit Report which states, "Some of the notable achievements include supporting cooperatives to implement camel and sheep shearing services, animal health disinfection services, environmental rehabilitation works and a baby wool combing project."[20]

Though no benefit was ascribed by herders to new infrastructure such as roads and other facilities, observation showed that herders used new roads and also benefited significantly from cell phone coverage including 3G network in Javkhlant and parts of Gaviluud. There is no cell phone coverage in most of Bayan and Nomgon baghs.

3.9 **Tri-partite Committee (TPC)**

TPC is a recently established institution. Over the course of fieldwork across the *soum*, we met a number of individuals who were not aware of the existence of the TPC or, alternatively, if they had

[20] Report of the: Independent Environmental and Social Consultant, Oyu Tolgoi Mine, September 2015, pg 10.

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heard about the TPC, they did not know how it represented them or how to contact their representatives. Based on participant observation and interviews with herders in Nomgon, there is frustration, criticism, and anger towards the TPC for appearing only to give attention to herder issues in Javkhlant and Gaviluud *baghs*.

Many herders expressed doubt that the TPC is a transparent mechanism and some felt that it serves the interests of a small group of people. They question how the elected herder council was chosen and how some who do not appear to be active herders dominate. It is unclear to them to what extend TPC is 'owned' by Oyu Tolgoi or the local government, [21] and doubt that the TPC represents the interests of herders and herding livelihoods.

3.10 Household income, infrastructure and assets

3.10.1 Income and Expenditure

The primary sources of reported income for herders in Khanbogd are sale of livestock and livestock products, pensions, wages from jobs, and loans. Households vary in the amount of livestock produce that they sell depending on available labour and number of livestock. Alternative sources of income include: wage labor, businesses, seasonal work, and cash transfers from relatives. 100% of the households surveyed rely on livestock to some degree for their income. This income is typically seasonal, with the largest cash generated in the spring with cashmere sales, followed by sale of camel wool.

Household's income and expenditure profiles and their ability to cover expenses changes over time depend particularly on the age and number children attending school or university. Households also report that fluctuating prices of cashmere, wool, and meat make their households vulnerable: this has been the case since the early 1990s. This year, the price of camel wool, sheep wool and meat were lower than previous years (see appendix 2.3).

Households incur 'traditional' and 'new' expenses. Traditional expenses include maintenance of winter shelters, maintenance of vehicles, vet care, supplies to maintain *ger*, and new expenses include mobile phone, health care, fuel, second ger and household splitting costs.[22]

Faced with seasonal income, fluctuating prices and growing expenses, many households report feeling insecure. Households cite the following reasons why they are not able to "meet their annual budgets" (*tosov hurehgui*):

- The price of basic goods in Khanbogd is increasing.
- The price of skins and meat is extremely low.
- High medical expenses.

[21] See appendix 2.5.

[22] See appendix 2.4.

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- High school and university fees.
- Expense of moving.

In the agricultural sector, livestock, cashmere, and mutton are the most vulnerable to risks from *dzud*, drought, and exogenous shocks, such as falls in world commodity prices.[23] Of these risks, *dzud* has been identified by the World Bank as the most significant shock to pastoralist livelihoods. The D-EIA contains evidence of herder experiences of *dzud* induced poverty from a meeting in November 2003, i.e. before any relocation: "Local communities would like to see IMMI assist in addressing the increasing poverty among local herders, some of whom have lost 30% of their stock over the past 3 years."[24] Additionally, Mongolia's reliance on commodity markets (e.g. for copper, coal and cashmere) makes it vulnerable to external shocks whereby lower prices, as in the past few years, reduce government income and affect the value of the currency, with knock on effects on domestic prices and the ability of the government to fund welfare programmes and social services.[25]

3.10.2 Loans

Since 2003, loans have become very common across herder households in Mongolia. "We live from loan to loan," one Nomgon herder explained to us regarding his yearly budget. There are few households who do not currently have loans, either salary advances, pension advances, or herder bank loans. Herder bank loans are annual loans and herders report paying off loans with money generated from cashmere sale and immediately take out new loans.

Herder use of loans include:

- Paying school fees.
- Meeting everyday expenses.
- Paying for medical expenses.
- Buying high-priced items such as motorcycles or transport vehicles.
- Buying *ger* or materials to build a house.
- *Tsagaan Sar*.

Livestock are used as collateral for most formal bank loans; household with larger animal holdings qualify for larger loans. Research on debt amongst pastoralists in Mongolia has illustrated cases where poorer households who do not qualify for bank loans nonetheless take out loans in the names of wealthier households,[26] thus the extent of informal indebtedness of herder households in Khanbogd is unknown. Ethnographic research conducted by the Mongolian scholar David

[23] World Bank (March 2015) Mongolia: Agricultural Sector Risk Assessment. Document No. 101088

[24] Eco-Trade, LLC. (2006) DEIA, Part IV, Chapter 1, p. 37.

[25] IMF (2012) Inflation Dynamics in Mongolia: Understanding the Roller Coaster.

[26] Sneath, David. (2012) The 'age of the market' and the regime of debt: the role of credit in the transformation of pastoral Mongolia. *Social Anthropology* 20 (4): 458-473.

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Sneath, for example, has shown that in Baatsagaan soum of Bayanhongor aimag, "all but the richest households…have bank loans."[27]

3.10.3 Capital accumulation

Capital accumulation varies widely, reflecting the wealth differences between families in the soum. While a small group of families own more than 1000 livestock, more than one vehicle and have successful small businesses with property in the soum and multiple winter and spring camps, there are many households who are struggling with debt, serious health issues and supporting unemployed children and grandchildren. Older herders are a vulnerable group as they do not have the physical ability to carry out many herding tasks and many suffer from joint pain or other health issues related to old age. Older households also report lower livestock numbers as they disperse their livestock to children.

3.10.4 Household consumption and marketing of livestock products

Livestock sales are seasonal and depend on the ability of households to produce labour-intensive goods. The largest cash income generated for herders is cashmere, which is sold in the spring. Other fibres sold by herders include camel wool and sheep wool. Sheep wool is not cut as frequently by households as camel wool, both because of the very low prices offered per kilo of sheep wool and the labour intensive nature of cutting the wool. The second category of income includes dairy products (milk, airag and aruul). Many households use dairy products for their own household consumption and do not sell it on the market. Other households with excess sell mainly airag and aruul.

Herders are incentivized to sell to cooperatives (khorshoo) but the herders we spoke with were ambivalent about selling to cooperatives because they do not feel it is a profitable option. According to herders, cooperatives are meant to subsidize prices, but many herders sold their products and have not received the subsidy. Also, herders report that there is a 100,000T membership fee and consider that cooperatives are run for the benefit of a few traders[28]. While some households sell camel wool to their cooperative, others sell to buyers in the soum centre. A herder who sells milk, for example, has a prior arrangement with a buyer in the soum centre. One family enthusiastically recalled having a contract to sell *aruul* and *airag* to OT for one year.[29]

3.11 **Schooling and Household Splitting**

A trend across rural Mongolia is household splitting (i.e. mother and school age children living separately from the rest of the household during the school year). This affects labor and household expenses. Herders see household splitting as a reflection of how society has changed

[27] Sneath, David. (2012) The 'age of the market' and the regime of debt: the role of credit in the transformation of pastoral Mongolia. *Social Anthropology* 20 (4): 458-473.

[28] See appendix 2.4.

[29] See appendix 2.4.

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and why there are fewer younger herders. [30] For example, a herder explained, "Society has changed, this is why there are no longer any more young herders. Kids go to kindergarten from a very early age. In earlier times, they did not even go to pre-school. They went to school at the age of 8. Now children go to school at 6 years old and must go to kindergarten before that. It's social change." Household splitting weakens social capital, especially during winter months when women and children reside in the soum centre.

3.12 Contract herding, hired herders and placed herds

Herders in Khanbogd have a variety of arrangements for looking after livestock[31], including contract herding - which is occurring in various degrees across Mongolia.[32] The survey found:

- 'Traditional' herders who take care of their own herds.
- Herding households who take care of livestock for family and friends.
- Herding households who place their herds in other areas outside of Khanbogd soum, for example small livestock.
- Herding households who contract herders to help them herd. These households herd together with hired labour.
- Absentee herders: people who own livestock and do not live in the country side all year around as herders (as defined in the National Statistical Yearbook of Mongolia).

3.13 Livestock conditions

3.13.1 Livestock Inventories

Livestock numbers in Khanbogd have increased since 2003, reaching a record high in 2014.[33] Livestock were provided as a form of compensation to displaced households in 2004[34]. The high numbers of livestock in Khanbogd is a factor in stressed pasture conditions, especially where mobility is impeded. An examination of livestock inventories in Khanbogd reveals an increase in wealth inequality over the course of the last five years. In 2015, fifteen families owned more than 800 livestock, with one family reaching close to 2000. In 2010, only 6 households had more than 800 livestock. Additionally, the 2013 Population and Housing Census of Khanbogd Soum,

[30] Ahearn, A. and D. Bumochir (2016). Contradictions in Schooling Children Amongst Mobile Pastoralists. *Human Organization* 75 (1), p. 87.

[31] See appendix 2.3 for data.

[32] Murphy, D. J. 2014. Ecology of Rule: Territorial Assemblages and Environmental Governance in Rural Mongolia. *Anthropological Quarterly* **83**, 3, 759-792.

[33] Jigjsuren et al. 2015. Evaluating the impact of climate change based on herders'observations and comparing it with hydro-climatic and remote sensing data. Proceedings of the Transdisciplinary Research Conference: Building Resilience of Mongolian Rangelands, Ulaanbaatar.

[34] Dalaibuyan, B. and Namkhai, B. (2014) Oyu Tolgoi LLC: Resettlement Action Plan (RAP), External Completion Audit.

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Umnugovi Province reports that "Over the past five years, the number of livestock in Khanbogd has increased by 10%, however, there is a 34 percent drop in the number of herders."[35]

According to soum records, in 2015, Gaviluud had the highest number of registered livestock at 41,544 head (including livestock registered with herders actively herding in the countryside and absentee herders who live in the soum). This was followed by Javkhant with 35,377, Bayan with 31,965 and Nomgon with 24,127. According to soum records, the average number of livestock across the soum is 196 head per household, which includes the herds of absentee herders. Average herd size for active herders is 288 livestock per household. Herders report moving to other soums such as Bayan-Ovoo, Manlai, or Dundgovi aimag during times of drought, dzud or in the case of labor shortages. Also, the MDT encountered and interviewed herders from other soums who come into Khanbogd territory to use the pasture. Households move across soum lines in search of pasture and water, thus at any given time it is unclear exactly how many livestock are located on the Khan Bodg territory. This is the nature of pastoralism. From the data gathered from the MDT survey, however, the primary reason given for movement both into and out of Khan Bogd territory is to access water and pasture.

Total Livestock Numbers, National Statistical Office of Mongolia

Year	Mongolia	Umnogovi	Khanbogd	Manlai
2000	30,227,500	1,489,611	**69,296**	76,674
2001	26,075,338	1,209,566	**47,768**	74,308
2002	23,897,569	909,128	**52,760**	78,985
2003	25,427,699	907,355	**53,375**	65,517
2004	28,027,946	1,070,058	**62,256**	79,063
2005	30,398,830	1,121,524	**69,098**	83,265
2006	34,802,941	1,155,747	**71,285**	82,238
2007	40,263,838	1,399,996	**86,031**	95,629
2008	43,288,513	1,684,939	**102,456**	108,380
2009	44,023,900	1,755,215	**116,283**	118,859
2010	32,729,528	1,010,327	**96,084**	72,224
2011	36,335,781	1,223,459	**112,143**	88,298
2012	40,920,915	1,419,253	**123,291**	102,618
2013	45,144,324	1,653,264	**126,003**	117,787
2014	51,982,583	1,849,043	**126,467**	128,835
2015	**55,979,781**	**2,055,765**	**133,013**	**133,820**

[35] Sustainable Development Consulting (2013) Population and Housing Census of Khanbogd Soum, Umnugovi Province (pg. 92)

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Percent Changes in Livestock Numbers, National Statistical Office of Mongolia (Dzud years highlighted)

Year	Mongolia	Umnogovi	**Khanbogd**	Manlai
2000-2001	-14%	-19%	**-31%**	-3%
2001-2002	-8%	-25%	**10%**	6%
2002-2003	6%	0%	**1%**	-17%
2003-2004	10%	18%	**17%**	21%
2004-2005	8%	5%	**11%**	5%
2005-2006	14%	3%	**3%**	-1%
2006-2007	16%	21%	**21%**	16%
2007-2008	8%	20%	**19%**	13%
2008-2010	2%	4%	**13%**	10%
2009-2010	-26%	-42%	**-17%**	-39%
2010-2011	11%	21%	**17%**	22%
2011-2012	13%	16%	**10%**	16%
2012-2013	10%	16%	**2%**	15%
2013-2014	15%	12%	**0%**	9%
2014-2015	8%	11%	**5%**	4%

Khanbogd Soum Livestock Records, livestock type by percentage of total, National Statistical Office of Mongolia[36]

Year	Total	Horses	Cows	Sheep	Goats	Camels
2000	69,296	6%	2%	39%	33%	19%
2001	47,768	6%	1%	33%	36%	24%
2002	52,760	6%	1%	30%	41%	22%
2003	53,375	5%	2%	28%	42%	23%
2004	62,256	5%	2%	27%	46%	21%
2005	69,098	4%	2%	27%	47%	20%
2006	71,285	4%	2%	26%	48%	20%
2007	86,031	4%	2%	26%	51%	17%
2008	102,456	4%	2%	26%	53%	15%

[36] National Statistics Office of Mongolia, www.en.nso.mn/index.php

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2009	116,283	4%	2%	26%	54%	14%
2010	96,084	5%	2%	27%	48%	18%
2011	112,143	5%	2%	27%	49%	17%
2012	123,291	5%	2%	27%	49%	17%
2013	126,003	5%	3%	27%	48%	17%
2014	126,467	5%	3%	27%	47%	18%
2015	133,013	5%	3%	27%	47%	18%

A comparison of national, provincial, and soum level data illustrates the large losses in livestock numbers as a result of two particularly difficult dzud years in 2001-2002 and 2009-2010. As mentioned previously, dzud has been identified by scholars and the international agencies as one of the biggest risks to herding livelihoods today. The data shows that the 2009-2010 dzud affected Khanbogd less severely than Omnogovi aimag as a whole and neighboring Manlai soum. In 2009-2010, Manlai experienced a negative 39% change in livestock while Khanbogd saw a negative 17 percent change. The years following the dzud also illustrate a slower percent change increase in livestock numbers compared to Omnogovi and Manlai. These relative changes may be partially explained by the regional effects of dzud and dzud recovery. The tables also show a gradual increase in goats as a percentage of the total livestock population and a gradual decrease in sheep as a proportion of the whole. This reflects nation-wide trends in Mongolia since the economic transition of the 1990s as cashmere has become a dominant source of seasonal income.

The list of compensated households provided by OT includes 93 household names. According to the soum government census records, of this list, 51 households have increased their livestock holdings between 2010 and 2015. Twenty-one households have decreased their livestock holdings. Four households have maintained nearly the same number of livestock (+/- 5 livestock). Census records for 21 households are missing[37]. In 2015, 45 of these households had fewer than 250 head of livestock. It is unclear how many of the households with less than 250 livestock are currently active herders and how many are absentee herders. The average number of livestock for 76 families for which 2015 livestock census records are available is 308 head of livestock, above the soum average.[38] Regarding the missing livestock records, in a number of cases it is unclear if families had any livestock at the time of 2011 compensation as some names do not appear in the 2010 soum livestock counts. It is also unclear if households who no longer appear in the 2015 soum livestock records have completely exited herding as a livelihood.

A Nomgon bagh herder pointed out the contradictions of government policy on livestock which rewards herders for increasing herds and achieving growth of more than 1000 livestock, and the

[37] See appendix for table of livestock numbers including names with missing records. Clarification of names and additional information about the 29 missing records were requested but information remains incomplete.

[38] See Appendix for table of records.

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policy which aims to improve quality of herds and decrease quantity as a way to reduce pressure on pastureland:

"There are problems like pasture ability, etc. State policy has changed now. On one hand, they are giving awards to the herders with 1000+ livestock, on the other hand pasture ability is not enough, so [they say] let's have fewer livestock of good quality. So these two policies are against each other, right? On one side, if you grow livestock, you are a good herder, you have 1000 livestock, but people like us who have 500 or 600 livestock are not herders, too? No one visits us. The 2000, 3000 livestock herder is more important. Here it is much better than other places. It is hard to have 1000 Livestock here. Khangai is different, they stay on the edge of the river. If there was water, it is no matter how many thousands can be reached." – Nomgon bagh herder.

3.13.2 Livestock Health

Ninety-eight percent of households raised issues regarding the impact of dust on livestock lungs and internal organs such as liver. These problems appear as mucus in the lungs or discoloring. Some herders no longer eat internal organs due to these concerns. Other issues raised in relation to livestock health were hair loss along the spines and feet of goats and severe bloating. Other safety concerns for livestock include the loss of livestock from deep holes constructed as part of the power line between Oyu Tolgoi and Tsagaan Khad. Herders report that livestock get trapped in the holes when they are searching for water.

Herders report that livestock weight gain depends on the availability of pasture, water and winter fodder. During times of drought and dzud weight gain is a challenge and households will move to access pasture in different soums. The livestock health survey conducted in 2014 found changes in lungs of livestock residing near roads due to dust.[39]

3.13.3 Herd Fences

Herd fences (corrals and winter shelters) are constructed of a variety of material: concrete blocks, dung, tree logs and branches, construction lumber, stones, and recycled materials such as used wooden and metal fences, pallets, etc. Many herd fences are well-designed and maintained. Almost all surveyed herders have a well-constructed outhouse. In other parts of the Gobi, for example to the west in Bayanhongor, it is rare to see wooden construction and most shelters are made of dung or local stone, and there are no outhouses.

3.14 Perceptions of the Future

Herders convey a sense of uncertainty about the future in terms of climate, future infrastructure and mining development, and economic fluctuations. "We don't know what's going to happen next." Insecurity is a part of herder livelihoods, though new issues have been introduced. Both

[39] Key to Business Success NGO. 2015. Report on Livestock Health Study Carried out in Khanbogd, Manlai, Bayan-Ovoo soums.

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compensated and uncompensated households feel that future security in herding livelihoods is dependent on the availability of water and pasture and the ability to make money from livestock products. Herders compensated in 2011 who currently have 5 year work contracts express concerns about transitioning to a sudden decrease in income on which they have come to rely.[40] Other factors that contribute to feelings of insecurity about the future are:

- Dzud and drought events.
- Attack from wild dogs and wolves.
- Perception that there are not many young people herding.
- Not enough labour in the countryside to carry out all herding tasks.
- Social conflicts which impede cooperation and understanding between households.
- Concerns about joint and health problems which make it difficult to live in the countryside.
- Difficulties in making profit from herding.
- Insecure land rights.
- Climate change.
- Not possible to move freely any longer.

Others express confidence in herding as a livelihood, feeling that they are able to support themselves as long as livestock products are profitable. Many herders expressed a sense of satisfaction after the rains in May and July.

Regarding children's career choices, many herders feel it is better for children to go to university and get trained for a non-pastoralist profession. Elderly herders who are retired from herding and live in the soum centre see OT as a means to advance the livelihoods of their children. In general OT is well-regarded in the community as a job source and to advance livelihoods, though it is also seen as disruptive to the herding environment. Herders feel that Khanbogd registered citizens should have priority access to jobs or job training.

3.15 Cultural capital

3.15.1 Sacred Sites

In May 2016, members of the herding community and Khanbogd sum gathered at the Khanbogd sacred mountain for a mountain worship ceremony. This was a very well-attended event and featured horse-racing, wrestling and playing of shagai games. Other cultural sites remain valued and accessible, including the Demchig Monastery and energy centre, the table rock, and other sacred sites throughout the soum territory.

The majority of the herders that we interviewed across the soum said that they believed in the effects of offering customary respect for the sacred mountain and felt that the ceremony brought about the rains which occurred on the same day. Herders also reported that they maintained consecrated sheep and horses in their herds, which is a traditional practice across Mongolia.

[40] See appendix

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3.15.2 Preservation of Tradition

In visiting herder households across the soum, we encountered few households who offered dairy products upon entry into the home. Households did offer alternatives such as candies, bread or *boov (*hard biscuits). In May, many households used powered milk in milk tea. Households explained that this was because livestock were not being milked yet. This was striking because goats typically kid in the early spring and milking can begin in March. This suggests less focus on making dairy products and reliance on traditional gift giving and hospitality customs. It was the first time in the researcher's 12 years of working with rural herders that tea was not offered at the home of one household. We were told and we observed that there is less preservation of traditional knowledge around training pack animals, making a variety of homemade dairy products, and maintaining traditional codes of conduct around *ger* social customs.

3.16 Differences between bagh

The primary differences between *bagh* are the population density, the availability of pasture, and the presence of infrastructure. Nomgon and Bayan *bagh* report the best pasture availability and quality, but herders in both areas report critical shortages of water.

3.17 Social Conflict

Social conflict about pasture, water and access to resources is often focused on perceived injustices caused by OT's compensation packages. Herders we interviewed expressed deep anger and upset about having no effective means to express their position and secure their rights to resources by both the local government and mining companies. Reported social conflicts are:

- Conflicts between separate herding households who are family members because one household was compensated while others were not.
- Conflicts between herders from Javkhlant who attempt to move to other soums or baghs and are driven away, being accused of "selling their land."
- Conflicts between herders over grazing on winter pasture.
- Conflicts because livestock of different households mix while grazing.
- Decline in cooperation between households and sources of social capital

The presence of OT and non-OT infrastructure contributes to conflict between herders, changes in mobility and land use.

4 Do current herders have the capacity to retain traditional livelihoods into the next generation?

The' Umnogovi *aimag* social, economic and environmental baseline study' in 2008[41] found that "Only 1.8 percent of people thought that traditional culture is being preserved well (p 7)." Herders

[41] Center for Policy Research. 2008. "The Umnugobi aimag social, economic and environmental baseline

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interviewed during the survey perceived their capacity to retain traditional livelihoods as determined largely by access to pasture and water, which involves being able to practice mobility, produce Mongolian livestock products, and find markets to sell them in order to make a sustainable living, and to teach the next generation this knowledge and skills. The capacity for herders to retain traditions into the next generation thus requires government policy that is favorable to herder livelihoods by providing rights to practice mobility, secure rights to public resources such as water sources and pasture within systems that enable, not impede, mobility. Government failure to do this hinders traditional pastoralism.

Additionally, in order for herders to retain traditional livelihoods into the next generation, there need to be more resources dedicated to enabling pastoralism, and removing pressures to sedentarize in order to have access to good quality school and hospital services, for example. Herders have the capacity to contribute significantly to community well-being if government policies protect herder secure rights to land use in their home territories. Further, herder households should consider how household splitting affects their children's opportunities to learn livestock husbandry skills and traditional knowledge. This home-based learning environment is an important element of retaining traditional livelihoods and maintaining social values and customs connected to this way of life into the next generation.

5 What is attributable to OT?

5.1 Overview

OTs main direct impacts include: providing compensation and employment, displacement of herders, possible contribution to water shortage, e.g. cascading bore holes in Bayan bagh, TSF seepage risks[42] and pasture fragmentation. Indirect impacts include: social conflict between herders; stress on soum government resources; triggering population increase in the soum; employment shifting some herders away from traditional pastoralism, and the effects of companies subcontracted by OT on the environment.

In 2003, Oyu Tolgoi began the first resettlement programme of herder households and gave compensation to 10 households with winter camps located within and nearby the Mine License Area. These households moved to other areas of the soum, some outside of Javkhlant *bagh*. Herders from Gaviluud report that they were not consulted during the resettlement process and the resettled households moved close to existing households, which has pressured pasture resources. Herders in Gaviluud report that the resettled households in combination with the construction of new infrastructure in the *bagh* has created a critical situation in which many cannot move and feel insecure in their pasture use rights. This may partially explain why there are

study."

[42] 2016 January 15. Oyu Tolgoi TSF Seepage Monitoring Report. Water Team, Environmental Department Quarterly Monitoring Report.

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a higher number of winter camps issued in Gaviluud than the rest of the soum, as herders try to secure rights to pasture in these areas.

In our view, OT needs to more actively communicate with herders, compensate herders who were missed in 2004 and 2011, work with the national and local government to support herder transition to sustainable livelihoods, actively share data with the soum government and support the soum government to develop their capacity. For example, OT and the soum government should share data in a more dynamic way by conducting structured meetings to ensure that monitoring data is mutually understood and both parties can evaluable implications together, and do joint monitoring. This will enable the soum authorities to engage the public in better dialogue. See the specific recommendation in the conclusion. Although it was not a topic covered in this research, we found that the soum environmental officials are trying to cover a wide range of environment topics and the department does not have the necessary resources. Can this be addressed through the cooperation agreement? The national government and relevant ministries should be involved in monitoring and controlling the environmental issues faced by the soum.

5.2 Impacts on traditional herder livelihoods

The table below provides our evaluation of the how key aspects of traditional herder livelihoods have changed since 2003 as a result of OT and of factors other than OT.

Features of Traditional Livelihoods	OT Impact	Changes not attributable to OT
Mobility	-contributes to pastureland fragmentation -pastureland squeezed by 2004 resettlement -conflicts within and between families and lack of trust -displacement caused pastureland crowding and conflict	-non-OT infrastructure such as railroad, quarries, coal road, bird sanctuary. -lack of resources to do well maintenance from local government. -large livestock numbers
Knowledge and skills to train transport livestock (horse and camels)	-n/a	-herding by motorized vehicle (less need to train and use transport livestock on a daily basis) -younger school enrolment age for children and household splitting
Knowledge and skills to produce livestock products	**-**OT has impacted policy around pastureland management through external programmes and outsourcing. This had led to positive outcomes, such	**-**household splitting due to school access requirements reduces time available for women to milk animals and

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	as funding for Animal Husbandry Sustainable Development Program to improve livestock produce.	produce livestock products.
Social customs of hospitality and respect	-lack of trust of outsiders has eroded social customs of hospitality -influx of newcomers within a short time period	-general social change in household lifestyles and values, as well as changing social institutions
Traditional land use practices	-traditional land use systems have been affected by resettlement and focus on winter camp possession -traditional land use disturbed by major infrastructure construction -Cascading bore holds a major concern in Bayan bagh -displacement of herders has caused pastureland crowding and conflict	-government policy on winter camps - other government land and livestock-related policies?
Presence of institutions to enable and manage mobility and access to pasture	-Attempt made to establish pastureland management groups by engaging Nutag Partners; the results are unclear as there is no evidence from MDT research of outcomes.	-local government under resourced given complex situation

5.3 Dependency on Wage Labour

A direct effect of OT on herder livelihoods has been herder employment as roadside maintenance employees, which has provided an opportunity to receive approximately 800,000T per month to the households compensated in 2011 in Khanbogd. The 2 day per week work schedule has allowed households to continue living in the countryside with herds while receiving a salary. This income source has become very important for herders to meet their expenses, including paying high university fees. Dependency on wage labor has shifted focus from traditional livelihoods. A system for successful transition was not developed. For example roadside maintenance workers express concern about the 5-year contract ending and an inability to completely rely on herding full-time.

5.4 Herder Relationships to Oyu Tolgoi's Social Engagement Team

Only one household in Javkhlant described ongoing, active communication with members of OT's social engagement team and spoke positively about their experience of working with OT on developing their business. Compensated households report that they receive phone calls during the holiday season from OT representatives. Otherwise, households receive information about OT from a magazine publication, from the television, or if they attend meetings. Households are concerned about lack of representation of their experiences and interests to the OT. For example, a family who lives 15 km from the airport, who used to move into the area around the livestock, was not included in any baseline study research.

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A positive example of herder relationships with the OT social engagement team is the work conducted by the participatory environmental monitoring program around measuring well recharge which has enabled herders to monitor their water use.

5.5 Problems with 2011 Compensation: Uncompensated Households

- Boundary lines appear to be random and ignore customary pasture dynamics.
- Families only received partial compensation because they did not sign right away.
- Families felt the contract was not fair.
- Families did not receive compensation for registered *havarjaa* (spring camp) in the area that was designated as impacted, though they owned a possession contract for the camp. At least two families reported that they were told they would be compensated for the loss of their spring camps.
- Some herders argue that only people who had a registered license as of 2003 are included. Families were not able to register their *ovoljoo* prior to 2003 and many new families who were married after 2003 did not have a registered *ovoljoo* at the time. Additionally, families had *ovoljoo* winter shelters which they used according to custodial land tenure prior to 2003 but they did not own a winter possession contract (referred to as a "land license[43]" in the IMMI 2004 report).
- Household complained that they received partial compensation (i.e. employment but not money) because they were not physically located at their camp at the time of compensation or they did not sign the contract right away.
- A number of households appear to have been overlooked who live within the affected zone but were not compensated.
- Approximately 15 individuals were identified through MDT field research with cases entitled to review due to the above issues.

5.6 Customs and social relations

One of the palpable changes observed regarding traditional livelihoods in Khanbogd is a transformation in social relations and cultural customs. The psychological effects of OT's presence and the perception that some families have benefited while others have not, has contributed to feelings of injustice, anger, frustration and conflict between herders at a greater scale than we have observed or has been reported in other regions in Mongolia. Additionally, a sense of community and belonging has been broken to some degree. This is evident in the lack of trust expressed by herders and the cessation of many families in performing customary practices of hospitality.

[43] The legislation to legally obtain a winter camp site contract was amended in the 2002 Land Law. Custodial land tenure is protected in both the Land Laws of 1994 and 2002 as well as the Law on Local Government Administrative Units in 1992 and 2006. Thus many herders continued to practice their livelihoods according to their traditional practice without obtaining official contracts for land possession.

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6 Conclusion

Traditional pastoralist livelihoods in Khanbogd have adapted to the presence of mining in the region and the transformations of the landscapes in which they were raised. This adaptation reveals the resilience of herders and mobile pastoralist livelihoods to situations of change. One of the core skills of herders is to be flexible in response to the fluctuating conditions of the natural environment and the extremes of the Gobi Desert. We can see that practices of mobility, household organization, labour organization, forms of finance and budgets, social services, technology, land use patterns and political processes have been undergoing continual change since 2003.

Given these changes, herders have the capacity to retain traditional livelihoods into the next generation **under the right conditions.** These conditions require the availability of pasture and water for sustainable numbers of livestock in the soum, secure land tenure rights and rights to practice mobility, social institutions which value and support pastoralism as a livelihood, and access to social services that are conducive to mobile lifestyles. Currently, in Khanbogd soum these conditions are not being achieved. The local government lacks the capacity and staffing skilled in dealing with the level of management and administration required. There is little effort focused on developing sustainable livelihoods programmes focused on the development of local industries around processing livestock produce (i.e. dairy products, camel wool, cashmere, milk and cheese, etc). The scale of OT, Tavan Tolgoi, railway, etc in combination overwhelms the resources available to the soum to perform its duties and to ensure sustainable economic and social development.

The impacts of the high numbers of livestock in Khanbogd stresses environmental resources, especially with less pastures available due to the fragmentation of pasture from the development of infrastructure. Related to this, growing high livestock numbers is both encouraged by the national government and a means for households to achieve security and mitigate environmental and economic risks. The challenge is to build effective programmes and local livestock-based industries by including active herders in their design and implementation.

Although not the only factor in the soum which requires herders to demonstrate adaptability and creating stress, OT has a significant presence. As discussed above, there is more that OT should do to support herders and the soum authorities manage, respond to, and handle these pressures that they are contributing to. OT outsources much work to private companies which operate independently and have an effect on the landscape as well; these activities are driven by OT demand. Given the stresses faced by local herders, many people have expectations for OT that go beyond the mitigation of impacts. A role that TPC could play is in trying to enable open discussion about expectations and OT commitments.

A specific recommendation for OT to more actively communicate with herders is:

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Create an expanded community relations team with a new working plan. The team should comprise trained people whose role includes ensuring effective two way communication between OT and herders (as well as others in the community). This would include participating in formal meetings, for example, bagh meetings, and maintaining close contact with the local administration and elected officials; regular contacts with people in on-going compensation programmes, including identified 'vulnerable' people, but also informal contacts established by spending time travelling around across the soum.

The community relations team also need strong enough links within OT to be able to provide herders and other local residents with up-to-date information about OT activities (and during construction especially, the activities of contractors working outside the MLA such as who is working where, and for what period of time and how recruitment is being done), and be able to communicate back into management any concerns and issues they become aware of.

We also recommend that OT produce an annual report to Khanbogd that presents information on the past year's performance and plans for the coming year, covering local economic impacts including employment, local taxes and fees paid, local procurement; environmental impacts - monitoring and management programmes and the related data, and social performance including compensation programmes, support for vulnerable people, training and business development, Co-operation Agreement projects, donations etc. This should be published in the Mongolian language in a form which is accessible to herders.

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Appendix 1: TOR

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Invitation for Expressions of Interest
'Socioeconomic study of herder households in Khanbogd Soum, Umnugovi Aimag, Mongolia'

Release date: **April 1, 2015**
Submission date: **April 22, 2015**

Oyu Tolgoi LLC, with the agreement of the Khanbogd government and elected herder representatives from Khanbogd soum, invites interested and qualified experts to submit **Expressions of Interest** to undertake a **'Socioeconomic study of herder households in Khanbogd Soum, Umnugovi Aimag, Mongolia'.**

Those interested candidatess which have experience in executing similar studies are invited to submit Expression of Interest documents to Nandinchimeg Batsaikhan (Nandia) at nandiab@gmail.com prior **to 06:00pm, on April 22, 2015**

This call for Expressions of Interest from potential candidates makes no representation or promise in relation to procuring work from a candidate or candidates.. Hence, candidate proposals should not be complied with onerous expense or work. We will not be responsible for any costs associated with preparing and submitting an Expression of Interest.

Call for Expressions of Interest for a Multi Disciplinary Team (MDT) to undertake a socioeconomic study of herder households in Khanbogd Soum, Umnugovi Aimag, Mongolia

March 2015

Background

Oyu Tolgoi LLC (OT) over the past decade has developed and constructed the Oyu Tolgoi Mine in Khanbogd Soum, South Gobi region of Mongolia. Currently the mine runs an open pit operation, produces concentrate on site and trucks it to the Chinese border 80 km to the south via a paved road that was purpose-built by OT. Khanbogd soum currently has population of some 5,060 people, of whom some 3,900 live on the soum center (town) and 1,160 are rural herders engaged in transhumant animal husbandry.

The livelihood structure of many Khanbogd herder households has changed and continues to change as a result of the overall socio-economic changes associated with mining development. These changes, in many cases, threaten herders' traditional livelihoods. Additionally, many herders who continue to practice their traditional lifestyles fear that they will not be able to pass this culture along to future generations. However, while it is clear that these changes are taking place at a rapid rate, to date there has been no definitive study that investigates and describes the details and effects of these developments at a household level.

In October 2012, herders from Khanbogd Soum assisted by OT Watch - a national NGO, and Gobi Soil - a local NGO, lodged a formal complaint with the Office of Compliance Advisor Ombudsman (CAO) of the International Finance Corporation (IFC), stating that OT's 2004 resettlement and 2011 economic displacement compensation processes and contracts failed to sufficiently support sustainable livelihoods and compensate for the loss of traditional livelihoods and culture for the next generations.

Although over the past decade OT has commissioned a series of social, cultural and economic studies that seek to objectively map the changes to herder and general community livelihoods and culture, and determine which of these are due to the presence and activities of OT, these studies have not to date been compiled and analysed conclusively. Furthermore, up-to-date data and anthropological observation at household level are required to fully inform such an analysis.

Expressions of Interest are sought from a suitably qualified Multidisciplinary Team (MDT) to undertake rigorous desktop analysis of existing studies, compile selective household level observations and analyze the combined findings to produce a comprehensive picture of the current state of affairs of herder households in Khanbogd soum.

Objectives/Purpose of the Study

The purpose of the proposed study is to generate independent information on changes that are occurring in herder households, the impacts of OT's operations on herders' livelihoods and culture and the adequacy of OT's compensation processes. In particular, the Elected Herders Team (EHT) and OT want the MDT to assess changes in access to and quality of pasture and herd water as these relate to herder livelihood issues; to assess changes in herders household livelihoods more generally; and to use all of this information to evaluate the adequacy of OT's 2004 resettlement and 2011 economic displacement compensation.

Methodology

Proponents are invited to develop a proposed methodology for the assessment. The methodology should take into account the specifics of transhumant herder lifestyle and the impacts of mining projects on herder households and their resource needs. Critical analysis and synopsis of relevant government data and existing OT studies will be a major component of the work; a complete bibliography of existing studies is appended to assist proponents in the preparation of study proposals). Proposals for fieldwork and the collection of new primary data should be based on gap analysis, validation and selectively building on existing information, and explicitly avoid duplication. The methodology will be presented to the Local Government, EHT and OT for consideration and selection in competitive tender.

In developing the proposed methodology, proponents should include

'participant observation' and other anthropological methods, within a multi-disciplinary framework involving micro- and behavioural economics and sociological understanding. Proponents should adopt a team approach that will inherently benefit from the self-moderating interaction of team members having different professional perspectives, and will build an understanding of 'household ecology' rather than a narrow deconstructed view of individual livelihood factors.

The assessment will include three separate and complementary components: (1) *e*valuation of quality and to pastures and herd water – this can be largely drawn from existing studies and those currently underway (see bibliography attached); (2) an analysis of changes over the past decade to herder assets and livelihoods – this will require primary augmentation of existing studies and those currently underway (see bibliography attached); and (3) a review of the adequacy of OT's 2004 resettlement and 2011 economic displacement compensation processes, given the results of the assessments of pasture, water, assets and livelihood impacts.

Component 1: **Evaluation of quality and access to pastures and herd water**

The size and quality of available pasture, as well as access to water, is a major determinant of the number of animals that herders can raise, which in turn determines herders' standard of living from traditional nomadic pastoralism. Therefore, in order to assess OT's impacts on herders' livelihoods, the MDT must first assess impacts on pasture and water. Component 1 focuses on these aspects of impacts on herders' livelihoods and has three parts:

> *Part A* – With reference to primary and secondary data, complete a pasture count and a quantitative and qualitative assessment to determine, to the best extent possible, changes to Khanbogd soum pasture size, pasture quality and herd water from 2003 to present.
>
> *Part B* – Specifically map, to the best extent possible, the changes to pasture and water that are attributable to the OT project.
>
> *Part C* – Evaluate and develop recommendations regarding: (1) methods of restoring or preserving natural ecosystems and traditional livestock herding in Khanbogd soum as well as in Gobi region at large; and (2) whether there is capacity to bear the full scope of future impacts likely to be caused by the OT project.

Component 2: **Analysis of changes over the past decade to herder assets and livelihoods**

Component 2 will focus on impacts on traditional livelihoods and herder household culture and have two parts:

> *Part A* - Conduct an evaluation of how Khanbogd herder household livelihoods have changed from 2003 to present, with a particular focus on identifying the extent of loss of traditional livelihoods and culture and

assessing whether current herders retain the capacity to sustain their traditional livelihoods into the next generations.

Part B –Assess whether and to what extent the impacts identified are attributable to the OT project.

With regard to Part A, the assessment should be inclusive of, but not confined to, absolute levels and changes in:

- household assets and access to productive pasture (spring, summer, autumn and winter pastures); and water sources traditionally used during seasonal migrations, water wells and springs, herd fences and shelters, hay-fields, conveyance horses and camels and marketable healthy livestock;
- household infrastructure and assets;
- livestock inventories (animal quantity, quality, weight gain, age distribution, birth outcomes and species mix);
- animal products, primary and processed, for household use and sale;
- changes to household consumption and marketing of animal products;
- changes in herding practices and seasonal movements;
- value and changes in social capital (patterns of household collaboration and household composition);
- household incomes from other sources;
- household expenditure patterns;
- capital accumulation (herd growth/decline, banking, insurance and other non-herd assets);
- access and value to households of regional infrastructure (e.g. improved roads, retail facilities and communications, medical evacuation, health and education services and cultural sites);
- cultural capital of households (preservation of traditional living style, behavioural changes in following ancestors' ethics and teachings); and
- perceptions of changes and concepts of future (life histories, children's career choices, value placed by individuals on old versus new lifestyles).

Component 3: Compensation programme review

OT has run two processes to provide compensation for its impacts on herders in Khanbogd soum: the 2004 resettlement compensation process and the 2011 economic displacement compensation process. Many herders believe that these processes did not sufficiently compensate for OT's impacts overall on pasture and water (and therefore on the size of herds that households can maintain), as well as other impacts on traditional livelihoods and culture.

Using the information gained through Components 1 and 2, the MDT will conduct an independent review of the adequacy of the compensation packages to individual households and the overall support provided in KB by OT over the past decade. Specifically, the review should identify whether: (1) the impact assessing methodology applied to OT's 2004 resettlement and 2011 economic displacement compensation processes was suitable and adequate; (2) OT adequately compensated for any negative effects that can be attributed to OT's

presence, including OT-related infrastructure and natural resource use; (3) the compensation provided was sufficient to support transitions to sustainable livelihoods; (4) all herders deserving of such compensation were, in fact, compensated; and (5) the compensation processes complied with the IFC's Performance Standard 5.

MDT Team Membership and Selection Criteria

A 3-4 person team is envisaged, involving anthropological, sociological and micro-economic expertise that will be strictly vetted for qualification and relevant experience. The team should have a member with native Mongolian language skills and strong preference will be given to people with experience working with Mongolian herders. Equally, international 'best practice' experience and publication credentials will be essential for at least one senior team member.
MDT shall fulfil all tasks in a highly professional, ethical manner, without any bias.

Funding and Accountability

MDT proponents will prepare and present a budgeted proposal to the Local Government – OT - Herders Representatives Tri-Partite Council (Council - the successor body to the EHT/OT dialogue facilitated by CAO) involving herder representatives, Khanbogd Soum authorities and OT. Once the Council approves a proposal, OT will have the responsibility securing resources and funding for the MDT. Accountability for receiving draft reports, the final presentation and report and assessing the quality of all work will remain with the Council.

Reporting

The evaluation work should be done within 6 months and the draft report and recommendations will be presented to the Council within 2 months upon completion of the work. Progress report should be presented to the Council every 2 months during the work performance. From the feedback received at the presentation, the MDT will prepare a final written report, to be presented to the Council within one month of receiving feedback. Draft and final report will be prepared in both English and Mongolian.

Proposal Document

The Expression of Interest should include a succinct scope of work, methodology and descriptions of suggested multi-disciplinary team members, with summary CVs. The proposal can also include 'value add' suggestions that have not been outlined above. Proposals should be no longer than 10 pages.

From submitted Expressions of Interest, the Council will select candidate proposals to meet with the Council (logistics at OT's expense) to present proposals face to face, from which a final selection will be made. 6

Annexure: Bibliography and brief descriptions of available OT studies

1. OT Project Environmental Impact Assessment, Volume 3 Mining and Processing, Eco-Trade LLC 2003. In June 2003, Mongolian consultants EcoTrade conducted a census of all households within a 20km radius of the OT 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.

2. ***Additional Survey of Affected Herders, 2004-2005.*** Between 2004-2005, additional data was obtained from ten herder households that would be resettled from the 10 km Exclusion Zone in order to develop the entitlements under the herder resettlement package.

3. ***OT 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 and another 51 people were also involved in Focus Group Discussions based on four groupings. The Mongolian Centre for Policy Research and the Population and Training Research Centre led this work.

4. ***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.

5. ***Omnogovi Aimag Social, Economic and Environmental Baseline Survey in 2008*****.** OT commissioned the survey that was conducted by the Centre for Policy Research Mongolia, and the Population Training and Research Centre. A total of 70 households in Khanbogd *soum* centre and 37 rural households were involved in the survey.

6. ***Pastureland Mapping and Assessment Programme, 2009 to 2010.*** This programme was conducted to identify herders using pastures around the different OT impact locations. Data 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 impact sites. OT visited each herder household, conducted semi-structured interviews and drew seasonal pastureland area boundaries on an area map with the herders.

7. ***Phase 1 Report on Activities of the Oyu Tolgoi Cultural Heritage Program Design for Umnugobi Aimag.*** On 17 June 2010, Sustainability East Asia LLC (SEA) designed a long-term cultural heritage program (CHP) for Oyu Tolgoi LLC. The CHP design is divided into two phases. Phase 1 consists of the creation of a cultural heritage baseline and gap assessment, Phase 2 uses the information gathered during Phase 1 to develop the CHP and implementation plan. This

report summarizes the results of the Phase 1 work.

8. ***Oyu Tolgoi Resettlement Action Plan 2011.*** Part of the Lenders' ESIA documentation with supporting Operational Management Plans (OMPs). A comprehensive compilation of all work relating to 2004 physical relocation of 10 households from the Mine Lease area, and projected work on the 2011 economic displacement of 89 households from areas temporarily or permanently affected by ancillary infrastructure, such as road, electrical and pipeline construction.

9. ***Survey of Potentially Affected Herder Households (2010 to 2011).*** This survey built on the pastureland mapping and assessment programme above, to identify and gather more specific data on directly affected households. It was undertaken by OT between September 2010 and May 2011. This Survey involved detailed household visits to all affected herder families as well as other herder households in the Khanbogd *soum*. A total of 84 households were involved. The survey covered household composition, employment levels and sources of income, livestock and other assets, and other demographic data. The survey included 101 families. Altogether the survey covered 393 people, equating to 19% of all rural herders within Khanbogd *soum*).

10. ***Survey of local herders' perception of pastureland use agreement, 2012.*** National NGOs CPR, "Clean Energy" and "Altan Nutag" conducted a joint rapid survey among the herders of Khanbogd soum to record local attitudes towards pastureland use agreement to be established with the soum government. The survey found that 78 percent of the 186 herders interviewed expressed their support for a pastureland use agreement and some 72 percent expressed their readiness to formalise such and agreement. The survey results were used to define priority actions for soum authorities and herders to improve pasture management in their respective areas.

11. Population and Housing census of KB soum, 2013. This OT-commissioned census provides data on population numbers, disaggregated by age, gender, location, education, economic activity, migration status, and housing condition, at the lowest level administrative units - bagh and soum. The census was conducted using the same methodology employed in the Government of Mongolia 2010 Population and Housing census, and was the first census in Mongolia conducted in private-public partnership.

12. ***Oyu Tolgoi Resettlement Action Plan 2013 Update*****.** An update of the 2011 OT Resettlement Action Plan; part of the Lenders' ESIA documentation with supporting Operational Management Plans (OMPs). A comprehensive compilation of all work relating to 2004 physical relocation of 10 households from the Mine Lease area, and the 2013 status of 89 economically displaced households from areas temporarily or permanently affected by ancillary infrastructure, such as roads, electrical and pipeline construction.

13. ***Cultural Heritage Management Plan:*** **September 2013.** This operational Management Plan is a part of the Lenders' ESIA documentation. Its purpose is to set out applicable management interfaces; define roles and responsibilities;

outline the applicable Project Standards relevant to this Management Plan; define Project commitments, operational procedures and guidance relevant to this Management Plan; define monitoring and reporting procedures, including Key Performance Indicators; defined training requirements; and set out references for supporting materials and information.

14. ***Rapid Market survey, 2014.*** The survey was conducted by the Center of Policy Research Khanbogd, Manlai, Bayan-Ovoo and Dalanzadgad soums. Two hundred households, including 79 directly impacted herder households, were interviewed. In addition, interviews were conducted with soum officials and experts. The purpose was to identify business opportunities, obstacles for business development and training needs.

15. ***Assessment of livestock health in Khanbogd, Manlai and Bayan-Ovoo soums of Umnugobi aimag, 2014.*** The assessment was conducted by experts from the *Biznessinn Amjiltiin Tulkhuur, NGO.* The survey assessed 161 households in KB soum, including 73 from the project affected zone and 88 from the non-impact zone.

16. H*ealth status and living condition study of herders of Umnugobi aimag, 2014.* The study was conducted by the National Center for Public Health and the National Center for Communicable Diseases to assess the living conditions and health status of the KB herding population and develop recommendations. Of the project-affected households, nine families were covered by the survey. The study results are intended as baseline data for future healthcare policies to improve livelihood and health conditions in rural areas.

17. ***Survey on "Cooperative Priority Projects", 2014.*** The survey was undertaken by the Cooperative Training and Information Center to assess current status of cooperatives and their priority projects. The survey covered 18 cooperatives in four soums. Amongst other things it showed that out of all herding households in Khanbogd soum, 63.0 percent have joined cooperatives.

18. ***2004 Resettlement Action Plan External Completion Audit, 2014.*** Two Mongolian independent experts concluded an audit of the 2004 resettlement in March, 2014. The audit covered the 10 resettled households from 2004 and concluded that the company has provided all agreed entitlements, and the on-going activities such as assistance with university students tuition and school children supply be continued until the dates specified in the Relocation Agreement.

19. ***Oyu Tolgoi Resettlement Action Plan 2015 Update*****.** An update of the 2013 OT Resettlement Action Plan; part of the Lenders' ESIA documentation with supporting Operational Management Plans (OMPs). A comprehensive compilation of all work relating to 2004 physical relocation of 10 households from the Mine Lease area, and the 2011 economic displacement of 89 households from areas temporarily or permanently affected by ancillary infrastructure, such as roads, electrical and pipeline construction.

20. ***Study on Khanbogd Pasture Condition by Nutag Partners, commenced 2014 - ongoing.*** The purpose of this study is to assess the changes occurring to desert-steppe pasture in KB soum. The assessment will inform stakeholders (KB herders, soum government and central government agencies) when developing short- and mid-term plans for sustainable pasture use and vegetation regrowth.

21. Phase 1 Report of the Independent Expert Panel (IEP), 2015. Findings of an Independent Expert Panel (IEP) engaged by OT and KB herder representatives in a collaborative dispute resolution process convened by the Compliance Advisor Ombudsman (CAO) of the IFC. The purpose is to assess the OT Project's impact on three important water sources – the Undai River, Bor Ovoo spring (in the main channel of the Undai River) and the Haliv-Dugat River (a tributary of the Undai river) – and how these impacts will affect pasture, herders' access to water and water quality. The work of the IEP is to be undertaken in two phases, with Phase 1 focusing on the Undai River and Bor Ovoo spring.

22. Project Affected Households: Annual Household Survey, 2013, 2014. The survey is designed to track the receipt of entitlements under OT relocation and compensation agreements, assess involvement of affected households in community development programs and identify any improvement or changes in household livelihoods. The survey data is collected using a pre-designed questionnaire, and results are processed internally by OT monitoring and evaluation experts.

Appendix 2: Questionnaire (excluding household income and expenditure questions)

Малчин өрхтэй хийсэн ярилцлага

Гурван талт зөвлөлийн хүсэлтээр Ханбогд сумын малчдын нийгэм, эдийн засгийн байдалд 2003 оноос хойш гарсан өөрчлөлтийг судлах судалгааг хийж байна. Бид 100 малчин өрхийг санамсаргүй түүвэрийн аргаар сонгон авч ярилцлага хийх юм. Энэхүү судалгаанд та бүхэн өөрсдийн мэдэх зүйлсээ хуваалцаж бидний асуултанд хариулж, судалгааны ажилд гүн туслалцаа дэмжлэг үзүүлнэ үү. Эдгээр ярилцлагыг хийж, гарсан үр дүнг шинжлэн дүгнэж Гурван талт зөвлөлд тайлан бэлтгэж хүргүүлэх юм. Өрх бүрийн өгөх мэдээллийн нууцийг чандлан хадгалах ба тайланд хувь хүмүүсийн нэрийг дурдахгүй болно. Танд хариулахыг хүсэхгүй байгаа асуулт байвал заавал хариулах шаардлагагүй гэдгийг анхаарна уу.

1. Нэр
2. Нас
3. Та хүүхэдтэй юу? Тийм бол хэдэн хүүхэдтэй вэ?
4. Таны хүүхдүүд одоо хаана амьдардаг вэ? Тэд юу хийдэг вэ?
5. Яг одоо сургуульд сурч байгаа хүүхэд бий юу?
6. Танайх хаана өвөлждөг вэ? Хүүхэд сургуульд явахад хэн дагаж сум ордог вэ? эсвэл айлд ч юм уу? дотуур байранд өгдөг үү?
7. Хэдэн жил мал маллаж байна вэ?
8. Энэ нутагт хэдэн жил малаа маллаж байна вэ?
9. Малаа анх хаанаас, яаж авсан бэ?
10. Хэдэн ямаа, хонь, үхэр, адуу, тэмээтэй вэ?
11. Таны малын төрөлд өөрчлөлт орсон уу? Яагаад?
12. Хэзээ хамгийн олон малтай байсан вэ?
13. Малын тоо толгойг хангалттай өсгөх боломж байна уу?
14. Малын эрүүл мэндэд өөрчлөлт гарч байна уу? Яагаад?
15. Малаа хөлсний малчнаар маллуулдаг уу эсвэл танай ах дүү садангийн хэн нэг нь малладаг уу? Хэзээнээс эхэлсэн бэ?
16. Тавиул мал малладаг уу? Хэзээнээс эхэлсэн бэ?
17. Та өвөлжөө, хаваржааны бууцаа өөрчилсөн үү? Яагаад?
18. Та өвөлжөө, хаваржааны газрын гэрчилгээтэй юу?
19. Хэдэн өвөлжөө хэдэн хаваржаатай вэ? Өөр хүмүүс хэрэглэдэг үү? Яагаад олон өвөлжөөтэй болохоор шийдсэн бэ?
20. Танайх энэ жил цагаан сараас хойш хэдэн удаа нүүсэн бэ? Ер нь жилд хэд нүүдэг вэ?
21. 2003 оноос өмнө нүүж байсантайгаа адил удаагаар нүүх боломжтой байгаа юу?
22. Оюу толгойн уурхайн үйл ажиллагаа болон зам харгуй эсвэл ажлын хуваарь нь нүүх эсэх шийдвэрт тань нөлөөлж байв уу?
23. Одоо зусландаа байна уу? Таны зуслан, өвөлжөөний газрын хооронд хэр зайтай вэ?
24. Суманд ойрхон газарт амьдрах чухал уу? Яагаад? Ямар шалтгаан байдаг вэ?
25. Усны хүртээмж олдоц ямар байна вэ? 2003 оноос хойш усны хүртээмж хэрхэн

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өөрчлөгдсөн бэ?

26. Ямар худаг хэрэглэдэг вэ? Гар худаг? Гүний худаг?
27. Мотор хэрэглэдэг үү? Хэрэглэдэг бол үүнд хэдэн литр бензин хэрэглэдэг вэ?
28. Хэзээний худаг вэ? Нэгдлийн үеийнх? Оюу толгой гаргаж өгсөн? Өөрсдөө гаргасан? Улсаас, нутгын захиргаанаас?
29. Танай худаг хэдэн км-ийн зайд байдаг вэ?
30. Хэдэн айл хэрэглэдэг вэ? Худгаа цоожилдог уу?
31. Бэлчээрийн хүртээмж, чанар ямар байна вэ? 2003 оноос хойш бэлчээрийн чанар хэрхэн өөрчлөгдсөн бэ? Бэлчээрт юу юу нөлөөлж байна вэ?
32. Энд хамгийн сүүлд хэзээ зуд болсон бэ? Зудны үеэр юу болсон бэ?
33. Орлогын эх үүсвэр юу вэ? 2003 оноос хойш хэрхэн өөрчлөгдсөн бэ?
34. Танайх одоо хэдэн мал сааж байна вэ? Ямар ямар мал сааж байна вэ? Хэзээ малаа саадаг вэ? жилийн 4 улирал сааж чадаж байна уу?
35. Та нэг өдөрт хэр их сүү авдаг вэ? Сүүгээрээ юу хийдэг вэ?
36. Та гаргасан бүтээгдэхүүнээ хаана зардаг вэ?
37. Малын өөр ямар бүтээгдэхүүн үйлдвэрлэлж борлуулдаг вэ?
38. Банкны зээлийг юунд хэрэглэдэг вэ? Ямар зээл авдаг вэ?
39. Танай хүүхдүүдээс (том болсон нь) малчин болсон уу? Танай хүүхдүүд том болоод малчин болно гэж бодож байна уу? Энэ байдал танд ямар санагдаж байна вэ?
40. Сум, аймаг, Улаанбаатар болон бусад газарт өмч хөрөнгө бий юу? Тийм бол хэзээ үүнийгээ авсан бэ?
41. Ямар тээврийн хэрэгсэлтэй вэ? Машинтай бол хэзээ анх машин авсан бэ?
42. Өмч хөрөнгө худалдан авахдаа хаанаас санхүүжилт авч байна вэ?
43. Өрхийн гол зарлага юун дээр гарч байна вэ?
44. 2003 онтой харьцуулахад өрхийн зарцуулалт өссөн үү? багассан уу?
45. Сумын төв хэр их явдаг вэ? Аймгийн төв? Улаанбаатар?
46. 2003 оноос хойш сургууль, эрүүл мэндийн үйлчилгээ хэрхэн өөрчлөгдсөн бэ?
47. Эрүүл мэндийн хувьд танд ямар асуудлууд байна вэ?
48. 2003 оноос хойш мал эмнэлгийн үйлчилгээ хэрхэн өөрчлөгдсөн бэ?
49. Өнгөрсөн 10 жилийн хугацаанд мал маллах арга техник хэрхэн өөрчлөгдсөн бэ? Өөрийн мал ахүйд тань чинь Оюу толгойн уурхай болон зам нөлөөлж байвуу?
50. Уламжлалт нүүдлийн хэлбэрээр мал маллахад гол зүйл нь юу вэ? Уламжлалт мал аж ахуй юугаар тодорхойлогдох вэ?
51. Нүүдэлчин уламжлал хэвээрээ байна гэж бодогдож байна уу?
52. Тэдгээр уламжлалыг хэрхэн хадгалж үлдэх вэ?
53. Энд тахилгатай уул ус, газар бий юу? Догшин лус савдагтай уул ус бий юу? Тахилга хийж тахин шүтэхэд байгаль дэлхий өгөөжөө өгч байгаа нь мэдэгддэг үү?
54. Хэрвээ бусад малчидтай маргаан гарвал юунаас болж гардаг вэ? Хэрхэн шийддэг вэ?
55. Малчид бие биедээ хэрхэн тусалж эсвэл яаж хамтран ажиллаж байна вэ?
56. Оюу толгой уурхай танд ямар нэг байдлаар тус хүргэж байна уу? Ус болон бусад малын өвс тэжээл гэх мэтээр хангадаг уу?
57. Таны бодлоор баян ядуугийн ялгаа их болж байна уу? Жишээ байна уу?

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58. Энэ хавиар 1000с дээш малтай хэдэн айл байдаг вэ?
59. Оюу толгойн уурхайн зүгээс байгаль орчны хувьд ямар нөлөө үзүүлж байна гэж та бодож байна?
60. ОТ уурхай ажиллах болсоноос хойш амьдрал чинь хэрхэн өөрчлөгдсөн бэ? Сайн өөрчлөлт үү? Муу юу?
61. Уурхай таны мал маллагаанд хэрхэн нөлөөлсөн бэ? Оюу толгойн уурхай ажиллаж эхэлснээс хойш мал маллахад танд ямар нэг хүндрэл тулгарч байна уу? Ямар асуудал байна вэ? Хэрхэн шийдвэрлэж байна вэ?
62. Оюу толгой уурхайгаас болоод малчдын тоо цөөрсөн үү? Яг ямар шалтгаан байсан бэ?
63. Уурхайн ажиллагааны үр дүнд, ямар нэг өмч хөрөнгө, бууц, усны эх үүсвэр, хужир болон бусад бэлчээрийн хүртээмж алдагдсан уу? Тийм бол чухам аль нь вэ?
64. Танай гэр бүлийн гишүүдийн хэн нэг нь ОТ-д ажилладаг уу, эсвэл ажиллаж байсан уу? Ямар ажил хийдэг эсвэл хийж байсан бэ? Амьжиргаанд нэмэртэй байна уу? Сэтгэл ханамж ямар байдаг вэ?
65. Мал маллаж амьдрахад ирээдүй баталгаатай байж чадах уу?
66. Ирээдүйн төлөвлөгөөнд чинь Оюу толгой уурхай нөлөө үзүүлж байна уу?
67. Таны өдөр тутамд хамгийн ихээр сэтгэл зовоодог зүйлс юу вэ?
68. ОТ уурхайн тухай хангалттай мэдээлэл байгаа юу? Үгүй бол ямар мэдээлэл дутагдаж байна вэ?
69. Хамгийн сүүлд ОТ-н олон нийттэй харилцах хэлтсээс эсвэл ОТ-н төлөөлөл малчидтай хэзээ уулзсан бэ? Хэрвээ ОТ-той холбоотой ямар нэг асуулт, асуудал гарвал яадаг вэ? Асуудлаа шийдвэрлүүлж чаддаг уу? Хариултаа амархан авч чаддаг уу?
70. Танайх өвөлжөөнөөсөө нүүгээд нэг л газраа очдог уу? эсвэл хаа сайгүй нүүдэг үү?
71. Нөхөн олговор таны хувьд шударга байсан уу?
72. Та нөхөн олговор авбал зохистой гэж бодож байна уу? Ер нь таны бодлоор хэн хамрагдах ёстой вэ?
73. Таны бодлоор нөхөн олговор гэж юу байх ёстой вэ?

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Appendix 3: Mobility

"When we move somewhere, people will say this is my winter camp, my spring camp. Or the place that we moved has no water. We can just stay 2 days and the water will finish and we move again. Once, we moved twice in one day. There are 2 reasons why we move. One is because there is no water, the other one is because there are other families staying in the pasture. So we move."

In response to the question "how many times have you moved since Tsagaan Sar this year," a non-compensated herder in Javkhant stated, "we haven't moved since Tsagaan Sar. We cannot find a place to move. We have no spring camp, we lost it to Oyu Tolgoi. My spring camp was in the area around the airports." The researcher asked in response, "Typically how many times do you move in one year?" The herder stated, "Now we only move once to camp in summer pastures. There is no other way, no pasture for people around OT. We have to move between our winter camp and summer area."

A herder in Javkhlant stated, "Herding is no longer a secure livelihood. It used to be secure, it used to be. Now there are no places to move and stay to pasture animals. If it snows then there is a real problem. Now the security is gone. Today we are staying by our livestock, but without rain or grass….we're taking care of our few animals and waiting here…"

A herder in Javkhlant stated, "I am not moving anymore. In 2014, when we moved to Dukht, there was no pasture, so we moved to Tsogt-Tsetsii. But then we got into a car accident. When we got there people were saying you sold your nice land, go away from here, so I [returned and] never moved again."

Javkhlant Herder Profile

Khishgee (psydonym) is 32 years old, with two children. One child is in 8th grade and the other is 11 months old. In 2002 she lived to the west side of the OT MLA and her camels used the pasture close to the airport. She has not been able to utilize this area because there was no space between households and there was not enough pasture. Since 2010, she has moved with her husband to utilize pasture in Bayan Ovoo, Tsogtsegii and the areas around the boarder of Khanbogd. In the last year, they were unable to find a stable camp site and lived continuously in their car. When traveling to use pasture in other soums, the local herders made her family pay 100,000T to use the water and to pay close to 1 mill T to use a *buuts* in that area. She reported that the herders from other regions would treat them badly and yell at them for entering into their territory.

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Appendix 4: Herders and Absentee herders in 4 baghs, year 2015

Herders and absentee herders in 4 bags, year 2015

Name of bags	Herder household/family		Absentee herder household		TOTAL Households
Nomgon	59	46.8%	67	53.2	126
Gaviluud	107	58.2%	77	41.8	184
Javkhlant *	95	56.5%	73	43.5	168*
Bayan	88	52.4%	80	47.6	168
TOTAL	349	54%	297	46	646

*Note: 29 Household from Javkhlant was not included, due to not full information.

Possession of winter and spring camps sites by absentee herders, year 2015

Name	TOTAL HH	Winter camps sites		Spring camps sites		Winter & Spring camp sites		None of winter or spring camp sites	
Nomgon	67	20	29.9%	1	1.5%	6	9%	40	59.6%
Gaviluud	77	8	10.4%	4	5.2%	3	3.9%	62	80.5%
Javkhlant	73	33	45.2%	0	0	6	8.2%	34	46.6%
Bayan	80	11	13.8%	8	10%	15	18.8%	46	57.4%
total	297	72	24.2%	13	4.4%	30	10.1%	182	61.3%

- Most of absentee herder have no winter or spring campsites.

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Appendix 5: Household Income

"We go to the soum to sell. We want to sell, but it won't sell. Most people seem to have no money now. People can't buy. The last 2 years were the worst. OT bought dairy products, then what happened? They bought for one year and then stopped. I can't make money from dairy products". –Nomgon bagh herder

"Kids school fee and the university fee, including student accommodation fees are a lot now. A normal herder can't afford it. We live from loan to loans. We want to grow livestock more, but there is no market. Livestock products' price go down, and our life stops." –Nomgon bagh herder

Income items	**Young family (20-35 years) with 364 livestock, 3 adults & 1 child.**	**Middle Aged Family (36-55 years old) with 399 animals, 2 adults and 3 children**	**Older Family (56+ years old+) with 31 animals, 3 adult and 5 child dependents.[44]**
Cashmere	6.5 million T	7 million T	6 million T for cashmere & camel wool together
Camel Wool	30,000	1 million T	
Sheep Wool	48,000	n/a	180,000 T
Aruul	n/a	1 million T	Yes- enough for rice and flour
Airag and Milk	18 liters milk/day		Yes small amount
Skins and Meat	10 goats, 1 camel, 2 cows	3 million T	3 camels and 10 small livestock
Pension	n/a	n/a	200,000T (got advance for 18 mths)
Salary	Nurse (wife)	n/a	Received 2011 compensation
Child Payment	20,000T/month	n/a	n/a

[44] This family shares a camp with another family and their herds are combined, which is reflected in the income numbers from cashmere and camel wool.

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Loan	Herder loan and salary loan	10 million T in herder loans	n/a
Expenditure items	**Young family (20-35 years)**	**Middle Aged Family (35-50 years old)**	**Older Family (50+ years old+)**
School Fees	n/a	2 million uni tuition for two students and 250,000T/month	Supports 4 grandkids in school
Gas	100,000/mth	45,000T/month	50 L/month
Food supplies and misc. house supplies	50k flour, 25 k rice, 3 k potatoes plus onions (per month)	unknown	50 K flour/mth
Cell phone	15,000-20,000/mth	unknown	60,000 T/mth
Medical expenses	250,000 for medicine	unknown	20,000 T/mth
Travel	800,000	unknown	unknown
Veterinary care	50,000	unknown	80,000 T/year
Livestock feed	10 packs grain, 20 bales hay	unknown	n/a
Tsagaan Sar holiday	500,000	unknown	2 Million T.
Coal	35,000-50,000	unknown	n/a

2016 Prices were:

Cashmere: 65,000T/kilo
Camel Wool: 2500-3000T/Kilo
Sheep Wool: 300T/Kilo

Goat, camel and horse meat: 3000T/kilo
Sheep meat: 3500/kilo
Cow meat: 4000/kilo

Horse skin: 25,000
Camel skin: 15-20,000
Sheep skin: 8-10,000
Goat skin: 15-20,000
Cow skin: 35-40,000

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Camel aruul: 25,000/kilo

"We all Khorshoo members. If the person is not the member of khorshoo, they can't get the subsidies/ bonus/money. We still did not get the money yet. Who is getting and who is not? If we sell it for 6000 and paid same time is better for us. When OT gives anything, they give through Khorshoo. etc. But khorshoo will sell it to us... A few traders are the owners. We want to communicate with OT without Khorshoo. We just helping to the khorhsoo to grow big/ develop… Few traders are the owners. We want to communicate with OT without Khorshoo. We just helping to the khorhsoo to grow big/ develop." – herder in Nomgon bagh

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Appendix 6: Surveys and Trust

“Many people come to do surveys or research. We actually don't believe them anymore. I was asking about you from people, and maybe you seemed really not related to OT. Are you really an independent researcher? One who does not work for OT and does not work for the herders? Other researcher all seem like they are working for OT. So, at first we did not trust you. Then after asking from many people, you seemed to be really doing things honestly, then I intended to come here to talk. Some of the people who are strong and able to talk about the problem have just become quiet. Maybe they were under pressure or get money [to remain silent]. Nowadays it is hard to work fairly. I don't trust anymore.” –Bayan bagh herder

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Appendix 7: Compensated Households

Compensated Households Livestock Holdings Year 2010 and 2015, Khanbogd Soum Records (List provided by OT). The names have been replaced by a number to protect private information, a complete list can be provided with permission.

Name	Bagh	Year of compensation	2010 total	2015 total
1	Gaviluud	2011	293	597
2	Bayan	2011	327	964
3	Javkhlant	2011	276	195
4	Bayan	2011	208	Name not in records
5	Bayan	2011	288	282
6	Bayan	2011	189	267
7	Javkhlant	2011	Name not in records	250
8	Javkhlant	2011	Name not in records	23
9	Bayan	2011	125	199
10	Gaviluud	2011	217	279
11	Javkhlant	2011	264	304
12	Javkhlant	2004, 2011	43	9
13	Gaviluud	2011	430	297
14	Bayan	2011	154	157
15	Javkhlant	2011	185	495
16	Gaviluud	2011	149	202
17	Nomgon & Gaviluud (2015)	2011	63	157
18	Gaviluud	2011	232	353
19	Javkhlant	2011	201	Name not in records
20	Nomgon	2011	183	76
21	Gaviluud	2011	52	88
22	n/a	2011	73	Name not in records
23	n/a	2011	Name not in records	274
24	Javkhlant	2011	901	991
25	Bayan	2011	332	546

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26	Bayan	2011	168	71
27	Bayan	2011	10	Name not in records
28	Bayan	2011	Name not in records	50
29	Javkhlant	2011	280	552
30	Javkhlant	2011	100	149
31		2011	Name not in records 2010 and 2015	
32	Javkhlant	2011	47	53
33	Javkhlant	2011	Name not in records	384
34	Gaviluud	2011	145	165
35	Gaviluud	2011	172	355
36	Bayan	2011	442	771
37	Nomgon	2011	Name not in records	181
38	Nomgon	2011	93	150
39	Javkhlant	2011	239	443
40	Javkhlant	2011	60	248
41	Gaviluud	2011	73	350
42	Javkhlant	2004	94	187
43	Gaviluud	2011	83	202
44	Javkhlant	2004	825	1285
45	Javkhlant	2004, 2011	170	167
46	Gaviluud	2011	359	128
47	Javkhlant	2011	Name not in records	475
48	Javkhlant	2011	308	220
49	Gaviluud	2011	298	212
50	Bayan	2011	58	87
51	Javkhlant	2011	137	272
52	Javkhlant	2011	645	1017
53	Javkhlant	2011	85	160
54	Bayan	2011	30	Name not in records
55	Gaviluud	2011	34	67
56	Gaviluud	2011	25	80
57	Javkhlant	2011	269	156
58	Bayan	2011	171	103
59	Javkhlant	2004, 2011	335	549

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60	Nomgon	2011	99	51
61	Gaviluud	2011	81	209
62	Javkhlant	2004, 2011	271	258
63	Gaviluud	2011	187	286
64	Bayan	2011	136	134
65	Gaviluud	2011	148	31
66	Bayan	2011	209	144
67	Name not in records	2011	Name not in records	Name not in records
68	Javkhlant	2011	118	126
69	Javkhlant	2011	130	198
70	Javkhlant	2011	420	730
71	Nomgon	2011	127	296
72	Javkhlant	2011	63	324
73	Gaviluud	2011	123	344
74	Nomgon	2011	72	70
75	Bayan	2011	66	23
76	Javkhlant	2004	60	132
77	Javkhlant	2011	46	107
78	Javkhlant	2011	267	444
79	Bayan	2011	Name unclear	771
80	Javkhlant	2004	587	384
81		2004, 2011	Name not in records	Name not in records
82	Javkhlant	2004, 2011	258	222
83		2011	60	248
84	Gaviluud	2011	19	Name not in records
85	Javkhlant	2011	168	270
86	Javkhlant	2011	24	17
87	Nomgon	2011	191	270
88	Javkhlant	2011	53	281
89	not in records	2011	Name not in records	Name not in records
90	Javkhlant	2011	49	Name not in records
91	Gaviluud	2011	127	126

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92	Javkhlant	2011	196	495
93	Gaviluud	2011	138	168

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1 Introduction

This report considers compensation. It addresses the following questions specified in the terms of reference[1].

1. Was the impact assessment methodology applied to the 2004 and 2011 compensation process suitable and adequate?
2. Has OT adequately compensated for any negative effects that can be attributed to OT's presence, including OT-related infrastructure and natural resource use?
3. Was the compensation provided sufficient to support transitions to sustainable livelihoods?
4. Have all herders deserving of compensation been paid?
5. Have the compensation processes complied with the IFC's Performance Standard 5?

The approach to answering these questions draws on a mix of document review, information collected in meetings with herders, OT and soum officials, and the findings of the pasture/water study and the socio-economic survey, as agreed with TPC.[2] The Terms of Reference for Component 3 of the MDT study is shown as Appendix 1.

At the training on Joint Fact Finding held in Khanbogd in February 2016, members of the herder group in TPC requested that the experts also assess the emotional damage to herder elders resulting from resettlement.

During the study period, and after research had started, the herder group in TPC also asked that attention be paid to the following provisions in the compensation agreements:

- "Anyone who becomes a legal spouse to the Licensee or is born to or legally adopted by the Licensee may himself or herself become a member of the Licensee Family and, upon written notification to the Company (along with official documentation of the marriage, birth or adoption, as the case may be added to the list in Appendix 1." (Clause 3.2, 2004 Compensation Agreement).
- "Insist the Company to pay the compensation for the adverse impacts that have neither been identified nor covered by this Contract and have been caused by the construction of project supporting infrastructure facilities and consequence, operation of infrastructure and demand the Company to take measures to study, mitigate and control the so-called adverse impacts." (Clause 5.4, 2011 Compensation Agreement).

In response to the draft report, the herder group:

- requested analysis of OT's compliance with obligations under IFC's Performance Standard 5 to pay particular attention to the poor and vulnerable.[3]

[1] TOR, 'Socioeconomic study of herder households in Khanbogd Soum, Umnugovi Aimag, Mongolia'.
[2] Revised First Progress Report, April 2016.
3 IFC PS5, Paragraph 8, "Project Design**.** The client will consider feasible alternative project designs to avoid or minimize physical and/or economic displacement, while balancing environmental, social, and financial costs and benefits, paying particular attention to impacts on the poor and vulnerable."

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- Argued that cultural impacts are not addressed in the analysis of the adequacy of OT's impact assessment processes.

Because these latter issues were not included in the Terms of Reference, or in the workplans agreed with TPC, they were not covered in interviews or meetings unless they were mentioned by interviews or participants in focus groups. The herder group has not presented any new data on either topic. Therefore, our ability to reach conclusions is limited although we do make some observations on each point in Sections 4.4 and 7.2.2.

In response to the draft report, OT requested that we review the Khanbogd soum Animal Husbandry Sustainable Development Programme (10 year)[4] in the context of support for improved pasture and herder business support. This has modified our preliminary conclusions about collective compensation. See Section 6.4.

2 Context: standards and practice for impact assessment and compensation

Large mining projects like Oyu Tolgoi typically aim to comply both with national laws and regulations on impact assessment and resettlement, and with international standards and good practices. Both IMMI who managed OT initially, and Rio Tinto now, state their intention to meet national and international standards.

Since the OT project started, there have been important changes to both national and international law and standards.

- The environmental assessment laws applying to mines in Mongolia were first issued in 1998, and have been revised twice since then – in 2001 and 2012.
- The World Bank issued its 'Safeguard Policies' in the 1990s, these were followed in 2006 by IFC's comprehensive policies for social and environmental performance, and these policies were revised in 2012. In August 2016, the World Bank issued its new 'Social and Environmental Framework'.[5]

The main changes since the 1990s in laws and standards are:

- Initially, impact assessment was mostly a matter of permitting – providing an assessment that would allow a project to be approved by the government. Now, impact assessment focusses in much more detail on how the impacts of the project will be mitigated, managed and monitored throughout its lifetime.
- Each change – both nationally and internationally – includes a larger role for public participation. In the IFC Social and Environmental Performance Standards, this includes requirements to carry out 'informed consultation and participation'[6]. This requires that

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[4] Khanbogd soum livestock sector sustainable development program, 2016-2025.
[5] http://www.worldbank.org/en/news/press-release/2016/08/04/world-bank-board-approves-new-environmental-and-social-framework
[6] IFC PS1, para 31. See http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/performance+standards+-+2012

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stakeholders are identified; the potential positive and negative impacts on each group of communities is understood; individuals and communities potentially affected contribute to the understanding of impacts and the actions to manage and monitor impacts; there is regular disclosure of information and the project and its impacts and a clearly communicated and accessible grievance mechanism.

- Initially standards on resettlement focused on providing cash compensation to people whose land was taken by projects. From the first World Bank safeguard policy onwards, the concept has always been that it is better to provide people with alternative land or housing than to pay cash compensation because cash compensation usually does not lead to good results for the people affected.
- Over time the focus has been increasingly on requirements that projects minimize land acquisition as far as possible; involve affected people in decisions about relocation; find (non-cash) ways to compensate for 'economic resettlement' i.e. where projects affect peoples' economic use of land; monitor how livelihood restoration is progressing, with the intention that people return to being economically independent and do not have to rely on the project long-term; and find ways to ensure communities benefit from the presence of the project. This is usually shown in a 'Livelihood Restoration' plan.
- Since the 1990s large mining companies have also been developing their own policies and procedures and expertise in line with changing standards.

These changes in laws, standards and company policies reflect growing understanding of the variety of impacts – good and bad – that a mine can have locally, and the importance of mining companies, local residents and local government communicating frequently and openly to find ways of avoiding or minimizing negative impacts and enhancing benefits. Each mining project has its own technical characteristics and timeline, each community and local administration its own priorities and concerns. It is also increasingly well understood that relocating people, or compensating for reduced access to land and resources, in a sustainable way, is difficult[7]. It requires careful planning, extensive consultation, and adaptive management by a mine and the community that takes account of changing circumstances – such as the cumulative impacts of other projects or changes in government policy.

The MDT team finds that the approach of OT to impact assessment and compensation has developed broadly in parallel with the development of national and international standards and practice. This means that the impact assessment and resettlement activities conducted prior to 2006 were completed before the IFC Social and Environmental Performance Standards were first issued in 2006. However, in February 2013, IFC approved an investment into OT. The environmental and social review summary (ESRS) made public by IFC in August 2012 before the investment decision noted that OT would prepare all the documentation for the project based on IFC's 2006 Performance Standards, but that OT has indicated that it will follow the intent of the updated Performance Standards which came into effect on January 1, 2012.[8] This means that actions taken that complied with the then current standards now need to meet standards that did not exist at the time.

[7] See, for example, ICMM, Land Acquisition and Resettlement: Lessons Learned, http://www.icmm.com/publications/pdfs/9714.pdf

[8] http://ifcext.ifc.org/ifcext/spiwebsite1.nsf/ProjectDisplay/ESRS29007

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3 Was the impact assessment methodology applied to the 2004 and 2011 compensation process suitable and adequate?

3.1 Criteria

A suitable and adequate impact assessment has the following characteristics:

- It provides detailed baseline information on the livelihood and standard of living of the people affected by a project.
- It identifies potential impacts.
- It proposes actions to avoid or limit negative impacts; to compensate for unavoidable negative impacts, and to monitor what actually happens.
- The process involves research and consultation with people potentially impacted and with other stakeholders with relevant knowledge or influence.

In addition, where physical relocation of people is involved, or land use by a project prevents people from continuing their economic activities, then a resettlement action plan (RAP) and/or a Livelihood Restoration Plan (LRP) is prepared that:

- Identifies the specific people, lands and land uses affected and tries to minimize resettlement.
- Consults with people affected on options.
- Establishes compensation that will enable people to maintain (or improve) their standard of living and livelihood, and monitors this.
- Provides a grievance mechanism to handle complaints and problems related to resettlement and livelihood restoration.

A RAP or LRP may be sections of an impact assessment or comprise separate documents.

3.2 Impact assessment related to 2004 compensation

3.2.1 Who was compensated in 2004?

The 2004 compensation process involved ten households comprising sixteen families who were compensated for loss of winter camps located within the mine license area (MLA) or the 10 km. exclusion zone around the mine camp.[9] (0ne household subsequently divided, so this group now includes 11 households. [10]) The assessment and relocation were carried out by IMMI. There is a reference in the 2011 RAP that three additional households were provided with winter shelters, barns and stockyards 'due to hardship and their association with the area'.[11]

3.2.2 Impact assessment and Resettlement Action Plan (RAP)

The Oyu Tolgoi *exploration* programme started in 1999, involving up to 500 workers and construction of a temporary camp. There was no impact assessment for exploration and as far as we are aware, no physical or economic displacement.

[9] RAP External Completion Audit 2004, Dalaibuyan and Namkhai, September 2014.
[10] Throughout the D-EIA documentation reference is made to eleven households being relocated.
[11] 2011 RAP, p.48.

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Following successful exploration, the impact assessment for *mine development* was submitted to the Ministry of Nature and Environment in 2006[12] as the D-EIA. It includes studies of social and environmental issue as required by the ministry, including a Socio-Economic Impact Assessment that was written in 2003[13]. (Appendix 3 lists the sections of the D-EIA.) The households compensated in 2004 were identified on the basis of a census of all households within a 20km radius of the OT mine camp that was carried out as part of the socio-economic assessment. The census methodology is not described; the D-EIA refers to baseline studies conducted in 2001-2[14], but OT does not have baseline reports from these studies, only the information that is included in the D-EIA.

There is no 2004 Resettlement Action Plan that systematically documents the reasons for relocation, the baseline conditions of the affected people, the process of consultation, the entitlements, and the monitoring and complaints process, though there is:

- An undated internal Ivanhoe Mines 'Policy for the Resettlement at Oyu Tolgoi'. The 'Policy for Resettlement at Oyu Tolgoi' notes that resettlement should be carried out in accordance with World Bank standards; it also reports the presence of twelve herding families within 10kms of the site.[15]
- A 'Herder Relocation Report' dated August 2004 that summarises the outcome of negotiations with the authorities and the families to be relocated and shows the relocation budget.
- A 'Herder Support Plan', referred to in the D-EIA, "The program aims to ensure livelihood security and development for nomadic herding families currently in and near the project site through a comprehensive support package."[16]

3.2.3 How did the impact assessment and related documents identify impacts on herders?

The 2003 Socio-Economic Impact Assessment correctly identified that the economy in Khanbogd Soum was based on traditional nomadic herding, and includes baseline information from official statistics for the aimag and soum and comparison areas - including trends from 1999-2002 in the numbers of herders and different types of livestock. The socio-economic assessment discusses in general terms the impacts of weather on herds; soum pasture management programmes, and water resources and reports that there are problems about the maintenance of wells and the resulting degradation of land around the functioning wells.

The Socio-Economic Assessment provides some baseline information on the households 'surrounding' Oyu Tolgoi in June 2003, all 'stock breeding families, who live a traditional nomadic lifestyle'[17] and identifies the wells used by each household. It also identifies three households that had recently moved to the Oyu Tolgoi area (one from Javkhlant Bagh, the other two from Bayan-Ovoo Soum). It shows locations of winter camps and wells within 30 kms of OT.[18] However, there is

[12] OT Project Environmental Impact Assessment, Volume 3 Mining and Processing, Eco-Trade LLC 2003 (document cover shows a date of 2006).
[13] The socio-ecopnomic assessment is Section IV of the D-EIA.
[14] For example, D-EIA, Part II, Chapter 1, p.8
[15] Ivanhoe Mines Mongolia Inc., Policy for the Resettlement at Oyu Tolgoi, undated.
[16] D-EIA, Part IV, Chapter 1, p.18.
[17] D-EIA, Part 1, Chapter 4, page 9.
[18] D-EIA, Part IV, Chapter 1, p.10.

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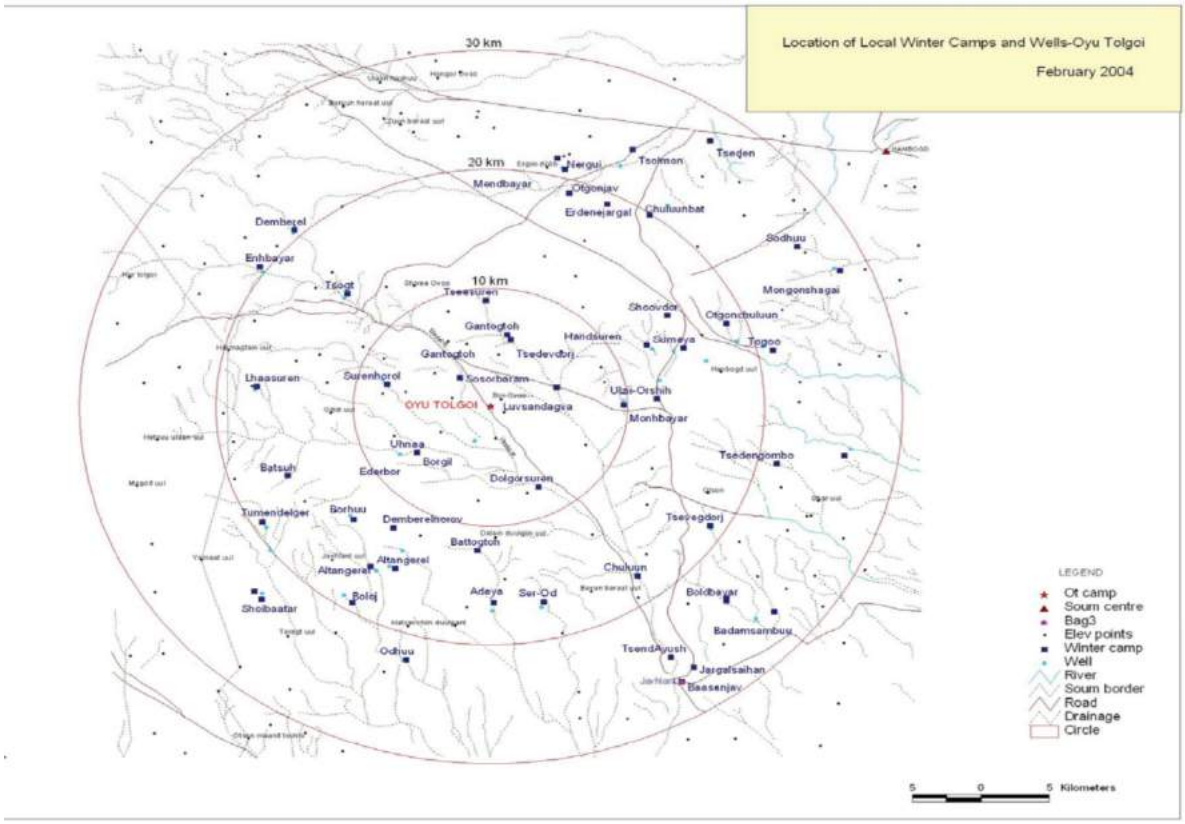
no detailed description of herding practices or documentation (or evidence of efforts to document) migratory movements or water use. Also, some documents refer to 10 families to be relocated or relocated under the 2004 compensation agreements, some to 11, some to twelve.[19]



There was some stakeholder consultation in 2003: two rounds of public meetings, and meetings with the local administration and elected representatives in Oyu Tolgoi, Khanbogd Soum, Dalanzagdad and Ulaanbaatar in March and November 2003. This included two meetings specifically with herders held at the Oyu Tolgoi camp. The Socio-Economic Assessment also says that there were meetings with herders in July 2003, but contains no further information on these meetings. The consultation summaries show that key issues that have been subsequently raised by herders, i.e. about possible impacts on pasture, water and animal health as well as questions about relocation, were raised from the beginning and that IMMI was urged by the local authorities to communicate more with herders to avoid land conflicts[20]. The Herder Relocation Report also reports herder concerns such as that animals are habituated to their grazing areas so will not adapt well to relocation[21], and states that areas with pasture and space for new herders do not have water, and that herders were very concerned about their future and about what long term support they will receive.

[19] D-EIA, Part II, Chapter 9, p.2. and Part IV, Chapter 1, p.18 mention 11 families; Herder Relocation Report, Section 1.2 states that there are 12 herding households within 10kms of OT.
[20] D-EIA, Part 4, Chapter 1, p.57.
[21] D-EIA, Part 4, Chapter 1, p.9.

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The Socio-Economic Impact Assessment does not include any detailed discussion of the economics, culture or social organization of herding, and no sociologists or anthropologists were in in the team that lead the assessment.[22] Despite identifying herding as the main activity and finding out through the consultation about potential herder concerns, it lacks in-depth baseline information and assessment of impacts on herders. For example, there is no investigation of soum wide herding practices; there is no discussion of patterns of seasonal movement, nor of whether relocating some herder's winter camps might have knock-on impacts on other herders. Interestingly, the socio-economic assessment does identify a future need to relocate herders in the zone 10-20 kms from the mine license area because of likely nuisance from blasting etc. in a list of negative impacts, but does not present any plan or timeline for this.[23] In terms of impact avoidance and mitigation the 2003 Socio-Economic Assessment just reports that IMMI has programmes for community consultation and the Herder Support Programme.

In other parts of the D-EIA 2006, there is little analysis of impacts on herders beyond that in the socio-economic assessment. Some comments are made about the possibility that impacts of mining on soil moisture, or the increase in dust, could affect herders but this is not investigated further other than to reference the exclusion zone and relocation programme.[24] The Executive Summary of the environmental impact assessment reports a list of positive impacts on local residents but no negatives.[25]

3.2.4 Findings - 2004

The 2003 Socio-Economic Impact Assessment does provide information on each of fifteen herder households on or within a 22km radius of the mine site.[26] It also briefly identifies a wide range of potential impacts on herders. However, it draws the simplistic conclusion that impacts would be mitigated by relocation of the households with winter camps inside or close to the mine license area plus the educational support, training and employment provided to these families. The wider concerns about impacts on herders raised in consultation meetings were not addressed, and other impacts of the development of the mine, including its infrastructure, were not evaluated.

Therefore, neither the 2003 Socio-Economic Impact Assessment nor the 2006 D-EIA that it was incorporated into was adequate as a basis for mitigating impacts on herders and for compensation.

[22] EIA, Executive Summary, p. 2-3.
[23] "To relocation households which are living within 10-20km radius from the OT Project Area because they may have to effected during mining activities such as blasting, dust emission and other impacts. EIA, Part IV. Chapter 1. Page 15.
[24] "Induced impacts on local residents from environmental change may occur in the areas of local water supplies, grazing land, air quality, and noise levels. IMMI has implemented a residential exclusion zone surrounding the project site and is assisting with the relocation of herders who have customarily used this area for traditional activities". EIA, Part I – 14.
[25] EIA, Executive Summary, p.5.
[26] D-EIA, Part 4, Chapter 1, p.9

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3.3 The 2011 Compensation process

3.3.1 Who was compensated in 2011?

In 2011, 89 herder households were compensated for economic impacts related to construction of the mine and the associated infrastructure. Six of these households had previously been compensated in 2004 for relocation of winter camps because their new winter camps were affected by OT infrastructure. In addition, a programme for collective compensation of herders in the soum was started to address the overall reduction in pasture land.

3.3.2 Impact assessment for 2011 compensation

Between 2006 and the 2011 compensation programme OT made significant efforts to fill the gaps in knowledge and understanding about impacts on herders. Also, from 2009, the mine management adopted the IFC Social and Environmental Performance Standards (PS) including PS 5 on 'Land Acquisition and Involuntary Resettlement' and the Rio Tinto 'Communities Standard'.

Table 1 Studies related to impacts on herders, 2006-2011

2006 – Formal assessment of 2004 resettlement.
2007 - Perceptions study on water use in the Khanbogd soum.
2008 – Study of Water Use within the Gunii Hooloi borefield area.
2008 - Omnogovi Aimag Social, Economic and Environmental Baseline Survey.
2009 – Oyu Tolgoi Socio-Economic Impact Assessment.
2009 to 2010 - Pastureland Mapping and Assessment Programme.
2010 - Pastureland Health Assessment and Monitoring in Khanbogd Soum.
2010 - Evaluation of Resettled Herder Families in 2010 (internal.
2010 to 2011 - Survey of Potentially Affected Herder Households.
2010 to 2011 - Sustainable Pasture Management in Khanbogd Soum.
2011 – Resettlement Action Plan (RAP 2011) - this became part of the Environmental and Social Impact Assessment submitted to lenders in 2012.

The 2009 Socio-Economic Impact Assessment is more thorough than the 2003 study and provides additional information about land use and herding practices. It looks at a wide area including all of Khanbogd soum; and topics discussed in surveys included pressures on land and pasture, water sources and supplies, and resettlement and associated burdens. 55 people from Khanbogd soum were involved in focus group discussions, interviews or secondary data collection.[27]

The 2009 socio-economic assessment reports the concerns of herders about impacts of OT and its infrastructure in the context of other mine and infrastructure developments in the area. It highlights the complexity of consequences of taking pasture land for infrastructure by OT and others, including changed herder mobility patterns and pressure to move herds less, with follow on impacts on pasture quality[28]. The report identifies potential for emotional damage to herders from the stress of facing new and unknown circumstances such as heavy traffic, fears and uncertainty about what would happen next, concerns about impacts on children and young people[29]. It also highlights the

[27] 2009 Socio-Economic Impact Assessment, p.39.
[28] 2009 Socio-Economic Impact Assessment, p.109.
[29] 2009 Socio-Economic Impact Assessment p 57-95.

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risk that if herders give up herding to take mine jobs they will find it difficult to return to herding if employment ceases. It reports herders' concerns that 'pasture will become less available due to (i) increased herd size, (ii) impacts of global and localized climate changes, (iii) pastureland take associated with mining and infrastructure development'[30] and concerns 'that construction of other infrastructures and the expansion of mining to new area/sites may trigger a new wave of resettlement'.[31] The assessment process included focus group meetings in each bagh and key informant interviews - although no meetings were held specifically with herders.

The assessment states that "In conclusion, it should be emphasized that taking pastureland would affect the resource-based viability of pastoral communities in the Gobi region with predominantly negative impacts."[32] However the assessment is all at a general level: it does not identify specific locations or herders potentially impacted.

The 2009 socio-economic assessment identifies weaknesses in the 2004 relocation and improvements needed for future resettlement,[33] specifically the need to:

- Review and redesign the criteria for exclusion zones for the mine site and infrastructure with a focus on minimizing resettlement impacts.
- Ensure access for customary grazers to the exclusion zone.
- Manage relocation taking account of cumulative impacts from OT and other mines in the area so that all affected people are treated equally.
- Ensure equal treatment for those to be relocated beyond the mine site and those affected by off-site mine infrastructures and constructions
- Revise the compensation process and processes so that:
    - The grievance mechanism is responsive and efficient
    - There is cooperation with the soum authorities
    - Compensation agreements are reviewed to ensure that all those affected receive equal opportunities
    - Resettlement criteria are revised (to take account of the findings of the impact assessment and lessons learned from other studies)
    - Methods used during herder resettlement and reviewed and revised
    - Situations likely to require compensation are identified, e.g. pasture impacts, livestock accidents
    - Incorporate resettlement activities into community relations.

The assessment concludes with a listing of impacts and evaluation of their significance and the proposed mitigation measures. It includes several impacts that are particularly relevant to herders and are rated in the 2009 Socio-economic Impact Assessment as 'high negative' as well as proposed mitigation measures for these impacts. The proposed mitigation measures include both impact avoidance and monitoring by OT, as well as areas where joint action between OT and other mines,

[30] 2009 Socio-Economic Impact Assessment, p. 37
[31] 2009 Socio-Economic Impact Assessment, p.42.
[32] 2009 Socio-Economic Impact Assessment, p. 109.
[33] 2009 Socio-Economic Impact Assessment P.114-6.

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and OT and the soum administration is recommended, e.g. joint action on land use management and pasture improvement.

3.3.3 2011 RAP

The 2011 RAP was developed as part of the Environmental and Social Impact Assessment (ESIA) completed in 2012 to provide the policies, plans and procedures to manage all activities with potential to impact land use and the physical and economic displacement of people living on and/or using the land required/disturbed by OT.[34] It forms chapter D15 of the ESIA. As part of the RAP process there were community meetings to discuss the planned infrastructure works, to update people on progress, and a meeting in each bagh to present the Finalised Entitlements Matrix, implementation procedures, and households to be covered. [35]

The 2011 RAP reports on the 2004 compensation, then on new compensation related to impacts of the mine site, the extended fence, the transport corridor, airport sites, and the Gunii Hooloi borefield and pipeline. It does not specifically identify any impacts related to the Undai diversion and replacement of Bor Ovoo Spring but notes that if there is displacement associated with these or other OT activities, then the same principles will be applied to compensation. It states that:

- " All people residing or using land in the Project affected areas ("impact zones") are entitled to compensation and livelihood restoration". [36]
- The RAP includes in the definition of people eligible for compensation:
    - "Those who do not have formal legal rights to land or other assets but have a claim to legal rights based upon the laws of Mongolia, upon the possession of documents such as land certificates or upon permission of local authorities to occupy or use the affected land;
    - and those who have recognisable traditional claim to the grazing land they are using as identified by local authorities and by community consensus." [37]

The RAP identifies a series of 'displacement impacts' and related 'impact zones' and describes the categories of herders in each. For example, in impact zone B1 are herders with winter shelters within 5kms of the airports and traditional grazing rights in the area; category B2 is herders with shelters within 5-11kms of the airports and traditional grazing rights. The RAP identifies the numbers of households in each category[38], and gives summary data on each household based on a survey[39]. It includes a grievance mechanism. In relation to compensation for herder households, the RAP decided that eligibility would be determined by the location of winter shelters because "All households have winter shelters but only a few have spring shelters."[40] The focus on herders with

[34] 2011 RAP, p.6.
[35] 2011 RAP, p57-8.
[36] 2011 RAP, p.37.
[37] 2011 RAP, p.36.
[38] RAP 2011, p.32.
[39] RAP 2011, p.99-104.
[40] 2011 RAP, p.40.

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winter campsites excludes the small number with Spring shelters and also the larger number without shelter licences.[41]

The RAP also recognizes that OT contributes to 'overall loss of pasture in the area' and proposes to compensate for this through the Sustainable Pasture Management Programme open to herders in the soum except those resident in the soum centre. The RAP also describes a process of liaison with the Soum administration to identify vulnerable households and provide these 14 households with additional support during the compensation process and in livelihood restoration.[42]

Consultation on the RAP was largely though a Compensation Working Group (CWG) established by the Khanbogd Governor in early 2011 with members from Oyu Tolgoi LLC, affected herder household representatives, and *bagh* Governors. CWG facilitated negotiations with herder households and mediated grievances.[43] For example, if people complained that they should have been included in the households compensated, 'CWG went out with the person and measured if they were in or out of the defined line'; if herders had unregistered winter shelters, then the head of the CWG and the bagh governor decided if they were included.[44] In 2011, at the suggestion of the soum, a lawyer was appointed to assist herders understand the compensation agreement terms and helped individuals to negotiate. Most winter shelters are held in men's names; there is no discussion in the RAP of any consideration of differential impacts on women.

Table 2: Displacement impacts identified in 2011 RAP.

- Physical displacement of herder households from the Mine Licence Area (MLA) and 10km Residential Exclusion Zone (2004)
- Economic displacement of herders affected by reduced access to and/or loss of summer pastures due to land take for the airport sites
- Division of pastures caused by the construction of linear Project components (including the OT-GS Road and the water supply pipeline)
- Disruption to herding activities
- Loss of wells and other impacts to water availability/quality (e.g. impeded access to wells)
- Overall reduction of pastureland in Khanbogd soum leading to increased competition for grazing and overuse of remaining grazing land.[45]

3.3.4 Findings

The 2011 socio-economic impact assessment and the 2011 RAP applied a largely suitable and adequate methodology to identifying OT activities that would affect herder's use of land. However there are some weaknesses, as follows:

[41] Current soum data collected in interviews with bagh governors, May-June 2016, shows that 16% of herders in the soum do not have either winter or spring licenced campsites although they are active herders using pasture and wells.
[42] 2011 RAP, p.63.
[43] 2011 RAP, p.60
[44] OT, discussion, February 2016.
[45] 2011 RAP, p. 21.

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- The definition of which herders were affected by OT activities is based on what appear to be arbitrary definitions of impact zones, e.g. certificates issued or applied for before 18 March 2011 for winter shelters within 5, 10 or 20 kms of the impact generating activities, and a simple definition of which herders would be affected, i.e. focusing on possession of winter shelter licences.
- Important measures proposed in the impact assessment to mitigate impacts on herders have not been implemented, particularly those that require cooperation with the Soum and/or other mining companies.
- The 2011 RAP does not include an explicit livelihood restoration strategy.

3.4 Assessment of future impacts

The ESIA 2012 does not systematically assess impacts of the following OT activities or related developments that could potentially present impacts on herders, except for limited discussion in the 'Cumulative Impacts' section.

- Expansion of OT ore throughput from 100,000-160,000 tpd. including any additional demand for land, water or air pollution/noise impacts.[46]
- Any construction or land use resulting from the August 2014 "Power Sector Cooperation Agreement" between the Government of Mongolia and Oyu Tolgoi regarding long term power supply. Note that OT does have a commitment to undertake an environmental and social impact assessment to international standards if a power plant is developed by the project.
- Impacts of additional road traffic from underground mine construction and operations.
- Any additional land to be brought within the mine fence[47].
- Construction and operation of the railway – although the 2012 ESIA notes that OT may request a spur line to the railway[48].
- In addition, the 2012 ESIA is based on the assumption that there will be significant off-site accommodation for OT workers in the Khanbogd soum centre which is no longer in the OT plan.

Since the research was completed for this study OT has published on-line an amended D-EIA[49] but this does not cover all the points above. At the time of MDT fieldwork (May-July 2016) OT was starting communication with communities about the underground mine project.

3.4.1 Recommendation

OT should commission and disclose in advance of work starting the results of one or more supplemental ESIAs to IFC standards to identify and consult on any additional impacts (and impact mitigation measures) related to the underground mine project; the power agreement; changed plans for workforce accommodation; the railway construction; paving of the Khanbogd Soum to OT

[46] 2012 ESIA, Chapter A1, Introduction, p.13, 'Future project elements not directly addressed in this ESIA.'
[47] We were informed in an interview in May 2016 with OT's then resettlement manager that an additional 4ha of land would be brought within the fenced area as part of the underground project.
[48] OT has informed us that this is covered in the OT Loan Agreement. We have not seen this document.
[49] Amendment to Oyu Tolgoi Copper-Gold Deposit Mining and Processing Project Detailed Environmental Impact Assessment Report, See http://ot.mn/reports/environment/

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road, any significant changes to the project since the 2012 ESIA was published and update the analysis of cumulative impacts of other infrastructure and mining/oil projects.

Assessment should consider if paving the soum center to OT road will create additional and faster traffic that would limit animal movements.

4 Has OT adequately compensated for any negative effects that can be attributed to OT's presence, including OT-related infrastructure and natural resource use?

4.1 Infrastructure

The analysis of pasture carried out as Component 1 of the MDT study did not find any major negative impacts on pasture that can be definitively attributed to OT's presence that have not been included to some extent in compensation programmes (the effectiveness of compensation is discussed later). It did find that:

- Herders with camps between the OT road and the Tavan Tolgoi road, and this road and the railway under construction are negatively impacted. The railway will have a particularly strong impact because of the height of the embankments which are a barrier to animal movements. The coal road is not in any way attributable to OT; we are unclear as to the extent to which the railway under construction by the Government of Mongolia will be used by OT and if so, whether it should be considered as an 'associated facility'[50] to OT.
- Pasture in the area north-east of the mine site is particularly fragmented due to OT infrastructure and this affects herders beyond those who have been compensated it is an area through which there was historically much movement.

4.2 Water

Herders throughout the soum are concerned that wells dug by OT are 'acting like a sieve' and affecting herder water supply. The analysis of water issues (Component 1 report) found that there has been no systematic monitoring or modelling of alluvial aquifers nor systematic evaluation of whether actions by OT could affect herders. There is evidence that some boreholes connect alluvial and bedrock resources, and that there may be reduced water supply in some wells from loss in the alluvial aquifer. It is therefore not possible to assert that there has been no damage to herder water from OT activities, nor is it possible to prove complaints about damage, or to establish how much damage there has been. It is also possible that boreholes dug by other entities could have affected herder water.

Water is a critical resource for herders, so this uncertainty about a potentially significant impact is unsatisfactory. The Component 1 study recommends an expanded programme of monitoring herder wells and alluvial aquifers and a hydrological study to provide information on alluvial aquifers, a general assessment of OT impacts on herder water and identify possible locations for new wells in areas of pasture without water. (See Component 1 report.)

[50] "Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable". IFC, Performance Standard 1, 2012, para. 8.

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4.3 Emotional impacts

We were asked by herder members of TPC, and after the work commenced, to investigate emotional damage related to OT. Our team does not include psychologists, and we are therefore only able to make observations from a sociological/anthropological perspective. We observed that:

- Herders throughout the soum express anger and frustration that changes have taken place, including OT but also other projects, that have affected herders but which they feel they have had no opportunity to influence. "They played with my life."
    - Older herders had already experienced great changes in herding in the 1990s following the end of socialism. The introduction of mining (initially artisanal, later large projects notably OT and Tavan Tolgoi) was another major change. For some of the elders we interviewed, the changes brought about by OT have had less emotional impact than the end of socialism; for others, OT has added to a sense of being subject to continuing change brought about from outside.
    - The 2004 relocation created distrust between herders and OT that remains today. This was made worse because of the Undai diversion and the replacement of Bor Ovoo Spring. The distrust is found throughout the herder community who are fearful about what other changes will happen. In the words of one elder, "OT was small at the beginning, change was small at the beginning, then along the way we realized there were more changes."
- OT is very visible in the landscape, and not far from the soum centre. One consequence of its visibility is that OT is being seen as responsible for all damaging changes even where the responsibility lies elsewhere.
- Elder herders report a loss of peace due to vehicles – both OT and non-OT vehicles.
- Compensation has triggered tension and conflict within and between herder households about who has received compensation.
- Herders as a group, and many individual herders, have contradictory attitudes to OT: a fear that traditional livelihoods are changing alongside a desire for more employment in or business support from OT.
- In individual interviews herders recognize that herder actions, or those of the soum, contribute to problems e.g. increased number of animals, use of vehicles that disturb the peacefulness of areas where herders are camped and locked pumps that prevent other herders using wells, whereas in groups the focus tends to be only on OT as a source of problems.

4.4 Cultural heritage

The herder group in TPC argue, in response to the draft report, that cultural impacts are not fully recognized in the impact assessment and RAP processes and that the individual and cultural compensation should take account of cultural losses.

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As with other issues introduced after the Terms of Reference and the Workplan were agreed with TPC, these are not claims we have the information to examine in detail. However, we note the following:

- Protection of cultural heritage is covered by both national laws and IFC PS8.
- The 2012 ESIA includes detailed chapters on the cultural heritage baseline and impacts and these explicitly address intangible heritage; OT has a Cultural Heritage Management Plan – and implementation of this plan is subject to regular external monitoring (along with other aspects of the social and environmental management plans), and OT has worked with leading authorities in Mongolia and internationally to understand and develop responses to potential impacts on cultural heritage. This has included ethnographic surveys of herder families within the OT impact zone, although the researchers note that possibly people did not identify all the relevant sites in order to protect them.[51]
- In the socio-economic survey conducted as Component 2, while many interviewees mentioned aspects of cultural heritage important to them, there were no complaints about impacts of OT on cultural heritage or spiritual sites other than in relation to the Bor Ovoo Spring. This is discussed addressed in the IEP work.

Therefore, we do not consider that cultural heritage issues have been ignored. This does not mean that they have necessarily been addressed satisfactorily. We do not know. If there are complaints about the identification or management of cultural heritage, these should be addressed to, and handled by, OT's grievance mechanism. Cultural heritage impacts are not part of a compensation process.

4.5 Recommendations

The Component 1 study recommends that OT provides collective compensation in the form of a programme to construct new shallow hand wells, especially in areas in the Soum where there is pasture that is not currently being used due to lack of wells.[52] This will compensate for additional impacts of pasture fragmentation north east of the MLS and for any impacts on herder water resources.

The emotional impacts of OT cannot be quantified in any credible way. However, they can and should be addressed. In part, these impacts should be addressed through community level compensation. Therefore we propose the following.

- OT should acknowledge to herders that there were problems in the approach used to relocation by IMMI in 2004.

[51] 'Protecting the Past, Preserving the Present: Report on Phase 1 Activities of the Oyu Tolgoi Cultural heritage Program Design for Ömnögovi Aimag', February 2011.
[52] The Component 1 report also makes other recommendations not specifically relating to compensation.

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- OT should communicate throughout the soum its grievance mechanism and ensure that it is understood by, and accessible and credible to the herders in the soum so that any herders who consider themselves impacted know how to present their case.

- OT should expand its community relations activities across the soum as a whole and have locally based community relations staff who spend time regularly in different baghs and interact with as many herders as possible. (See Component 2 report.)

- Herders should also consider how they can address problems related to herding but not to OT such as increased use of vehicles and vehicle damage to pasture and the practice of locking wells, for example, by reviving or strengthening traditional mechanisms for dealing with disputes about land and water.

5 Have all herders deserving of compensation been paid?

5.1 Gaps

OT tracks delivery of agreed compensation measures. This is largely progressing satisfactorily.[53] The principal issue is whether all herders deserving of compensation have been included in the programmes. The terms of reference for the MDT work does not include detailed investigation of the validity of individual herder's claims to compensation.

The Socio-Economic Survey conducted as Component 2 of the MDT involved interviews with a sample of herders drawn randomly to represent three groups: herders who have been compensated by OT, herders who believe that they should have been compensated, and other herders.

We found the following categories of herder have potentially credible claims for compensation in 2004 and/or 2011 and herders in these categories should be provided the opportunity to present their claims, if they can provide relevant supporting documentation. (The socio-economic survey identified fifteen families who claimed to fall within one or more of these categories. There may be others not included in the survey since a total of thirty three herders were identified by TPC as 'considering they are eligible for compensation'.)

- In relation to 2004 compensation herders in the following groups should have the opportunity to present their case for compensation to a compensation claims committee (See Section 5.2.) :

    - Households with winter camps within the area designated for relocation in 2004 but not included in the compensation programme because they were not present at the time that surveys were done or agreements negotiated.

[53] The Socio-economic survey found a small number of cases where herders consider that they have not received the compensation due. See Component II report. We are not able to verify these complaints. We suggest that TPC encourage any herders included in the compensation programmes who have complaints about receipt of agreed benefits submit their complaint to the OT grievance mechanism because these are matters of fact that should be readily resolvable.

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- Any households with spring camps within the area designated for relocation in 2004.

- Herders with winter or spring camps close to, but outside, the compensation zones that were similarly affected as those compensated. I.e. where they can provide evidence that at that time they were using the same pasture and water wells as those who were compensated.

- Herders with established winter and/or spring camps in areas that others herders relocated to under the 2004 resettlement programmes, and who can demonstrate that their access to pasture and water was negatively affected by this relocation.

- In relation to 2011 compensation, the criterion for inclusion in the programme was the location of a winter camp within defined distances from specific OT infrastructure. The following groups should be added and receive the same compensation packages as those compensated originally.

    - Herders with winter camps close to, but outside, the compensation zones that were similarly affected as those compensated. I.e. where they can provide evidence that at that time they were using the same pasture and water wells as those who were compensated.

    - Holders of Spring licences in the compensation zone at the time of the 2011 compensation or with spring camps close to, but outside, the compensation zone who were similarly affected, i.e. where they can provide evidence that at the time they were using the same pasture and water wells as those who were compensated[54]. There is no impact-related reason to exclude them. We heard in interviews that two herders with Spring licences had been told they would be compensated, and had presented documents to OT.

    - Any herders who were registered by the soum as having winter or spring camps within the compensation zones but who did not have camp licences.

- The socio-economic survey conducted as Component 2 of the MDT work found that 16% of herder households in the soum do not have licences. In relation to relocation in 2004 or 2011, herders who can provide credible evidence that they had camps but not camp licences and were impacted should be able to present their cases to the Compensation Committee.

[54] The herder group have requested in their comments to the draft report that the impact zone be extended by 5kms to address impacts to herders close to but outside the existing impact area. We think that putting another arbitrary boundary is not the correct solution and that herders who consider that they were impacted because they were using the same wells or pasture as those who were compensated should make their specific case to the proposed 'Compensation Claims Committee'.

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- We have been told that some herders moved away from the mine area prior to the 2004 relocation, and that this move was due to the mine. We do not consider that these herders are due compensation because this was not 'involuntary resettlement' which is what IFC PS5 covers.

- We are also concerned that the use of the 'household' as the unit for compensation. Some compensated households included more than one family but were grouped with other families as a single unit for compensation in 2004 and/or 2011. Families that consider that they should have been separately compensated should have the opportunity to present their case for compensation.

5.2 Recommendation

TPC should establish a 3-person 'Compensation Claims Committee' comprising one person from each of the herder group, the soum and OT supported by an independent secretary such as CAO. This committee should receive and decide upon claims from herders within any of these groups listed above on the basis of evidence put forward by the claimant and any other relevant other information held by the soum administration or OT. Claimants should be required to produce evidence for consideration by the committee demonstrating eligibility, and we hope that the soum administration will be able to offer assistance in accessing official documents and records to help the process. The process of making claims should be open for a defined period such as 12 months. Claims should be supported by evidence such as the following:

- Registration in the soum as a herder in 2004 or 2011 as relevant to the claim being made, and,
- A winter camp registration or lease for the relevant area, or
- A spring camp registration or lease for the relevant area, or
- Well registration for the relevant area.
- In a few cases, where herders do not have registered camp licences, evidence may include statements from the soum authorities; evidence, for example from old hand-drawn maps created by the bag governors which depicts old customary camp sites and local consensus.

6 Was the compensation provided sufficient to support transitions to sustainable livelihoods?

6.1 What compensation was provided?

The compensation packages provided in 2004 and 2011 are summarized in Table 3 below. The 2004 compensation included both replacement of lost assets (winter camps and wells); a number of animals (implicitly but not explicitly to offset any losses of animals or productivity resulting from the relocation), and measures to assist household's long term development through education support and employment. The 2011 compensation contained many of the same elements as 2004 in terms of assistance to as well as support for sustainable pasture management as a collective compensation programme for all herders.[55]

[55] The herder group in TPC has argued that OT should have, and failed to, prioritize land based livelihood restoration strategies. We do not accept this argument and consider that in the context of resettlement where the continuation of nomadic herding remains possible, the approach adopted

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Table 3: Summary of compensation

2004 – Physical relocation of winter camps[56]	2011 – Economic displacement [57]
• Timber summer house. • Timber animal shelter. • Transportation of ger(s) plus belongings to new location. • Provide or refurbish minimum of one well or borehole to provide sufficient water for the number of animals in possession of the family at the time of the Agreement. • An agreed number of livestock. • Educational expenses for two students nominated by the family: • Fees • Transportation • Accommodation (university students only) • School clothing and supplies once a year. • Employment of a family member • Training – discretionary, to be assessed case by case.	• One permanent part time job as a road work assistant • Education • One MN 5mn. tertiary education scholarship • MNT215,000 for school students from the family • If a household has no students, then MNT 5,215,00 allocated to a livelihood improvement programme for the household. • One MNT 300,000 scholarship for one 45-day adult education course in Mongolia. • Contribution of MNT35,000 per household to the fund to enhance the sustainable management of pastureland.[58] • Assistance in setting up a business (livelihood support).

The 2004 compensation agreement is badly drafted. It does not acknowledge that the mine could have a lifetime of many decades. In particular, the commitment to employment of one family member implies that this commitment is for one person only (it states that no substitution is allowed if the nominated person is dismissed for breaking company rules) and discusses 'the nominated person'. However, the Agreement also allows for other people to be added to the named list of family members eligible for benefits. We have been told that some herders consider that OT has therefore entered into a perpetual agreement to employ one family member.

6.2 Transition to sustainable livelihoods - 2004

The 2004 RAP Completion Audit undertaken by independent specialists in 2014 concluded that it was difficult to evaluate household livelihoods holistically due to gaps in the availability of time series data. Instead it compared livestock numbers and possession of a small number of assets in 2004 and 2014, and documented the extent to which commitments made in the compensation agreements had been implemented. It also recorded the views of the herders about the compensation. The key points from the audit concerning transition to sustainable livelihoods are

by OT that includes compensation elements to support herding and employment related compensation that reflects the priorities of affected people is appropriate.

[56] Based on the example of one 2004 compensation agreement.

[57] Oyu Tolgoi Compensation Agreement 2011, generic, English

[58] According to the RAP, 2015, this sum was paid out to herders in cash.

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that eight out of the ten compensated households had larger herds in 2014; that only two out of ten deep wells were still functioning but that replacement shallow wells were usable (except in one case, but here the deep well was usable); that in four out of ten households the permanent job had not worked out, and the nominated person had been dismissed. [59]

This broadly matches what we found during the research: some households have succeeded in restoring their herding livelihood or adapting to take advantage of other economic opportunities, but some have not. The education support elements of the packages are widely welcomed and seen positively, but there are problems with other aspects of the 2004 compensation, as follows:

- Replacement assets
    - The wooden replacement winter shelters have not weathered well. We were told that herders had agreed to the use of wood instead of stone for building the shelters, but that the type of wood used was not good enough. Some of the replacement shelters have been abandoned.

    - The 'summer houses' were not an established part of herder culture, and have not proven useful to most of the households that received them. One recipient used the wood to build a house in the soum centre.[60]

    - Replacement water wells were originally constructed as deep wells, in agreement with herders. As acknowledged in OT monitoring, many of these wells failed for a variety of mechanical and economic reasons (e.g. fuel for pumps too expensive). The failed wells have been replaced with hand wells which are working satisfactorily, except (as of the 2014 Completion Audit) in one case.

    - In the 2004 relocation traditional processes for allocating winter shelters including consensus from other herders, were not followed. As a result, some of the relocated winter camps lead to tensions and conflict with previously established users of the land.

- Employment
    - Good practice advice regarding employment is that the focus should be on *enabling* people to participate in direct and indirect employment opportunities. Mines should include training to help equip people for employment for employment as part of livelihood restoration packages but should not include guarantees of employment.[61]

    - Permanent employment at OT provides very significant livelihood support. In 2004, of the 10 relocated families, only one had a salary as part of their income. In 2014, seven of the ten households had salary income, and one household's

[59] 2004 Resettlement Completion Audit, September 2014, household by household analysis, p8-33.
[60] 2004 Resettlement Completion Audit, September 2014, p.31.
[61] ICMM, Land Acquisition and Resettlement, lessons Learned, 2015, p. 32,40.

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income came in part from providing bus services to OT.[62] When we discussed compensation with herders in the 2004 group, all stated how important employment is. In four of ten cases, the permanent employment offered by OT failed because the employee was dismissed. In a group discussion with herders relocated in 2004, requests were made for another chance at employment, and we were told that herders do now understand better what is involved in wage employment and there are now better qualified young people to take on jobs. We consider that these employment failures were predictable given the previous lack of experience of nomadic herders in the Gobi with salaried employment in a private sector company.

- We found in the focus groups and interviews that at least one of the households that does not have a member employed in OT is struggling economically; it is also clear that factors unrelated to OT (e.g. premature death of the head of household) have made life difficult for at least one other household.

6.2.1 Recommendation

We recommend that the weaknesses in 2004 compensation are addressed as follows:

- TPC should establish a three-person committee (one member each from the herder group, the Soum and OT) supported by an independent secretary, e.g. CAO, to assess each of the replacement winter shelters to determine if they are adequate for the number of animals held by the household at the time of compensation (this number is recorded in each compensation agreement). Where the shelter is not adequate, it should be repaired or replaced by OT to make it adequate.[63]

- Those households compensated in 2004 (including any additional households added to the list as a consequence of the process set out above in Section 6.2) that do not currently have a household member employed full time in OT because the people originally appointed lost their jobs should be offered the opportunity of employment for one family member in underground construction (temporary) or mine operations (long term). This is because it was over-optimistic in 2004 in the context of Khanbogd soum where there was almost no private sector waged employment to think that people could easily make the transition from herding to employment in a private sector, and therefore those households where employment was unsuccessful should be offered a second chance. Note: This depends on there being a household member who is capable and qualified for employment and meets OT employment criteria. The compensation agreements should also be clarified to establish that OT has no obligation to employ another family member once the employment of the existing employees is finished whether by retirement, resignation or dismissal etc.; however members of herder households are able to apply for employment at OT and will be considered alongside other applicants according to OT's recruitment policy.

[62] 2004 Resettlement Completion Audit, September 2014, p.8-33.
[63] If the herder wishes to have a larger shelter to cater for the current size of their herd, then the additional costs of a larger shelter should be met by the herder.

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6.3 Transition to sustainable livelihoods, 2011

OT monitors the implementation and outcomes of the 2011 compensation programme including through an annual Affected Household Survey conducted since 2013. This collects information on household structure, the number of wells in use, herd size and composition, education and skills and income. OT also maintains information on the numbers of people from compensated households who are employed by OT or involved in business development or training programmes. See Box 1.

Box 1: Employment and training by members of compensated households (July 2016)

Permanent job at OT
- 12 people from 89 households in 2011 compensation agreement employed at Open Pit
- 6 people from households involved in 2004 agreement have permanent jobs at OT

New skill job
- 10 people were employed at OT Nursery in KB for 8 month period
- 25 people are involved in Participatory Monitoring programmes (not full time)
  - Hand well water monitoring – 21
  - Elm tree monitoring (photo) – 3
  - Wild animal monitoring – 1
  - Cultural site protecting – 7

Training participation:
- Job readiness training - 8
- Apprentice/ Job skill training - 2
- Baby camel wool training - 18
- Felt art training - 5
- Electric camel shearing training – 18

Co-operative projects
- "Ikh nogoon gurvaljin" co-operative – Livestock/animal health project
- "Turliin myangan taij" –the best co-operative, Livestock veterinary project
- "Goviin bayan erdenes" –co-operative; Camel shearing project
- "Khan-Oortsog" co-operative - Well restoration project

Student scholarship: 14 students from 2011 and 2004 agreements; current student are 2.

Source: OT, email, July 2016.

No audit has yet been made of the overall effects of the 2011 compensation programme on livelihoods of the compensated households or herders as a whole.

The approach that OT took to compensation for economic displacement is appropriate to supporting people re-establish their livelihoods by providing temporary employment as well as assistance in developing new income streams (some related to herding, some unrelated to herding) and support for the education of the younger generation. However there have been problems with the implementation of, and results from, the 2011 compensation. These are well known to herders and OT.

- The part time employment as road maintenance workers was originally designed to allow herders to gain some cash income whilst also continuing to herd. This was a good idea. However, the actual work is experienced by herders as demeaning and worthless and provides limited opportunities for advancement because it is managed as part of the

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communities budget rather than the operational payroll. By the time we conducted field work, some households with older workers had commuted the work into a cash payment; others were being paid ($380/month) but not working, some people were still doing the work. We were told by OT that 27 people employed in the road cleaning programme want to continue this role. Under the 2011 Compensation Agreements, the 5-year employment provision was due to end in November 2016. At the same time as disliking the work, many households have become dependent on the cash income it provides.[64]

- Few of the households have been successful in establishing businesses, although some have, e.g. the Ulziit Munkh Ovoo LLC sewing service supplier that provides uniforms to OT and the bus service provider.

The problems with 2011 compensation are harder to address than those related to 2004. In particular, we cannot see any simple solution to the problem of dependency on the income from road maintenance contracts.

6.3.1 Recommendation

We recommend that OT:

- Commission an independent audit of the implementation and results of the 2011 compensation programme, and act on any corrective actions identified.

- Identify in the audit any households that have not succeeded in restoring their income and develop a tailored approach to assisting these households further where a reduction in income can be attributed to economic displacement by OT.[65]

- Employment in the well building, well maintenance and monitoring technicians team to build the wells recommended by the Component 1 study should be given to members of the 2011 compensated households that have not succeeded in restoring their livelihoods as long as there are members of these households capable of, and interested in, doing this work.

- Continue supporting the work of consultants to help herders develop proposals for funding under the Co-Operation Agreement. Even though Khanbogd soum is a challenging area in which to establish businesses because of its isolation and small population, these efforts should be continued.

6.4 Compensation for overall reduction in pastureland – collective compensation

Much of the concern from herders has been on the individual compensation. However, the collective compensation for the loss of pasture resulting from OT is also important particularly in the context of multiple pressures on pasture, and has the potential to positively affect herders across the soum. As the Component 1 report concludes, "Khanbogd soum faces an array of current and likely future demands on land for new infrastructure and potentially for other mines and resource

[64] How to handle the termination of these agreements was discussed at the 10 October 2016 TPC meeting that reviewed the draft MDT/IEP2 reports.

[65] We have been informed by OT that they plan to commission an independent external Outcome Evaluation and Audit in line with the project's RAP commitments.

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extraction." OT correctly recognize that it is the soum that has responsibility for overall pasture management in the soum, but that OT can and should work alongside the soum on this. In September 2015, Khanbogd soum adopted a 2016-2025 Livestock Sector Sustainable Development Programme.[66] Specific parts of this programme are identified as to be funded through the Co-Operation Agreement between OT and local authorities.

OT has developed several programmes to assist improved pasture management and support to herders in the soum.[67]

- The Sustainable Pasture Management Programme was developed in 2010 by the Mongolian Society for Range Management on behalf of OT, and is described in the 2011 RAP as a measure for collective compensation. The programme involved evaluating pasture health and water supply around fifteen monitoring points, consultations with herders on pasture related problems and possible solutions, resulting in a pasture management plan based around the concept of forming Pasture User Group and on-going regular surveys and interventions supported by a revolving fund for pasture user groups. [68]
- Subsequently Nutag Partners – a land-use consultancy – carried out Participatory Rangeland Monitoring project in Khanbogd, Bayan-Ovoo and Manlai soums that generated two years data. Nutag recommended that Khanbogd soum develop a pasture management plan, and also recommended other studies and assessments needed to develop such a plan.
- The Co-Operation Agreement between OT, Umnugobi Aimag and the soums (including Khanbogd soum) made in April 2015 commits the parties to work together and with other relevant parties to support the preservation and development of traditional animal husbandry and traditional nomadic pastureland usage as one of seven thematic areas within the Agreement. The full programme has not been defined, but as of October 2016 the following projects have been approved.
    - Khanbogd Inter-soum animal health care center
    - "Healthy herder" program in Khanbogd soum (approved)
    - "Animal Disinfection -2016" project to be implemented in all soums of Southgobi. NB The Co-operation Agreement is a co-funder of this programme.

  Two other projects have been submitted but not approved for funding to date.

    - Pastureland capacity assessment on eastern part of Southgobi aimag
    - Pasture water hydrology study in Khanbogd soum.
- In addition, OT has directly rehabilitated some wells and pasture, and operated a temporary programme of direct supply of water to eight locations.

We find that the concept of community level compensation for the overall reduction in pastureland resulting from the presence of OT is sound. Community level compensation reflects the migratory

[66] Khanbogd Soum Livestock Sector Sustainable Development Program, 2015. The program has been developed in line with following policies and programs: "State Policy on Herders" 2009, approved by Parliament of Mongolia, "National Mongolian Livestock Program" 2010, "Intensified livestock development program" 2006, of the Mongolian Government, "Herder Program" of Umnugobi province, 2010 and "Khanbogd Socio-economic development action plan for 2014-2023" 2014.
[67] To date these programmes have not been very successful. See Component 1 report.
[68] 2011 RAP, p.15, 61, 74, 82.

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nature of traditional herding which means that except for registered camps, herders are free to move throughout the Khanbogd soum grazing areas. We also found little confidence on the part of OT, soum officials or herders that this collective compensation is effective yet. However, since the Co-Operation Agreement now provides a basis for a longer term and collaborative approach to pasture management, we think it would not be wise to propose further changes until the new approach has had a chance to work[69]. To ensure that the Co-Operation Agreement continues to address the concerns of herders, we suggest that for 5 years a proportion of the funding is earmarked for pasture and herder water measures in the soum.

7 Have the compensation processes complied with the IFC's Performance Standard 5 (IFC PS 5)?

7.1 What does IFC Performance Standard 5 require?

IFC PS 5 is the international benchmark standard for land acquisition processes and for compensation to individuals and communities affected by physical relocation and/or economic displacement. It is a long and complex document. The main requirements are that:

- Projects minimize the amount of relocation and displacement that they cause.
- Where there is relocation and/or economic displacement, then decisions about relocation and livelihood restoration are made transparently and in consultation with the people who are affected; attention is paid to communications with, and impacts on, vulnerable people, and there is a grievance mechanism to handle any disputes. The grievance mechanism should allow recourse to an external body for reconsideration of their case.[70]
- Where there are economic impacts, projects have clear plans for livelihood restoration.
- The objective is that after compensation and livelihood restoration, the people affected are at least as well off in terms of income and standard of living as they were before the project came.
- People who move into compensation zones after the announced 'cut-off date' are not eligible for compensation.
- Compensation and livelihood restoration are monitored and progress is reviewed until it can be demonstrated that the objectives have been reached.

7.2 Compliance with PS5

7.2.1 Overview

The 2004 and 2011 compensation programmes were conducted before IFC PS5 (2012) was issued, so this report is evaluating compensation against standards that did not exist at the time.

[69] In the draft report we suggested considering a quite different approach to community compensation, i.e. allocating shares in OT to herders so that they would profit directly from OT success. However we learned since that no dividends are likely to be paid to shareholders for ten years. We therefore dropped this proposal.

[70] CAO, A Guide to Designing and Implementing Grievance Mechanisms for development projects, p13.

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Our overall assessment is that the 2004 compensation programme did not comply with IFC PS5 in many respects:

- No clear justification was provided for the 10km exclusion zone that was applied in 2004 to herding as well as the location of winter camps. Therefore, resettlement was not minimized.

- We heard compelling evidence that although IMMI consulted with the soum administration, there was little effective consultation with the herders involved. We heard repeated accounts of visits from IMMI community relations staff to herder homes pressing for signature of contracts, public 'naming and shaming' of herders who were reluctant to sign, and one case where an elderly parent was pressed to sign on behalf of her son – to her continuing regret.

- We are doubtful that compensation terms were transparent at the time, and the compensation agreements required herders to keep the terms confidential.

- The grievance mechanism is inappropriate – informal resolution within 7 days or recourse in English to the Mongolian Chamber of Commerce and Industry. This type of dispute mechanism is appropriate to a commercial contract between commercial entities but not to a contract between a rural herder and a large company.

- No livelihood restoration objectives were set.

- There was no formal monitoring in the first few years, although since 2010 OT has been monitoring the situation of the households who were relocated.

Our assessment is that the 2011 process for compensation for economic displacement was improved on the 2004 process, but still has some non-compliances with IFC PS5.

- There was no livelihood restoration plan.

- The 2011 contracts required herders to maintain confidentiality about terms, as in 2004. This was not transparent.

- The grievance mechanism in the compensation agreement is not specified in any detail, just requires 'efforts to resolve in good faith'. The current grievance mechanism (2015 RAP) does not include the option for complainants of recourse to an independent recourse. The fact of complaints being made to CAO indicates that the mechanism is not working effectively.

7.2.2 Impacts on vulnerable people

In 2004, IMMI created short profiles of each of the households that were relocated. The (internal) Herder Relocation Report identifies two households as in 'not good' or 'very difficult' circumstances but does not report any additional or specific measures to mitigate impacts.

In the 2011 RAP and 2012 ESIA (in which OT reported assessments and mitigation and compensation plans designed to be compliant with the IFC Social and Environmental Performance Standards), the category of vulnerable people is identified. A definition is provided of vulnerable households based

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on soum data, and data provided showing that such households have been identified. A process for working with vulnerable households set out.[71] The approach recognizes, correctly, that there may be change over time in who is vulnerable and that people may cease to be vulnerable over time.[72]

The 2004 RAP Completion Audit (September 2014) noted that using the then applicable government criteria, 5 of the 10 households relocated in 2004 were poor or very poor, and that when audited ten years later 5 households had improved livelihoods, 4 had restored livelihoods and one household's livelihood was only partially restored. However, the audit team were not satisfied by the approach with respect to households displaced in 2004, "There is no specific programme or specific assistance to vulnerable groups." The audit recommended that OT "identify vulnerable people and make sure their needs are integrated into the RAP." [73]

The 2015 RAP does not comment on the audit recommendation, but includes an extended presentation of OT's approach to vulnerable people. It sets out essentially the same approach as the 2011 RAP but with more specific commitments in relation to annually updating the list of vulnerable herder households and a case management approach including collaboration with the soum authorities, individual visits and support.[74]

As noted in Section 2, because this issue was introduced after field work research was completed, we do not have direct information from vulnerable households. Nor have we seen any of OT's quarterly reports on vulnerable households. The request from the herder group in TPC to give greater consideration of vulnerability does not include any specific additional data on vulnerable people or households.

Based on the points above, we conclude that:

- Since 2011 OT has addressed questions of herder vulnerability in impact assessments and RAPs;
- The steps taken to address vulnerability are appropriate;
- However, information is lacking about implementation and results.

7.3 Recommendations

Most of the gaps are addressed in preceding recommendations. In addition:

- OT should cancel the confidentiality clauses in the 2004 and 2011 compensation agreements so that those who have been compensated are able to disclose information if they choose to do so.
- OT and other TPC members should clarify the options for recourse to an external body in the grievance mechanism; communicate and consult on the current grievance mechanism to

[71] 2012 ESIA, Chapter B9 on Employment and Livelihoods (9.6.11); Chapter C10 on Land (10.3.6, 10.3.9); Chapter C13 Cumulative Impacts (13.7.5); Chapter D15 RAP (15.6).
[72] See Monitoring Plan, D15, p. 73 which includes quarterly recording of the numbers of vulnerable people being assisted and how; changes in the number of vulnerable people and the number of people no longer vulnerable.
[73] 2004 Completion Audit, p. 38.
[74] 2015 RAP, Section 9.

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herders and others in the community; revise the mechanism as necessary, and encourage people with complaints about OT to use this mechanism.

- OT should disclose information every year on the vulnerable households programme including data on the numbers of people included and the actual assistance measures that are provided.

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Appendix 1: Terms of Reference: Compensation Programme Review
English

Component 3: Compensation programme review OT has run two processes to provide compensation for its impacts on herders in Khanbogd soum: the 2004 resettlement compensation process and the 2011 economic displacement compensation process. Many herders believe that these processes did not sufficiently compensate for OT's impacts overall on pasture and water (and therefore on the size of herds that households can maintain), as well as other impacts on traditional livelihoods and culture. Using the information gained through Components 1 and 2, the MDT will conduct an independent review of the adequacy of the compensation packages to individual households and the overall support provided in KB by OT over the past decade. Specifically, the review should identify whether: (1) the impact assessing methodology applied to OT's 2004 resettlement and 2011 economic displacement compensation processes was suitable and adequate; (2) OT adequately compensated for any negative effects that can be attributed to OT's presence, including OT-related infrastructure and natural resource use; (3) the compensation provided was sufficient to support transitions to sustainable livelihoods; (4) all herders deserving of such compensation were, in fact, compensated; and (5) the compensation processes complied with the IFC's Performance Standard 5.

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2nd Phase Final Report by the Independent Expert Panel (IEP)

Undai River Diversion Complaint

November 2016

by

Steve Buckley[1] and Sabine Schmidt[2]

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2nd Phase Final Report by the Independent Expert Panel (IEP)

Undai River Diversion Complaint

November 2016

Executive Summary

1) The Haliv-Dugat River has been diverted and altered in several parts of the watershed. The river and/or its tributaries have been ditched, filled and blocked in several areas, due to mine and road infrastructure. This has changed the surface and groundwater flow in this part of the watershed. It is not possible to quantify the amount of change in the surface or groundwater due to insufficient pre-project monitoring of the hydrologic conditions in this part of the watershed. The cumulative impacts of these changes to pasture use and herding livelihoods are discussed in Part 2 of this report.

2) The Tailings Storage Facility (TSF) is currently leaking, as detailed in the report "2015 TSF Raise Design Report, Golder Associates 4/30/2015 p.10". The Golder Associates report has led to construction design changes and operational changes of the TSF. One of the effects of these changes has been the removal and relocation of monitoring weirs and piezometers at monitoring sites below the TSF dam. Most monitoring sites have intermittent or very little data, which makes quantifying the seepagedifficult. The seepage collection system is designed to contain the seepage water within the Mine License Area (MLA) and it appears that the seepage has been contained within the MLA. In any case, the data that does exist suggests that the future monitoring program should be both thorough and vigilant.

3) The prospect of modifying the TSF to avoid impact to the Haliv-Dugat River is not tenable due to the fact that the river has already been diverted and both cells are under construction and TSF Cell 1 is operational. There remain, however, some options for mitigation and monitoring that are outlined in the body of this report.

4) The surface drainage in the Haliv Dugat basin has been affected by infrastructure developments including roads, quarries, the Tailings Storage Facility and diversion channels, impacting herders' water supplies in the basin. Details on impacts are discussed in Part 1 of the report.

5) These impacts, along with the loss of Haliv Dugat pastures, namely Gurvan Modnii Haliv Dugat ("Dugat"), Khukh Shand, Dugatiin Dugui, Gurvan Modnii Haliv ("Haliv"), Vandan Tolgoi, Shunkhat and Oyut Tolgoi, to the Mine License Area directly or to related infrastructure and resulting fragmentation as well as dust and noise pollution, has led to a concentration of livestock in other areas, particularly in Ust Bag Mod, Khanan Davaa and Toin Tsokhio.

6) Herder households have moved into these areas either as a result of assisted resettlement, with establishment of winter camps, or are making seasonal use of these areas as they move away from lost, impacted and fragmented pastures. Herders' perceptions as well as household livestock data by the Soum government confirm these trends.

7) As a result, seasonal movements of herders are reduced, and summer grazing often takes place in the winter pasture. Herders information and livestock data suggest that households in Haliv Dugat area have increased livestock numbers less than the overall increase Soum wide, and that they are focusing more on herding small livestock than large livestock.

8) Similar to the Undai River, where the loss of Bor Ovoo spring and surrounding summer pasture has triggered changes to the traditional sytem nomadic livestock husbandry, marked by seasonal moves and common use of summer pasture by many households, the customary pattern of pasture use and livestock management of the herder community has been changed. With areas permanently lost, it is not perceivable that it can be restored to its previous state.

Recommendations

- Expand and improve participatory water quality monitoring with OT, local government officials and herders. This could include an expansion of precipitation gage network, and additional monitoring wells downstream of the TSF. This should be done in the spirit of joint fact finding with the involvement of all parties in the water quality sampling process.

- Improve the integrity of the Haliv-Dugat diversion channel. This would reduce erosion and convey floodwaters of the Haliv-Dugat River more efficiently. This could be done using joint fact finding survey to assess the stability of the diversion and identify areas of excess erosion that could benefit from bank or bed hardening and reduction of ponding where appropriate

- Provide adequate drainage mechanisms such as culverts, arches or armored flood flow crossings, where appropriate, to reduce ponding and evaporation in the watershed. A review of these areas and potential mitigation techniques could be done jointly by TPC.
- Convene the Independent Technical Review Board (ITRB) to review the seepage and design modifications of the TSF and the potential for downstream impacts and report results to all parties.

- In general, IEP supports MDT recommendations. To the MDT- Component 1 recommendation on water point development soumwide, IEP adds that wildlife/biodiversity – livestock conflicts be considered, and comments that not all apparently available pasture is indeed suitable for grazing

In addition, some specific comments and recommendations are provided here:

- In line with recommendation in MDT Report Component 1, local government needs to re-establish a grazing system, to adjust for the lost pasture areas. This is a very difficult task, as key pasture areas (summer pasture) have been lost forever. While there may a large territory, not all is suitable pasture due to the terrain and vegetation type.
- Local government (Soum and Aimag) should be supported by central government in these efforts by providing national experts and training; it will be important to increase ownership of this efforts – herders, local organizations, and government on all levels (Bag, Soum, Aimag, central government, and relevant professional agencies) need to carry this effort, as opposed to external actors (OT, foreign experts).
- While TPC has a crucial role in bringing stakeholders together, it is important that the existing institutions and structures of community and government are the key actors (i.e. bag meetings, bag representative khural, Soum khural etc., livestock unit, annual land use planning procedure etc.).
- ALAGAC undertakes 5 yearly assessments in each Soum, using professional organizations as sub-contractors. ALACGAC could provide professional support in the process of planning an "adjusted" grazing system in Khanbogd Soum. ALAGAC (Agency for Land Affairs, Geodesy and Cartography) has recently introduced a process of identifying resource use rights and planning land and resource use with local government aiming at documenting and securing customary use rights of herders.

- The issue of loss of local community's "Nutag" and of spiritual values remains. These losses will have to be addressed separately.
- Support for these programs could be provided from revenue generated through OT (taxes to central government, cooperation fund at Aimag level, others); the lender (IFC) could provide additional support while promoting local ownership of the process of planning and implementation.
- More detailed knowledge and transparency is needed on the increase of livestock. The IEP phase 2 study (and the previous CPR studies, 2012) suggest that effected households (both the officially recognized and those considering themselves effected) are mostly not the cause of significant livestock number increase; or that the rate of increase is much less than average. Rather, in general, they are adjusting their livestock number and type. The question of absentee livestock ownership in particular should be further investigated, in order to get a better understanding of the growth of livestock numbers and pasture pressure.
- Regarding baseline data on ground water: MDT Report Component 1 refers to the lack of baseline data to establish impacts on alluvial water through connectivity of deep and shallow aquifer. IEP has noted earlier that no records on abstraction prior to 2007 are available. IEP has also made efforts in phase 2 to locate and access data, at local government and the Ministry for Environment and Tourism, but was informed that the data do not exist (at local level) or cannot be shared (by experts at the Ministry). Under this circumstance, experts cannot quantitatively assess impacts over time; in order to make progress, existing data need to be made available.
- Review the categories of effected households, and consider inclusion of a) households that were not recognized as impacted so far , that have lost access to any seasonal pasture (winter, or summer/autumn pasture), b) experienced increased pressure on their pasture as others moved away from impacts and into their pastures, c) households that had shared a winter camp site and only one household was recognized, d) households that had winter camps (in MLA, exclusion zone) temporarily not in use because of family circumstances, e) households whose winter camp was recognized by the community and customary rule, but not formally licensed
- Names of households effected in different ways as outline above were provided in this report to the best judgement of the expert, though the list is not considered complete. The names are provided based mostly on information received in group discussions, with consensus of discussants. A review of the names is recommended, by a team of individuals elected by TPC (or through a process with broader participation).
- Organize discussions with households named in this report on livelihood support strategies (similar to consultations with 59 households after IEP Phase 1 report)
- Assess options for fodder growing/production (lessons learnt, information available from programs implemented in other Soums in South Gobi, Uvurkhangai and Bayankhongor)

OT to rehabilitate any disturbed/abandoned sites as soon as possible, in order to make pasture available again as soon as possible, to shorten time of dust generation from disturbed sites and minimize risks of accidents in quarries

PART 1

2nd Phase Final Report by the Independent Expert Panel (IEP)

Undai River Diversion Complaint

Part 1 - Hydrology

Summary of Findings

The Independent Expert Panel (IEP) Phase 2 Terms of Reference are:

- Whether the Haliv-Dugat river has been diverted or will be diverted in the future, and the potential cumulative impact of the diversion of Undai and Haliv-Dugat on the water and pasture resources in this region;
- Whether the tailings storage facility is currently leaking, the risk of such leakage in the future and what impact(s) such leakage would have on the Haliv-Dugat River or any other source of drinking water for the herders and their livestock; and
- The feasibility of modifying the Project's tailings storage facility or related monitoring and/or mitigation plans in order to avoid impacts on the Haliv-Dugat River." [1]

Phase 2 commenced in February 2016 with a multi-day meeting of the Tripartite Council, IEP, the newly established MDT (multidisciplinary team), and CAO representatives and facilitators. The meeting included training on joint fact finding, emphasizing the need for cooperation and information sharing by all parties, and clarified the overall approach, work schedules and expectations. The results of this Joint Fact Finding as it relates to the Terms of Reference of the IEP are as follows:

9) The Haliv-Dugat River has been diverted and altered in several parts of the watershed. The river and/or its tributaries have been ditched, filled and blocked in several areas, due to mine and road infrastructure. This has changed the surface and groundwater flow in this part of the watershed. It is not possible to quantify the amount of change in the surface or groundwater due to insufficient pre-project monitoring of the hydrologic conditions in this part of the watershed. The cumulative impacts of these changes to pasture use and herding livelihoods are discussed in Part 2 of this report.

10) The Tailings Storage Facility (TSF) is currently leaking, as detailed in the report "2015 TSF Raise Design Report, Golder Associates 4/30/2015 p.10". The Golder Associates report has led to construction design changes and operational changes of the TSF. One of the effects of these changes has been the removal and relocation of monitoring weirs and piezometers at monitoring sites below the TSF dam. Most monitoring sites have intermittent or very little data, which makes quantifying the seepage and leakage difficult. The seepage collection system is designed to contain the seepage water within the Mine License Area (MLA) and it appears that the seepagehas been contained within the MLA. In any case, the data that does exist suggests that the future monitoring program should be both thorough and vigilant. The potential impact of any water quality changes below the TSF to herders pasture and livelihood is discussed in Part 2 of this report.

11) The prospect of modifying the TSF to avoid impact to the Haliv-Dugat River is not tenable due to the fact that the river has already been diverted and both cells are under construction and TSF Cell 1 is operational. There remain, however, some options for mitigation and monitoring that are outlined in the body of this report.

[1] Undai River Diversion Complaint Independent Expert Panel Terms of Reference

Introduction

Phase 1 of the IEP investigation began in 2013 and was confined to the potential impacts of the Undai River diversion and loss of Bor Ovoo spring on water resources, pasture and herder livelihoods related to the diversion works. Phase 2 started in February 2016 with a multi-day meeting of the Tripartite Council, IEP, the newly established MDT (multidisciplinary team), and CAO representatives and facilitators. Phase 2 is confined to the Terms of Reference of the IEP:

- Whether the Haliv-Dugat river has been diverted or will be diverted in the future, and the potential cumulative impact of the diversion of Undai and Haliv-Dugat on the water and pasture resources in this region;

- Whether the tailings storage facility is currently leaking, the risk of such leakage in the future and what impact(s) such leakage would have on the Haliv-Dugat River or any other source of drinking water for the herders and their livestock; and

- The feasibility of modifying the Project's tailings storage facility or related monitoring and/or mitigation plans in order to avoid impacts on the Haliv-Dugat River."

Methodology

Existing reports and monitoring data were examined with particular emphasis on answering the questions outlined in the IEP Terms of Reference. The main sources that contain up to date information include:

- 2015 TSF Raise Design Report, Golder Associates, 4/30/2015
- TSF Cell 1 2015 Construction Summary Report, Golder Associates 1/18/2016
- TSF Seepage Monitoring Report #7, 2016, OT

No independent measurements or sampling were done by the IEP associated with this analysis. Field reviews were conducted on several occasions in the past few years, including visits to the TSF seepage area, diversion channels within the MLA and review of the Haliv-Dugat River and tributaries outside the MLA.

Results

The Haliv-Dugat River is an ephemeral stream, which flows only during periods of heavy rain events. It has much less alluvium and less alluvial groundwater than the neighboring Undai River. The Haliv-Dugat River has been altered and diverted in several areas both within the MLA and outside it. Some examples include: the main KB road crossing upstream of the MLA where there are no drainage provisions such as culverts; and again downstream at the sand pit and at the cement plant. Tributary channels have been filled, which are now occupied by the TSF and associated borrow sites, which are shown on numerous construction drawings in the above referenced reports. The Haliv-Dugat River has been ditched in order to re-route the river around the TSF. The diversion ditch is inadequate as evidenced by several site visits during which the ditch was undergoing repair or replacement. In addition, Satellite Imagery from 7/8/2015 shows signs of flooding and breach of the diversion at the Dugat River (Multi-Disciplinary Team Satellite Analysis). There is not enough monitoring information to determine how

these changes have impacted surface runoff, shallow groundwater or evaporation. The potential impact of these changes to pasture and herder livelihoods is discussed in Part 2 of this report.

Seepage from the TSF has been documented on p.10 of the 2015 TSF Raise Design Report, Golder Associates, 4/30/2015. In 2013 Golder Associates took over construction and design activities of the TSF from previous contractors. They state on pages 3-4:

"During the first site visit by Golder in late August 2013 a number of concerns were raised arising from our observations of the behaviour of the settled tailings. The following was observed:

i) The slurry solids content was lower than the design value, around 56%

ii) The beach slope was around 0.3%

. *iii) The average settled dry density was around 1.27 t/m3*

. *iv) The average rate of rise across the whole TC1 footprint would be close to 8 m/yr."*

" as the deposited tailings had not attained the design values, the following assessment was made:

TC1 will be filled faster than planned.

The tailings are unlikely to achieve:

The degree of desiccation predicted

Sufficient bearing to support, with safety, upstream embankment raises.

- *As a result of these observations and the assessment of the tailings beach condition, the following design changes were proposed and accepted by OT for implementation in TC1:*
- *Conversion of all embankment raises to downstream construction Steepening of the downstream slope of the embankments*
- *"On demand" tailings deposition. "*

The design changes included changes to the seepage collection drains downstream of the dam (p. 10-11). These changes are required to collect the seepage and re-route it back into the milling and tailings system and prevent the seepage from escaping the MLA. The nature of the seepage appears to be from several sources including tailings water, shallow groundwater and in some cases deep bedrock groundwater.

Page 40 of the TSF Cell 1 2015 Construction Summary Report by Golder Associates:

. "*According to the water quality test results, seepage water at Sta. 5+500 is deemed as seepage from the reclaim pond indicated by similar salinity and TDS while seepage water at Sta. N0+360 is considered as shallow groundwater migrating through the old river channel underneath the north embankment. Seepage water at Sta. 5+900 might be a mixture of the reclaim water and the shallow groundwater as indicated by the test results."*

The evidence for communication of the tailings water and the deep groundwater is discussed on Page 40:

. "*Water level (in deep aquifer, 20m below the ground surface) adjacent to the south embankment had a 2m rise from Oct 2014 to Oct 2015 which corresponds to the tailings discharge in sub-cell 1A. The Total Dissolved Solids (TDS) in the water has also been increasing which might be related to the seepage from the tailings. More investigation is required to confirm this presumption.*"

The quarterly seepage monitoring reports by OT are a critical component to determining whether the seepage of the TSF will have an impact on downstream water resources in the Haliv-Dugat watershed. In most situations of tailings impoundment leakage, the first sign will be an increase in sulfate in the downstream waters. This is because sulfate is more soluble than most metals, and will travel faster and further in the groundwater.

Recommendations

- Expand and improve participatory water quality monitoring with OT, local government officials and herders. This could include an expansion of precipitation gage network, and additional monitoring wells downstream of the TSF. This should be done in the spirit of joint fact finding with the involvement of all parties in the water quality sampling process.
- Improve the integrity of the Haliv-Dugat diversion channel. This would reduce erosion and convey floodwaters of the Haliv-Dugat River more efficiently. This could be done using joint fact finding survey to assess the stability of the diversion and identify areas of excess erosion that could benefit from bank or bed hardening and reduction of ponding where appropriate
- Provide adequate drainage mechanisms such as culverts, arches or armored flood flow crossings, where appropriate, to reduce ponding and evaporation in the watershed. A review of these areas and potential mitigation techniques could be done jointly by TPC.
- Convene the Independent Technical Review Board (ITRB) to review the seepage and design modifications of the TSF and the potential for downstream impacts and report results to all parties.

References

2015 TSF Raise Design Report, Golder Associates, 4/30/2015

TSF Cell 1 2015 Construction Summary Report, Golder Associates 1/18/2016

TSF Seepage Monitoring Report #7, OT Environmental Program

PART 2

2nd Phase Final Report by the Independent Expert Panel (IEP)

Undai River Diversion Complaint

Part 2 – Effects on Herders' Pasture and Water Resources and Herding Practice

Table of Content

Executive Summary

The surface drainage in the Haliv Dugat basin has been effected by infrastructure developments including roads, quarries, the Tailings Storage Facility and diversion channels, impacting herders' water supplies in the basin. Details on impacts are discussed in Part 1 of the report.

These impacts, along with the loss of Haliv Dugat pastures, namely Gurvan Modnii Haliv Dugat ("Dugat"), Khukh Shand, Dugatiin Dugui, Gurvan Modnii Haliv ("Haliv"), Vandan Tolgoi, Shunkhat and Oyut Tolgoi, to the Mine License Area directly or to related infrastructure and resulting fragmentation as well as dust and noise pollution, has led to a concentration of livestock in other areas, particularly in Ust Bag Mod, Khanan Davaa and Toin Tsokhio.

Herder households have moved into these areas either as a result of assisted resettlement, with establishment of winter camps, or are making seasonal use of these areas as they move away from lost, impacted and fragmented pastures. Herders' perceptions as well as household livestock data by the Soum government confirm these trends.

As a result, seasonal movements of herders are reduced, and summer grazing often takes place in the winter pasture. Herders information and livestock data suggest that households in Haliv Dugat area have increased livestock numbers less than the overall increase Soum wide, and that they are focusing more on herding small livestock than large livestock.

Similar to the Undai River, where the loss of Bor Ovoo spring and surrounding summer pasture has triggered changes to the traditional sytem nomadic livestock husbandry, marked by seasonal moves and common use of summer pasture by many households, the customary pattern of pasture use and livestock management of the herder community has been changed. With areas permanently lost, it is not perceivable that it can be restored to its previous state.

1. Introduction

The Independent Expert Panel (IEP) was tasked for the 2nd Phase of its work with the assessment of "impacts to the Haliv-Dugat River and cumulative impacts in the Undai River basin, in particular:

- Whether the Haliv-Dugat river has been diverted or will be diverted in the future, and the potential cumulative impact of the diversion of Undai and Haliv-Dugat on the water and pasture resources in this region;
- Whether the tailings storage facility is currently leaking, the risk of such leakage in the future and what impact(s) such leakage would have on the Haliv-Dugat River or any other source of drinking water for the herders and their livestock; and
- The feasibility of modifying the Project's tailings storage facility or related monitoring and/or mitigation plans in order to avoid impacts on the Haliv-Dugat River." [2]

The 2nd phase of work commenced in February 2016 with a multi-day meeting of the Tripartite Council, IEP, the newly established MDT (multidisciplinary team), and CAO representatives and facilitators. The meeting included training on joint fact finding emphasizing the need for cooperation and information sharing by all parties, and clarified the overall approach, work schedules and expectations.

Part 2 of the report is focusing on the effects on herders' pastures and pastoral practice in and around the Haliv-Dugat sub-basins as a result of impacts on the Haliv Dugat river system by the project. .

2. Methodology

The methodology for phase 2 included:

- field visits (February 26, 2016 jointly with MDT, March 28 – April 1, 2016, June 7 – 8, 2016, Nov. 15-16, 2016) with joint site inspections in the target areas. Details of the work during the field visit March 28 – April 1 are provided in Annexes 1 - , and details of the field visit June 7-8 are provided in Annexes 7.
- focus group discussions and key informant interviews with herders, local government and OT personnel, as well as with experts at national agencies. The questions and issues of the semi-structured interviews are listed in Annex 3, responses of herders in Annex 4; the process of the focus group discussions is outlined in Annex 5; the map and table produced by discussants are provided also in Annex 5. Photos documenting sites in Haliv Dugat in March/April 2016 are provided in Annex 6.
- a study to assess changes in livestock grazing (numbers) on pastures in the Haliv Dugat area, based on key informant and local government archive information on households and livestock type and numbers in the pastures of the study area. Details of the methodology are described in Annex 8.
- document reviews, focusing in particular on ESIA/DEIA sections concerned with cumulative impacts in the Undai River basin, and application of the approach to cumulative impact assessment as outlined in the IFC Good Practice Handbook (see Annex 2).

[2] Undai River Diversion Complaint Independent Expert Panel Terms of Reference

3. Findings

3.1. Field Observations

During the field visit March 28 – April 1, 2016, TSF and Dugat and Ust river inside MLA were revisited on request of herders with IEP member.

- TSF surface was melting. Observed a group of swans on the open water. The seepage area had more water than during February visit due to thawing.
- Ditch ("channel") near seepage area carried floodwater last year (pers. comm. Erdenebayar N. OT). "Channels" appear to be ditches to prevent flooding of facilities, not constructed to divert surface water properly.
- The Dugat river is blocked by road inside MLA (near cement plan), with no culverts at all to facilitate surface water flow.
- Ust River is cut off by sand pit (sand will be needed for underground mine construction, for concrete, for years to come, pers. comm. Tserennadmid, OT) inside MLA.

These observations and interpretation is discussed in Part 1 of this report on water resources.

3.2.Effects on Herders' Pasture and Water Resources

Discussions and interviews were structured to generate information on herders' perceptions on changes in condition of and access to pasture and water resources in the Haliv Dugat area in the time frame from before/around 2000 to 2015 and beyond, determining the condition and access in consecutive 5 year periods.

The following water sources were discussed: 1. Wells: Dugat, Khukh Shand, Shand (Mukhar Ergiin), Koltsog (Khalivin), Khurai (dried up 1998), Haliv, Bor Khoshuu, Koltsog at Bor Khoshuu (not used since 80ies), Oortsog, Erguleegt (Khaliviin), Tesget (dried 1999), Aman Us, Ulaan Khudag, Toin Tsokhio 1, Toin Tsokhio 2; 2. Zadgai/Springs: Dugatiin Zadgai, Khajuukhoovor, Budagiin Zadgai, Oortsgiin Bulag, Bor Khoshuuni Bulag.

The responses by herders reflected in many ways those recorded during Phase 1 work from herders who used Bor Ovoo and other water sources along the Undai River. Herders describe observations of beginning decline of condition of wells between 2000-2005. In the period 2005-2010, many wells were reported to have dried up already or were significantly reduced. Herders attributed the change in condition of the wells to abstraction of water from the wells and to boreholes in the vicinity. For "zadgai", herders reported also early changes in the period 2000- 2005, with significant changs between 2005-2010. Between 2010-2015, all "zadgai" disappeared according to discussants.

The preliminary assessment by IEP is that these water sources were mainly impacted by roads and infrastructure (rather than abstraction a decade ago) as described under field observations above. For more detail on water resources changes and possible causes, see part 2 of this report.

Key issues addressed in semi-structured interviews included: changes and reasons for changes in campsite locations, seasonal moving patterns, pasture condition, suitability of pasture, livestock productivity, and livelihoods. The following pasture areas were discussed: Dugat, Khukh Shand, Dugatiin Dugui, Haliv, Ust Bag Mod, Ukhaa Ovoo, Vandan Tolgoi, Shunkhat, Oyut Tolgoi, Khanan Davaa, Mongol Khar, Khar Ovoo, Toin Tsokhio, Oortsog, Bor Khsohuu, Budaa.

In general, herders described the most significant change/increase of pasture "pressure" having occurred between 2000-2005. As several areas fell inside the MLA and other areas experienced decline or loss of water sources, other areas experienced more "pressure" as households moved in and now share same pasture areas. Other factors driving pasture pressure in the fewer remaining areas are loss of reserve pasture through airport and Gunii Kholoi pipeline construction. In addition, dust is effecting pastures. Herders expressed their request to be duly compensated for loss of pasture, guaranteeing a future livelihood.

The loss of pasture land in the Haliv Dugat area is also effecting households to the North, in Ekhen Haliv area, who have used Haliv Dugat pastures for summer-autumn grazing. Annex 8 contains the information provided in group discussion and interviews with households from Ekhen Haliv (June 8, 2016).

The loss of pasture, and declining/lost water resources have forced herders to move further eastwards and into Khanbogd mountain for grazing their livestock; there, vegetation is less suitable and livestock are more at risk through predators (wolves and lynx). The increased use of these areas would also pose an ecological threat as wildlife habitat and natural areas are being disturbed more.

Based on available data on households' seasonal use of defined pasture areas and on livestock numbers from the Khanbogd Soum archive, livestock concentration on the remaining available pasture areas was defined.

Table 1. Total sheep units on pasture areas in Haliv Dugat Area between 2000 – 2015

	Gurvan Modnii Khaliv-Dugat ("Dugat")	Khukh Shand	Gurvan Modnii Khaliv	Ust Bag Mod	Khanan Davaa	Toin Tsokhio	Oortsog	Bor Khoshuu	Budaa
<2000	1719.2	263.5	1812.7	113.9	290.6	584.3	437	908	428.8
2000	1328.8	207.5	1685.5	97.5	222.7	529.2	388.4	796.6	336.8
2001	954.7	41.5	957	64.1	122	298.3	193.3	407.5	162.8
2002	1084.1	49.8	536.3	69.5	178.4	426.4	221.8	469.3	173
2003	1037.2	36.9	570.8	60.2	181.6	406.5	200	474.3	100
2004				498.7	176.6	367	260		
2005				939.5	196.7	424.7	252		
2006				912	30	512.9	202.8		
2007				968.3	44.9	549.3	206.9		
2008				912	40	598	223.1		
2009				1095.2	644.7	629.4	234.4		
2010				973	715.7	671.1	238		
2011				1075.2	913.2	787.8	286.4		
2012				997	1072.7	832.8	289.8		
2013				1006.2	1098	1018.6	282.2		
2014				1148	1376	1 286	215.8		
2015				1217	1275	1 224	213.5		

Table 1 reflects the changes in livestock numbers on local pasture areas in the Haliv-Dugat basin. Pasture areas were defined based on their customary local names. Names of households and the history of pasture use by different households were compiled based on information by Battsengel, L., (TPC chairman) and reviewed/added by D. Khurelbaatar (Head of Livestock Unit) and H. Otgonjargal (Vice Governor). The livestock numbers were calculated based on a) households with winter camps in the area, plus livestock of

other households taken care of by households residing in the area. Livestock were converted into sheep units – camel 5x, horse 7x, cow 6x, sheep 1x, goat 0.9 x).

The diagrams below show for each pasture area the sheep units for each year, from 2000 – 2015. Further information on the seasonal use of the pasture areas is provided (based on above individual's information). Remarks on changes in condition, suitability and accessibility of pasture and water resources are based on herders' observations, recorded in focus group discussions and semi-structured interviews. (These are marked as herders' comments in the text below.)

3.2.1. Gurvan Modnii Haliv Dugat ("Dugat")

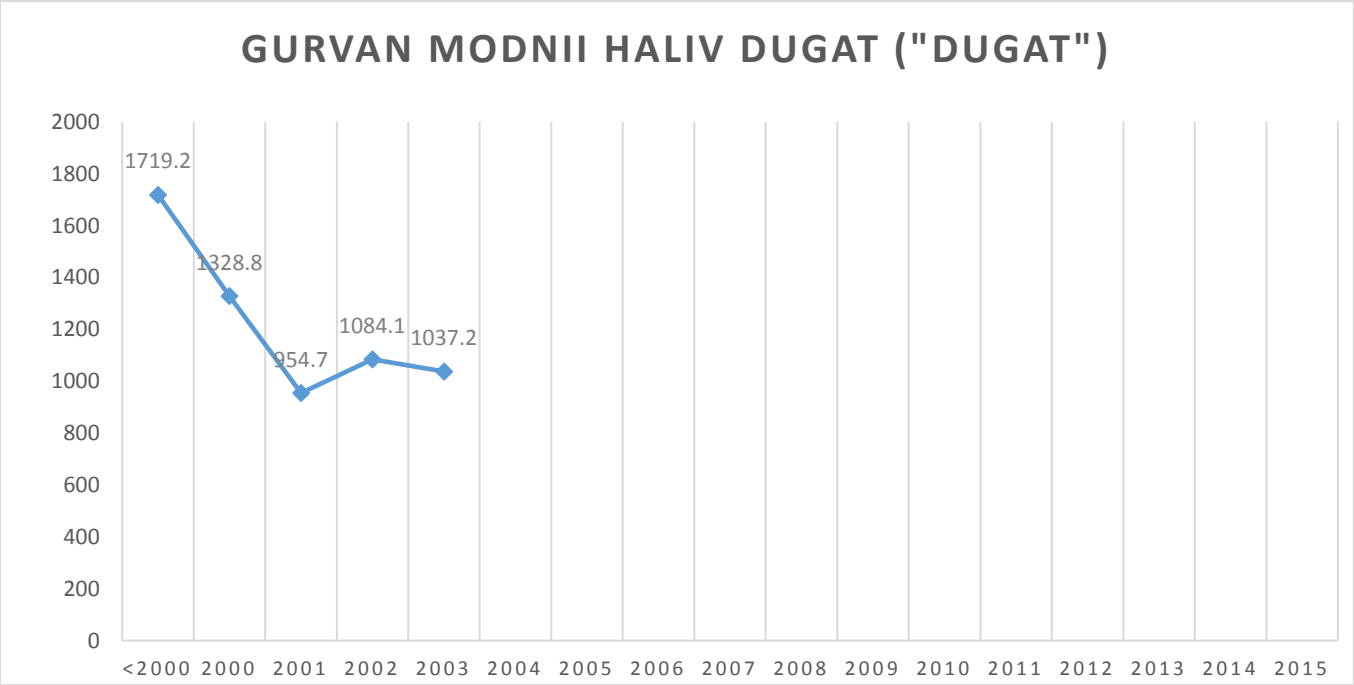


Fig. 1. Livestock numbers in sheep units at Gurvan Modnii Haliv Dugat, including the livestock of L. Battsengel, L. Bat-Erdene, L. Mandbayar, P. Tsagaan, D. Gantogtokh, L. Nomintsetseg, and Ts. Nergui.

Pasture Use in Gurvan Modnii Haliv Dugat ("Dugat") area:

Winter: Battsengel, L, Baterdene, L, Mandbayar, L., Tsagaan, P., Gantogtokh, D., Nomintsetseg, L., and Nergui, Ts. had winter camps in this area. These 7 households were resettled in 2004 - Battsengel to Tsagaan Shivee, Baterdene to Ulaan Khoshuu, Mandbayar went to UB, Tsagaan to Oroin Buuts, Gantogtokh to Toin Tsokhio, Nomintsetseg went to work for OT and left livestock with parents, Nergui to Ulaan Ovoo.

Spring: Battsengel (and Baterdene and Mandbayar) still have a spring camp in Dugat, this has been used a little bit by others - in 2014 and 2015 by Badamsambuu for about 2 weeks, and in 2016 by Adiya for about 10 days.

Summer and Autumn: Before 2000, a number of households used Dugat for summer and autumn pasture. These include, but may not be limited to, a) Badamsambuu, B., Adiya, D., Bandi. S., Bayaraa (son in law of Bandi), b) the 7 households listed above that had winter camps here, and c) sometimes Chuluunbaatar, Kh., Surenkhorol, N., Mendbayar, G., Tsagaan, Ts. , d) some households that had winter camps South of MLA, used the area in autumn before 2000, e) around 2010, Ulam-Undrakh A. and Narantsetseg, A. used the area in autumn.

Access to and Condition of Pasture and Water Resources:

Since 2005, few households have been using the area in summer, because the pasture is close to MLA and airport, and there is not enough water. Dugat well, according to FG (focus group) participants[3] declined in condition/water level from 2000 – 2015 from 4 to 1 (on a scale of 4 – 0). Herders attribute the changes in the water source to numerous deep drilled wells in the area during exploration phase, and report that well water was used for washing of samples. According to the account of an elder, the shallow ground water level in the Dugat area was previously such that it was difficult to find a suitable spot for a sheep dip that would not fill up with water.

3.2.2. Dugatiin Dugui

Dugatiin Dugui pasture area was close to Bor Ovoo (about 3 km); it had no well and no spring/zadgai.

Winter: There were no winter camps.

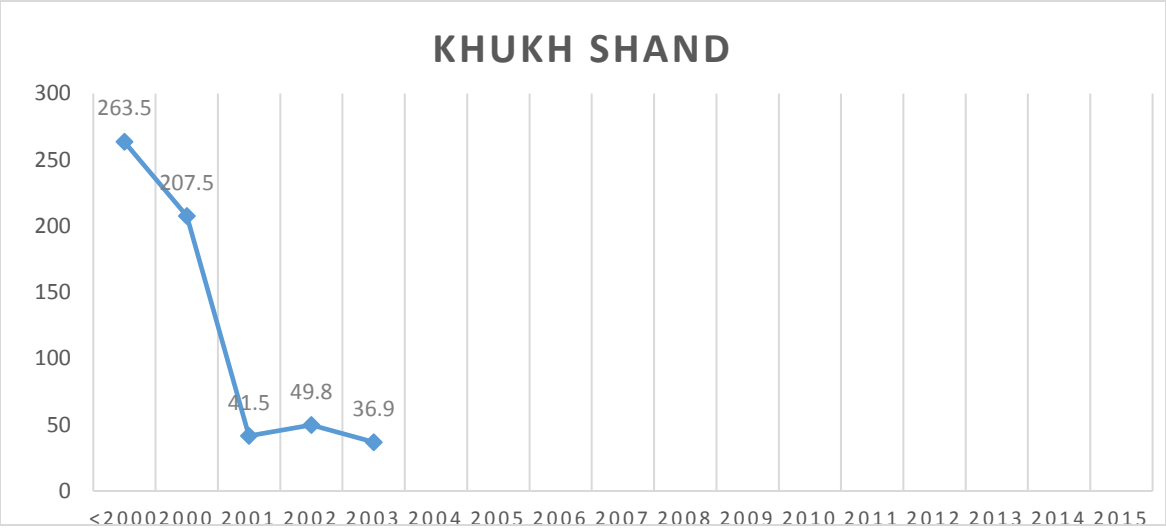
Summer and Autumn: Dugatiin Dugui was part of common pasture, along with pasture areas to the South including Oyu Tolgoi, Vandan Tolgoi, Shunkhat, used by households from Dugat, Gurvan Modnii Haliv and Ulaan Tolgoi (and from other areas depending on weather and pasture conditions). It was important camel pasture.

Since 2003, drilling started, then mining camp was established and camel grazing became impossible. In 2012, the MLA was expanded and the area fell inside the fence. Now the pasture area is not accessible. (FG participants March 30/31, 2016).

[3] Focus group discussion March 30/31, 2016. Participants: P. Tsevegdorj, D. Munkhbayr, B. Erdenejargal, Ts. Tsetsegmaa, D. Tuul, D. Tsendoo, S. Jargalsaikhan, L. Battsengel, B. Oyunerdene, D. Namsrai, B. Namsrai, Ts. Tsagaan, B. Okhunduu, Ts. Amartuvshin, Ts. Khandsuren, Ts. Samdan, B. Oyuntulga

3.2.3. Khukh Shand

Fig. 2: Livestock numbers in sheep units at Khukh Shand including the livestock of T. Purev.



Pasture use in Khukh Shand area:

Winter: T. Purev Purev , with few livestock, was the only household with winter camp at Khukh Shand.

Summer and Autumn: T. Purev also used the area for summer and autumn pasture; he was resettled in 2004, and in 2005 he moved to the Soum center.

Access to and Condition of Pasture and Water Resources:

Khukh Shand pasture area is now inside/close to MLA fence.
Khukh Shand well was assessed by herders as having declined from 4 – 0 (scale of 4 to 0) between 2000 and 2015; they attributed the changes to exploration drilling, road, and quarry in the vicinity.

3.2.4. Gurvan Modnii Khaliv

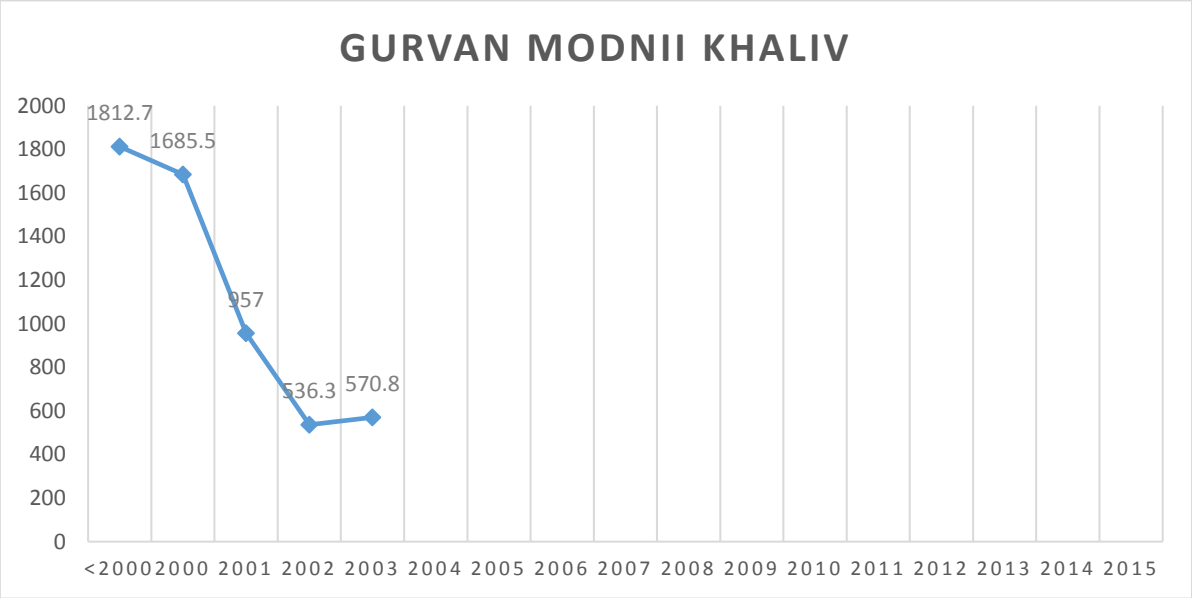


Fig. 3: Livestock numbers in sheep units in Gurvan Modnii Khaliv pasture, including the livestock of Ts. Tsagaan**.**

Pasture Use in Gurvan Modnii Khaliv Area:

Winter: Ts. Tsagaan's winter camp was there. The household was resettled in 2004, and first moved to Shavag area, for one year.

Access to and Condition of Pasture and Water Resources:

Gurvan Modnii Khaliv pasture area is now inside the MLA. Herders' water sources included the Khaliv handwell and the Khaliv "Koltsot" well.

3.2.5. Ust Bag Mod

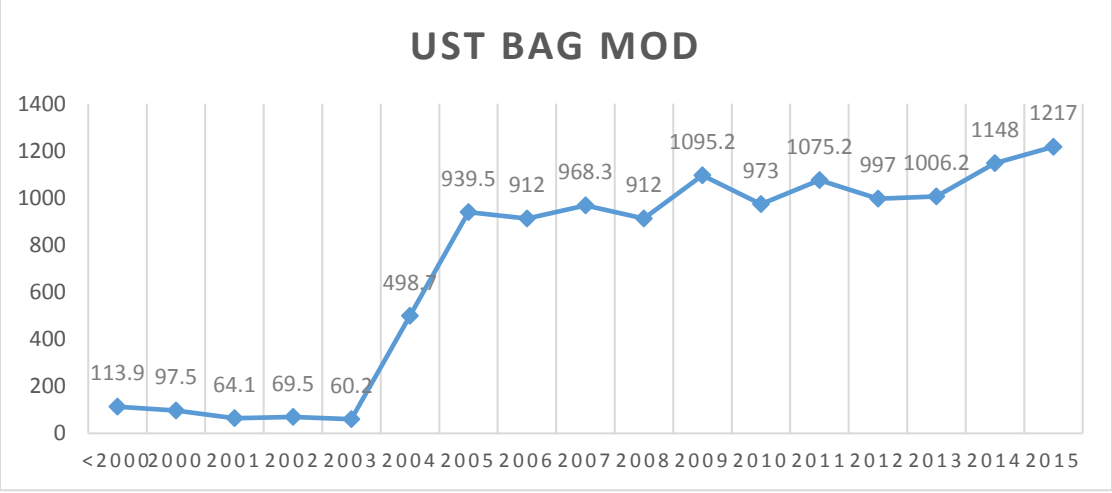


Fig. 4: Livestock numbers in sheep units including the livestock of Ts. Samdan, Ts. Tsagaan, L. Batbaatar, L. Otgonjav, L. Munkhbaatar, L. Nomintsetseg, J. Batmunkh.

Pasture Use in Ust Bag Mod Area:

Winter: Ts. Samdan , used the winter camp with small livestock, his large livestock would graze East of here. Ts. Samdan was resettled in 2004, moved to Soum Center. Ts. Tsagaan used this winter camp between 2005 and 2010. Since 2005, livestock of the households of L. Batbaatar, L. Otgonjav, L. Munkhbaatar, L. Nomintsetseg, J. Batmunkh is also using this pasture.

Summer and Autumn: Ts. Samdan also used the area sometimes in summer and autumn

Access to and Condition of Pasture and Water Resources:

Ust Bag Mod pasture is restricted by MLA fence in the West. To the East, it is bordered/limited by rocky/mountainous area not suitable for grazing. It is effected by dust. Five or more households share pasture here usually.

3.2.6. Ukhaa Ovoo

Fig. 5: Livestock numbers in sheep unit at Ukhaa Ovoo pasture including the livestock of Ts. Khishigchuluun

Pasture Use in Ukhaa Ovoo area:

In the past, during the Negdel time, some households used this winter camp site from time to time; it was not used since 1990 and until Kh. Khishigsuren got a winter camp license.

Access to and Condition of Pasture and Water Resources:

According to herders (FG March 30/31, 2016), 4 households share pasture here now, and the area is restricted/impacted by the MLA fence to the West. It is effected by dust.

3.2.7. Vandan Tolgoi (a hill in Gurvan Modnii Haliv area), Shunkhat (near Bor Ovoo) and Oyu Tolgoi

Pasture Use:
These were common pastures, mainly camel pasture, in the summer used by the herders, who were residing alongside Gurvan Modnii Khaliv and Dugat rivers,, and by the 59 households listed in phase 1 IEP report, whose winter and spring camps were alongside Undai river.
Access to and Condition of Pasture and Water Resources:
According to herders information (FG March 30/31,2016), during exploration phase, grazing here was effected by drilling activities. Sewage was dumped in Shunkhat area during exploration.
Since 2004, these pastures have been inside the MLA.

3.2.8. Khanan Davaa

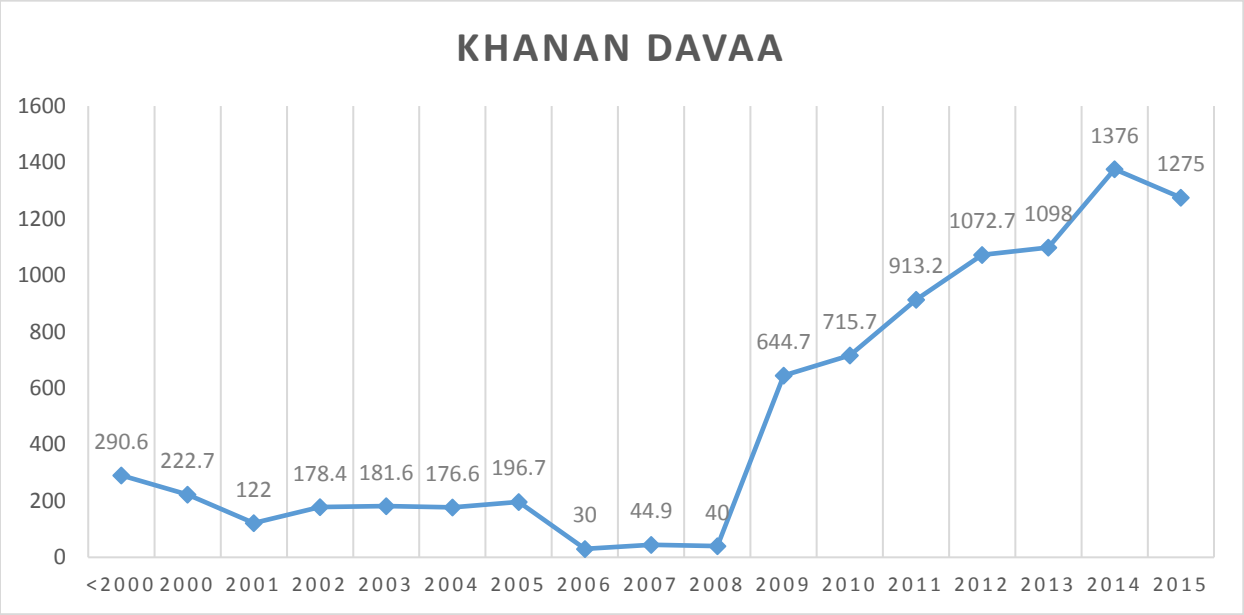


Fig. 6: Livestock numbers at Khanan Davaa including the livestock of M. Bayarsaikhan, A. Ulam-Undrakh, A. Narantsetseg, and of U. Uyanga, U. Tuvshintugs, U. Tsatsralt, and Ts. Shinetumur.

Pasture Use in Khanan Davaa Area:

Khanan Davaa pasture area was used in summer and autumn by a number of households. These included, but may not be limited to, Ts. Munkhtur, M. Bayarsaikhan, B. Erdenejargal, D. Gantogtokh, B. Namsraijav, R. Chuluu, Ts. Tsagaan, Ts. Samdan, B. Erdenebayar, Ts. Elbegsaikhan, Ts. Tumurtogoo, Ts. Nergui, Ts., Khandsuren, S. Jargalsaikhan, D. Choijilsuren, Sh. Ganbat, M. Purevdorj, D. Munkhbayar, D.

Since around 2009, also A. Ulam-Undrakh A. and A. Narantsetseg.have used this area in summer and autumn.

Two households recognized as impacted have moved in, as well as other households that are not recognized as impacted.

Access to and Condition of Pasture and Water Resources:

The pasture area size has been reduced due to infrastructure (powerline, Gunii Kholoi, land for gas filling company, transport companies). The concentrator road passes on the west side, the MLA fence line is crossing the Western part of the area. In the North is the Gunii Kholi powerline. The remaining available pasture has scarcer vegetation, and rocky ground. To the East and South are mountainous areas with predators (lynx, wolf) that limit extension of grazing in these directions. What would be reserve pasture, is now occupied by Gunii Kholoi pipeline and airport.

3.2.9. Mongol Khar and Khar Ovoo

Pasture Use:

There are no winter camps in this area. The pasture areas of Mongol Khar and Khar Ovoo are very rocky areas in the mountains, used as common pasture by households with winter camps in surrounding areas.

These households include: Namsrai, B. (winter camp at Toin Tsokhio), Bayarsaikhan, M. (winter camp at Khanan Davaa), Chuluu, R. (winter camp at Oroin Buuts), Ulziibayar, P., (winter camp at Arshand), Khandsuren, Ts. (winter camp at Aman Us), Erdenejargal, B. (winter camp at Zaraa), Munkhbayar, D. (winter camp at Bor Khoshuu).

Access to and Condition of Pasture and Water Resources:

This area is now impacted by dust - **fine white dust from open pit.** (herders observation). The concentrator road is in West. Impacts are mostly from dust, and also from noise from vehicles.

3.2.10. Toin Tsokhio

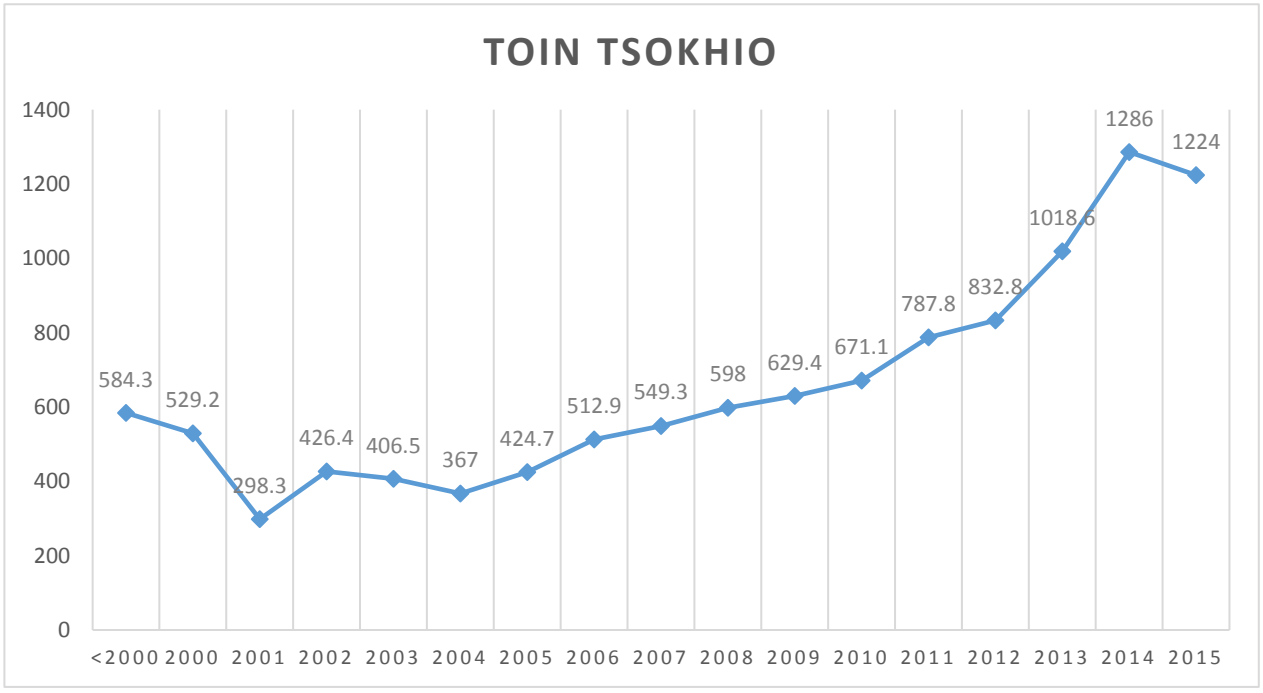


Fig. 7: Livestock numbers in sheep unit at Toin Tsokhio including the livestock of B. Namsrai(jav), G. Shoovdor, D. Gantogtokh, and of B. Boldsukh, U. Erdenebulgan, and T. Chinzaya. **Pasture Use in Toin Tsokhio Pasture Area:**

Winter: B. Namsrai became a herder in 1988 and since then he was/is residing in this area in Toin Tsohio being engaged in traditional animal husbandry.

Summer: G. Shoovdor has been residing in this area (Toin Tsokhio valley) for many years, engaged in traditional animal husbandry, and has a winter camp in "Tuimertiin Khoshuu", 3 km from Toin Tsokhio using water in Toin Tsokhio. G. Shoovdor has raised 10 children who all became herders and lived in the area. G. Shoovdor's household has not been included in resettlement or compensation program. In late 2004, D. Gantogtokh's household was resettled into the area and since then they are neighbors.

These households used the area as summer pasture: Namsrai, B., Shoovdor, G., Erdenejargal, B., Erdenebayar, B., Munkhbayar, D., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Battsengel, L., Mandbayar, L., Baterdene, L., Khandsuren, Ts., Doljinsuren, Yo., Purevdorj, B., Turtaivan, B..

Access to and Condition of Pasture and Water Resources:

When Gantogtokh (and L. Nomintsetseg and Ts. Samdan?) established winter camp here in 2004, it created a shortage of summer pasture for other households. Some households lost their livestock/gave up herding; expecting employment, they moved to Soum Center.

Those moving to Soum center include: Shoovdor Galsankhuu, Erdenebayar, B., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Doljinsuren, Yo., Purevdorj, B., .

According to herders information (FG March 30/31, 2016) several impacted households (*Ts. Samdan, D. Gantogtokh and L. Nomintsetseg)* moved to the area, and every year 3-4 households come to use this area as reserve pasture.

3.2.11. Oortsog

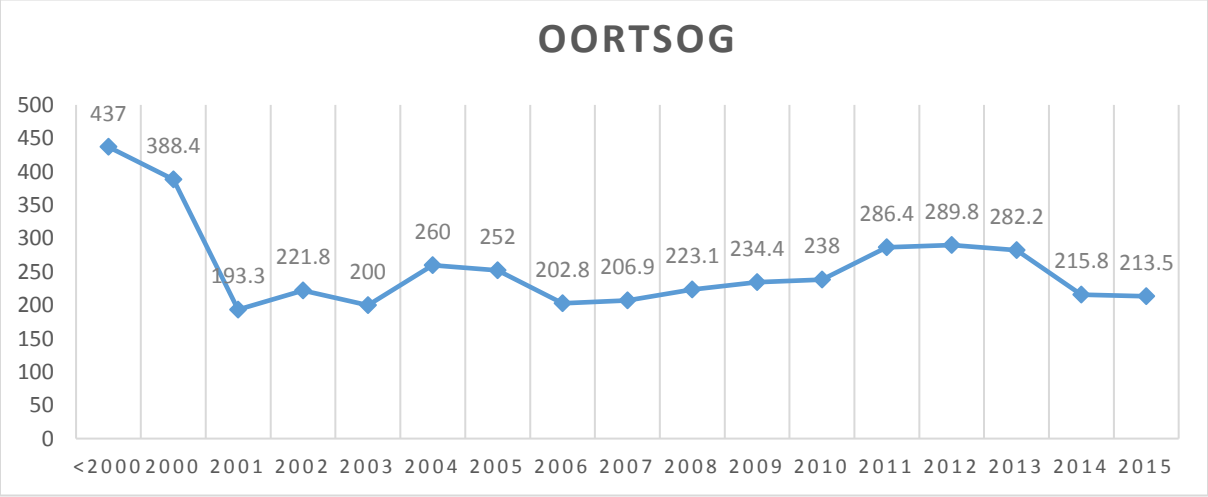


Fig. 8: Livestock numbers in sheep units at Oortsog including the livestock of J. Ulzii-Orshikh, S. Jargalsaikhan and D. Tsenddoo.

Pasture Use in Oortsog Area:

Winter: Ulzii-Orshikh spent winters in winter camp here until 2005, when he moved to the Soum Center. S. Jargalsaikhan had moved before 2004 to an area that is now inside MLA, then was resettled in 2004, and moved winter camp back to Oortsog. OT build new winter camp for his household, and they built themselves another winter camp.

Summer: These households used the area as summer pasture:
Namsrai, B., Shoovdor, G., Erdenejargal, B., Erdenebayar, B., Munkhbayar, D., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Battsengel, L., Mandbayar, L., Baterdene, L., Khandsuren, Ts., Doljinsuren, Yo.,
Purevdorj, B., Turtaivan, B..

Access to and Condition of Pasture and Water Resources:

According to herders (FG March 30/31), three impacted/resettled households were added as pasture users, otor households come through the area. A road is in 1 km distance, it is dangerous for livestock and accidents have occurred.

3.2.12. Bor Khoshuu

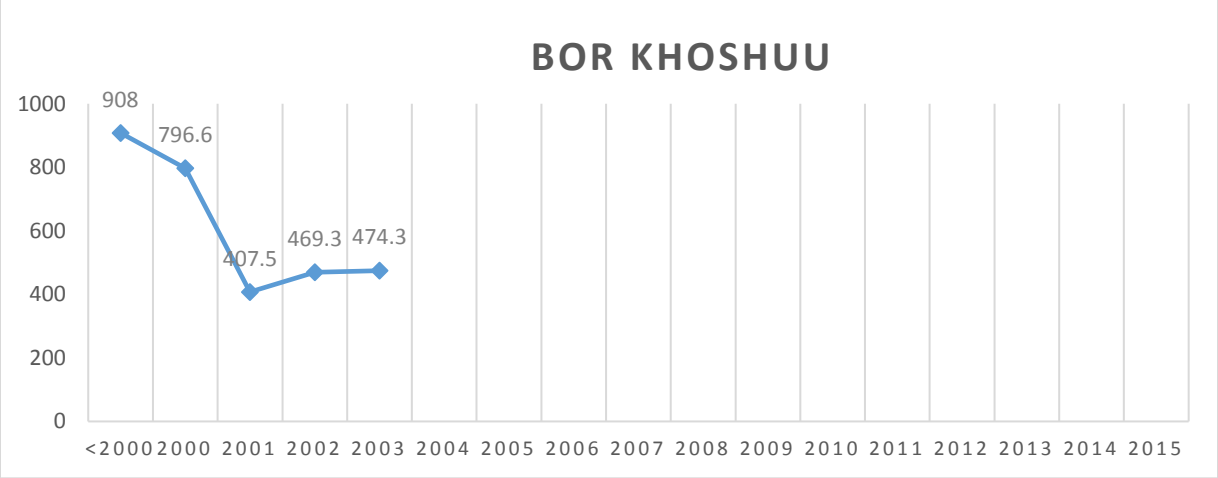


Fig. 9: Livestock numbers at Bor Khoshuu including the livestock of D. Munkhbayr and B. Sugarsuren.

Pasture Use in Bor Khoshuu area:

Winter: D. Munkhbayar and B. Sugarsuren had winter camps until 2004, when they were relocated. Munkhbayar, D. relocated to Khoroot, nearby, where OT provided a deep well. B. Sugarsuren was employed by OT for some time.

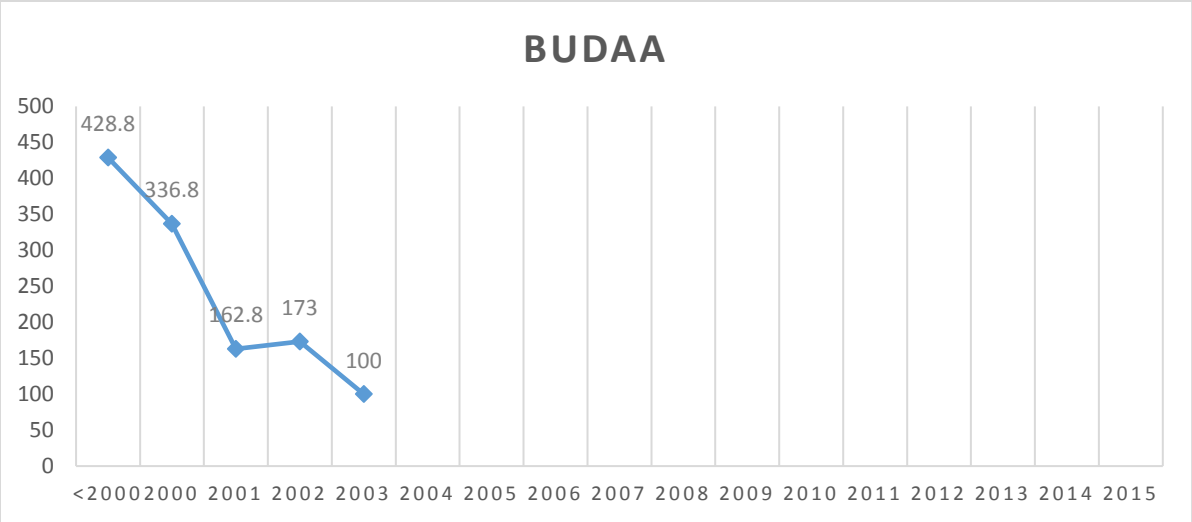
Summer: Munkhbayar, B. used the area also as summer pasture.

Access to and Condition of Pasture and Water Resources:

According to herders (FG March 30/31), otor households come through the area. A road is in 1 km distance, it is dangerous for livestock and accidents have occurred.

3.2.13. Budaa

Fig. 10: Livestock numbers in sheep units at Budaa including the livestock of B. Erdenebayr



Pasture Use in Budaa area:

Winter: B. Erdenebayar's winter camp site until 2004.

Summer: The area is used as summer pasture by Otgonjav. Kh., Byamba, Ts., Bilegsaikhan, D.

Erdenebayar, B, in 2004 relocated to Zaraa, to where his brother Erdenejargal was, and built winter camp in 500 meter distance. Then he moved to Soum Center around 2005

Access to and Condition of Pasture and Water Resources:

According to herders, water source (well) has declined; and is used only very early in the summer for few days now.

The diagrams above depict the decrease of livestock numbers (obviously) in pasture areas now inside the MLA fence or not accessible or of little use for other reasons such as near or directly crossed by infrastructure such as roads, or effected by dust.

On the contrary, remaining pasture areas – namely Khanan Davaa, Ust Bag Mod and Toin Tsokhio are areas where livestock is concentrated – including that of households that were resettled, and households that were not officially resettled but moved/move away from impacts (infrastructure, dust) and declining water sources, and households that use the areas as reserve pasture as previous reserve pasture is occupied by infrastructure developments such as airport and Gunii Kholoi pipeline.

In a similar way as households of the Undai River (see IEP report phase 1) were effected through the loss of Bor Ovoo spring and surrounding summer pasture, households are affected by the loss of access to pasture and water resources in the Haliv Dugat area. The effect is on community level, as the loss of summer and reserve pastures, and the resettlement of some households into other households pastures have disturbed the original system of seasonal pasture use and led to concentration of livestock in remaining areas.

The effects on livestock husbandry include a reduction in seasonal mobility; not only do more families use certain pasture areas compared to previous times but they also cannot undertake moves for summer

and autumn grazing but tend to stay close to their winter camp sites. The case studies of individual households are provided below.

3.3. Household Information - Effects on Herder Households of Haliv Dugat

Provided here is information on the situation of herder households connected to Haliv Dugat pastures, as reported by themselves during focus group discussions and in semi-structured interviews. (more comprehensive narratives are provided in Annex 4)

S. Jargalsaikhan, Used to spend summer in Khaliv Dugat river area. Now spends summer near his winter camp. Before used springs as water source, now water from hand well only. Before used to have 30 large and 250 small livestock, now has 20 large and 200 small livestock. Reduced number of livestock due to lack of pasture. Work load increased since moved to new pasture. Animal wool and milk declined both in volume and quality.

D. Tsendoo, resettled in 2004, but only son's household (the two households were living/moving together) was considered for compensation. Five to six households sharing pasture, therefore pasture access is poor; it is becoming very difficult to raise livestock number. Dust from road and mine site, especially with wind from the West. Water is getting scarce.

B. Namsraijav - three other households that were recognized as impacted (Ts. Samdan, D. Gantogtokh and L. Nomintsetseg) moved into his household's winter pasture at Toin Tsokhio in 2004. His summer pasture used to be at Dugat, now he has lack of summer pasture; grazing livestock to the East in the mountains where they lose livestock to predators (9) young camels in spring 2016).
The household of B. Namsraijav (and his wife Ts. Tsagdulsuren) is considered "not impacted" although they lost summer pasture and other households moved into their winter pasture.

Ts. Tsagaan, resettled in 2004. In 2000, had winter camp in Haliv Dugat area. In Khaliv Dugat, pasture was plenty, animals were used to the place, had a good water source. At the new place in Shavag, there are many winter camps, households and livestock, and insufficient water, pasture pressure is high.
Sharing pasture and water with other households, namely: Mendbayar, Nergui, Narantsetseg, Erdenejargal, Undrakh, Bayarsaikhan. Used to spend summer and autumn in Bor Ovoo, Tsankhi, Khuren Khoshuu and Dugat. Now spends summer nearby winter camp.

M. Bayarsaikhan, winter camp at Khanan Davaa; now effected by dust, roads that fragment pastures, loss of pasture through infrastructure development. Now sharing pasture with 5 other households. Lost summer pasture to airport.

B. Erdenejargal; resettled households moved their winter camps into his summer/autumn pasture at Toin Tsokhio; now he spends summer at his winter camp.

Ts. Samdan, household was residing at Ust Bag Mod in 2000, now winter camp is at Ikher Khondon. Relocated by OT, but compared to their previous winter camp, current one is very poor, not enough pastureland to graze livestock. Surrounded by 4 other families: Mungunshagai, Nasmrai, Khandsuren, Gantogtokh. Summer and autumn pasture was at Khaliv, Dugat, Bor Ovoo and Bumbat. Now staying around winter camp during summer and autumn.

D. Munkhbayar, (resettled in 2004). Was residing at Bor Khoshuu in 2000, moved to Khoroot because of dust caused by OT. Compared to previous camp, the current camp has not much pasture, and roads are fragmenting the pasture. They share pastureland with 3 other families: Jargalsaikhan, Khandsuren,

Tsagaan. To the East, there are many households, so cannot expand grazing to there. Summer pasture used to be at Bor Ovoo, Budaa and Dugat. Now they use winter pasture for summer grazing. Cannot increase livestock anymore because of lack of pastureland.

Khandsuren Ts. and Okhunduu, B. Reside at winter camp at Khairtsagt Aman Us since 2000. Have not been relocated, but others moved in and pasture and water became very scarce, making everyone's life difficult. Currently they have 5 neighbors, sharing pastures with Munkhbaatar, Namsraijav, Samdan, Tsagaan and Jargalsaikhan. Summer and autumn pasturelands are now inside OT's fence, including Khaliv, Bor Ovoo and Ukhaa Ovoo. They used to spend the summer at Khaliv, Ukhaa Ovoo and Bor Ovoo, these areas served as reserve pasture Their children's winter pasture's water source is now also inside OT fence, therefore all the childrens' livestock is also in their winter camp area.

The household of Ms Khandsuren, Ts. and Mr Okhunduu, B. was compensated in 2011, for the OT road impact. They feel however, that they are also impacted by OT itself (MLA/mine site) and as a result have a lack of pasture and water. They anticipate that the impacts will continue to grow more severe and difficult. They report to never have never received the tuition payment. They have a contract for road cleaning but are not planning to renew it. Sons of Khandsuren and Okhunduu:

- Mr. Khishigchuluun was 1 km from the MLA fence (Haliv area, Khaljun Khuvur); he cannot use it now due to noise, lack of water and pasture. The water source was the Haliin Us well, now located inside the fence. He is not being considered for compensation.
- Another son's winter camp was near Ekhiin Serun (near the Big Ger of OT); he is also crowded by other households (example Jargalsaikhan); he gave up herding, and left his livestock here.
- Two more sons also gave up herding, while leaving their livestock with family members. Therefore, there are now livestock of 4 families here.

Tsagaan P.

Was residing at Dugat in 2000, winter pasture at Ergen Us. Winter camp site fell inside MLA and P. Tsagaan was relocated. Pasture in the relocation site is not suitable, as there is pressure by many households and livestock. Before, she used summer and autumn pastureland at Oyu Tolgoi, Bor Ovoo and Bumbat area, now has no summer or autumn pasture. Before had 180 small and 5 large livestock (camels), no livestock at the moment (lost due to bad pasture, moved from mountainous pasture to valley and livestock could not adopt, water was not sufficient, there was no shelter for livestock to withstand stand harsh weather)

Gantogtokh D(amdin)

Used to have a winter camp at Khukh Uzuur in 2000, moved to Toin Tsokhio in 2004. Was relocated because camp fell inside OT licensed area . Current pasture is used by many herders' households. Used to have summer and autumn pastures at Dugat. Now has no summer pasture. Used to use hand well at Dugat, now uses the deep well at Toin Tsokhio. Now herding small livestock, horses and camels, livestock number has increased. Labor and expenses have increased (buying hay/fodder etc.)

Tuvshintugs Tsevegdorjiin

This household is from further South (Gashuun Sukhait is border crossing point). They bought a winter camp in Haliv Dugat area, now experiencing pressure as other households use same pasture. 5 families are sharing pasture: Khandsuren, Ts. Tsagaan, S. Jargalsaikhan, B Togoo etc. Reports that pasture and source of water decreased during construction of improved road by OT."

Munkhbaatar Luvsandagva

Has winter camp with license under his name, at Ust. He unsuccessfully applied for job at OT. Herding his livestock with his mother. After he bought winter camp at Ust, OT developed the road to Gashuun Sukhait (3 km distance), and the dust and noise from construction and trucks effected herding, and destroyed a large portion of pastureland with big vehicles. A sand quarry in only 800 meters distance from winter camp was established covering about 600 hectares of land, and creating a deep hole (20-30 meter deep). The household has received no compensation for the damages nor did he get employment.

Mrs Dolgorsuren

In 2005, spent winter at winter camp Khukh Khad. This winter camp was under her son's Namsrai's name, but several families were living here. In 2005, Namsrai moved out (OT relocation). OT considered only Namsrai as the holder of the winter camp certificate for compensation. Therefore, his mother Dolgorsuren was not considered. She was only registered as co-user but did not hold a certificate.

Now, in 2015, she has hired a herder, and made winter camp at Baishand (at Budaa gol) where spring camp used to be, and winter camp certificate was issued later for there. It is now used by the younger son, for camel grazing. The livestock of Dolgorsuren and her son, herded by the hired herder, grazes at both Khukh Khad and Baishand, wherever there is grass. Sometimes, when Baishand is overcrowded, the livestock is brought to Namsrai's current area.

Current winter pasture type/quality is ok, but there is too many livestock. Khukh Khad area previously was used by two households (Namsrai and mother Dolgorsuren). Now, Baishand area is being used by Odgairig, Tuvshintugs, Namsrai, and Khurlee.

The summer pasture before was plenty, and shared by many households. It included the pasture areas of now MLA including Bor Ovoo, and Haliv Dugat area, both now inside and near the fenced area. Summer pasture now is South of the MLA fence and around winter camp. Camels go to Tsankhi or Budaa. Small livestock stay around winter camp mostly. As for the quality of summer pasture – carrying capacity and quality have decreased now. The pasture in the North was much better/suitable, with more nutritious plants. Haliv Dugat area was very good, with high yield and nutritious. Further South, it is more desert.

Mrs. Dolgorsuren used to have 200-300 livestock, now she has about 50. There are several reasons: a) livestock was divided among children, b) there is not enough pasture and water and she adjusts the number of livestock to the carrying capacity, c) reproduction rate is not so well. The yield of milk and wool is reduced – before cashmere yield was about 1 kg/goat, now it is rather 700-800 grams/goat. Camel wool yield is the same as before.

Mrs. Tseesuren, M.

Mrs. Tsesuren's winter camp used to be at "Dugat Khuren Del", using the Dugat well. Following requests, she relocated to "Builsen Khovor", together with two sons who shared the winter camp site. Only one household was recognized as impacted; she feels to have signed the agreement under pressure. "Builsen Khovor" was near airport, and many vehicle tracks crossed the pasture, close to the ger. A drilling company was located close by. The well constructed at the relocation site by OT fell dry after 2-3 years. She moved to the Soum Center in 2007/8.

Tseesuren's comments on changes in water resources: There was always plenty of shallow ground water. During the 1990ies, it was difficult to find a place for a sheep dip, because water would come up at many

places the vet tried to dig a sheep dip. By 2010, water in wells and zadgai was gone; first, the levels in wells started to drop, and then all springs dried up.

Mr. Bilegsaikhan

Mr. Bilegsaikhan's winter camp used to be at Khar Tolgoiin Hand at the Undai River, but he would spend summer and autumn in the Haliv Dugat area. Since 1996 he lived like that. He had been just newly married, and had no license for the winter camp, which was just established. He saw a lot of bore hole drilling, and he felt that the area may not be suitable anymore for livestock herding. Bor Ovoo was the main water source.

In 2000, the pasture was good in Dugat, but the conditions were bad, with much drilling activity. Bilegsaikhan moved away to find suitable conditions to pursue livestock husbandry, to the Northern part of Gavilud Bag, and he stayed there for one year until 2001. Then, he moved to Gurvan Shavagtai, 30 km from the Soum Center. He was there for 7 years (2001 – 2006). In 2007, he got a winter camp license for his place that he called "Uzuriin Khand" in Shavagtai. Due to conflict with neighbors, he moved 2 km away in 2006, and was there until 2013. Six households were using one well there (Shavagtai well). In 2015, he moved to the Soum center.

Bilegsaikhan's winter camp establishment at the Undai fell between the registration of the Socialist times and the new licensing practice. He was young and just newly married. Because he had no certificate for his winter camp at the Undai, he was not considered for compensation.

Ms. P. Onon, and husband G. Mendbayar

Their winter camp used to be at Tsankhi, from about 1993 to 2002. At that time, there was lots of pasture, and four households shared the camp site. They could pasture the livestock to the West. In 2003 they moved to Ikh Gerlan, to have their own winter camp; they repaired the winter camp that used to be Ts. Nergui's. In summer and autumn, they used Haliv Dugat pasture areas.

The Haliv Dugat area had good vegetation, and was summer, spring and autumn pasture. In the socialist time, many livestock management activities, such as treatment for parasites and categorizing, was done there. In 2004, they wanted to settle in Dugat area, but it was not allowed anymore.

In 2011, the household was considered impacted, and hired as garbage collectors under a year contract. The husband got sick. (the contract will be extended). Onon states that they "really need a particular activity that will provide a sustainable livelihood."

Mrs. Nergui

Mrs Nergui has two daughters, one is a herder, the other is unemployed. Nergui states that as long as there is a shortage of pasture and water, they need to limit the livestock numbers. Therefore they need compensation to maintain a sustainable livelihood.

L. Mandbayar

Used to be at Khuren Del well, 4 families altogether. Pasture and water was good for herding. In 2004, winter camp license was issued, in the mother's name, as four households were considered one family. He had to move out and lost many livestock. He went to Ulaanbaatar and took different jobs, such as guard. He has nothing and was not considered impacted. He is still in Ulaanbaatar with his family. He would like to be considered impacted because he lost land and livelihood to OT. If OT was not there, he and his brothers would be herders.

Erdenebayar, B.

Erdenebayar's winter camp was at "Modod Tsankhi" hill (Khuren Khoshuu camp), now in the NE corner of the MLA, 400-500 meter from the fence line.Since 1993, Erdenebayar had built a shelter and dug a handwell. At that time, there was no shortage of pasture, and herders were able to increase livestock numbers. Erdenebayar spent winters at this camp until 1999. In 1999, rainfall had been scarce, therefore in the 1999/2000 winter Erdenebayar moved eastwards, where he spent two winters. In 2001/2 he returned to his Khuren Khoshuu camp. Around 2003, he moved to stay with his sister, in 4 km distance at Bor Khoshuu. (there were small children, and it was better if two families camped together, so the children would not be alone when somebody was out herding livestock).

In 2004, two children of Erdenebayar were already in school and his wife lived with them in the Soum center. Erdenebayar's livestock was at his sister's place, and he was going back and forth between Soum Center and his livestock grazing area. His own winter camp may have looked abandoned. He was not covered by the initial study on relocation/compensation, but was informed he could not use his winter camp anymore. Erdenebayar requested help from OT to build winter shelter elsewhere, a shelter was built at Tsaragiin Borkhant. It was only a wooden fence (half moon shaped), and a "summer house", but he still received no compensation and no resettlement contract. He had 200-300 livestock at that time, and possibility to build a livelihood as herder if there had been pasture and water.

Today (March 2016) he has 40-50 small livestock, 4 camels and 17 horses. He has relatively more horses and camels than small livestock, because now the "summer house" area is being impacted by the Gunii Kholoi power line and the pipeline, in 40 meters distance. In 500 meters distance is the OT supply road (OT-Manlai-UB). The road is very close/on top of his well. To the West, in 4-5 kn distance, is the airport. It is almost impossible to pasture livestock, as they have to cross the road. In 2011, Erdenebayar was finally considered impacted by Gunii Kholoi infrastructure.

Purev, T.

Spent his whole life until 2004 at winter camp site Khukh Shand, resettled in 2004 to Toin Tsokhio, together with son in law Gantogtokh. Purev moved to Soum center 7 years ago, Gantogtokh (who now works for OT) is still taking care of Purev's livestock.

3.4. Households effected in Haliv Dugat Area

At least 10 households used **summer pasture** regularly in the Haliv Dugat area. The "regular" ones included**: Badamsambuu, Jargalsaikhan, Dolgorsuren, Tsagaan, Ts., Bandi, Iderborgil, Namsrai, Odgairig, Tuvshintugs, Khurlee.**

Also, the households of children of these "regular" households, used Haliv Dugat summer pasture, as well as others who came on a less regular basis, when the summer pasture elsewhere was not so good. Those latter ones would stay only about 20 days. (information by Mrs. Dolgorsuren)

Households that lost summer pasture/access to summer pasture in Haliv Dugat area include (information based on focus group discussion, the list may not be complete) also:

Bilegsaikhan, Iderborgil, Surenkhorol, Enkhchuluun, B. Erdenejargal, Ts. Elbegsaikhan, G. Mendbayar, Ts. Nergui

Plus further households that had winter camps in the area (in 2000):

M. Tsesuren, L. Battsengel, L. Mandbayr, L. Baterdene; P. Tsaagan, T. Purev, D. Gantogtokh, , L. Nomintsetseg, Ts. Sandan, Ts. Tsaagan, Kh. Khishigchuluun, Ts. Khandsuren, Kh. Khishigtsogt, B. Namsraijav, B. Jargalsuren, D. Munkhbar, G. Mendbayr, I. Sumiya, G. Shoovdor

Household residing in Ekhen Haliv area, to the north of Haliv Dugat area, are also effected by loss of summer pasture/access to summer pasture in the Haliv Dugat area. These include:

D. Tuya, M. Purevdorj, J. Myadag, Ch. Demberel, Sh. Ganbat, Ts. Tumurtogoo, Ts. Munktur, Ts. Nirgui, Ts. Elbegsaikhan, G. Mendbayr, A. Narantsetseg, U. Nandintsetseg, Ts. Tsagaan, A. Ulam-Undrakh, U. Tsatsralt, U. Tuvshintugs, M. Bayarsaikhan, B. Baatarchuluun

3.5. Households and Livestock Numbers

Khanbogd Soum has experienced a significant overall increase in livestock numbers in the last decade. Official records[4] state 53.346 livestock for 2003, and 133.013 for 2015, representing a 149 % increase. Javkhalant Bag during the same period experienced an 130 % increase. [5]

For 16 households of Haliv Dugat, the overall increase in livestock between 2003 and 2015 was 60 %, significantly lower compared to the Soumwide increase in livestock numbers. The calculation is based on complete data sets from the Soum archive, for such households that already had livestock in 2003 and still had livestock in 2015. Not included are several households that gave up herding after 2004, and had no livestock registered any more under their name after that. Existing data, and responses by households met in Haliv Dugat area suggest a trend that households effected by restricted pasture areas will convert to herding more small livestock and reduce the numbers of large livestock, as well as adjust the overall herd size and growth to the available pasture and pasture productivity and suitability For the 12 Haliv Dugat households studied, the number of large livestock increased by 44 % between 2003 and 2015 (compared to a Soum wide increase of 117 %). The number of small livestock of the 12 households increased in the same period by 117 % (compared to Soumwide increase of 162 %) Annex 2 provides a table with the livestock numbers 2003 and 2015.

The data on livestock in Haliv Dugat area suggests that it is not simply livestock increase of local households that is the major driver of pasture pressure and degradation, but the reduction of the available pasture areas is a key factor exacerbating pressure on available pasture.

3.6. Summary of Cumulative Impacts in the Undai River Basin

Both MDT Component 1 report and IEP phase 1 and 2 have referred to the additional impacts, besides Undai river and Haliv Dugat river diversions and TS, that exacerbate effects on herders.

[4] Statistics provided by Khanbogd Soum government officers 2016
[5] Statistics provided by Khanbogd Soum government officers 2016

In summary, the impacts are:

- Undai River Diversion - Creation of artificial water source (pipeline outlet). Loss of Bor Ovoo water source with original qualities and of access to summer pasture, permanent, beyond mine life.
- Haliv Dugat River Diversion - Drainage altered, potential impacts on surface runoff, shallow groundwater or evaporation
- Tailings Storage Facility - Tributary channels of Haliv Dugat river filled, permanent. Seepage/leakage, and likely contamination of water sources. While contamination effects are less severe in arid environment, and currently seems contained within MLA, the integrity of water quality/safety is compromised.
- Open Pit - Permanent destruction/loss of land, cone of depression of ground water long term. Open pit will fill with water; cone of depression will develop further as pit deepens, eventually reverse (long term)
- Roads and quarries - Dust on pastures. Lack of adequate culverts effects surface drainage. Fragmentation of pastures, permanent. Risk to livestock (and people).
- Crusher - Spread of white dust to pastures (depending on operation times/wind direction), for the duration of mine operation
- MLA fence - Cutting off access to water, pastures and cultural sites. Enhancing safety of mine operations. For the duration of mine operation, and beyond.
- Waste Rock Dump- Pastures lost/destroyed, cultural/spiritual sites inaccessible (Bor Ovoo) or permanently damaged (Oyut Tolgoi, Shunkhat, Vandan Tolgoi).
- Underground Mine - Groundwater drawdown/ cone of depression, long term. Subsidence, loss of land/pasture, permanent.
- Gunii Kholoi/Pipeline - Loss and fragmentation of pasture land, long term.

These impacts are further exacerbated by developments not related to OT, such as the railway construction, and the "coal road". To quantify the contributions of impacts by different actors is not tenable, as they vary significantly depending on location. Closer to the MLA, the OT contribution obviously is higher; in other areas, households are much more effected by the coal road or the railway, and a lack of data for example on water use by the railway construction in recent years, prohibits quantitative assessments.

In summary the effects on herders are:

The cumulative effects on herder household level include i)) reduction of available pasture area size, fragmentation of pasture, increased pressure on remaining pastures, pasture degradation, ii) changes in herding practices (small vs large livestock, fewer seasonal moves, forced to graze livestock in less suitable pastures and areas with higher risk of predation), iv) decreased productivity of livestock, v) higher costs and increased workload of herding, vi) emotional stress (conflicts, uncertainty of livelihood, loss of identity, loss of ability to pass on land, livestock and tradition to next generation.

On community level, effects include i) reduction of available pasture area size, fragmentation of pasture, increased pressure on remaining pastures, pasture degradation, ii) disturbance to herding system on community level, (Undai Basin and beyond) iii) loss of cultural values (Nutag, communal herding in summer pasture, lost access to spiritual sites, iv) increasing conflicts over pasture and water among herders.

The impacts, and the responses to avoid and mitigate need to be put into the context of climate change and country wide developments such as increasing livestock numbers. While increase of annual mean temperature (mostly through warner winter averages) is a key climate change feature throughout Mongolia, there is no drying trend in the Gobi; rather, precipitation has slightly increased. Increased frequency and severity of extreme weather events, such as drought and dzud, is a projected climate change impact that will further increase the vulnerability of rural communities.

The preservation of water sources and appropriate measures in watershed management are a priority to reduce the vulnerability of communities to climate change impacts, and are government policy. The IFC Good Practice Handbook on Cumulative Impact Assessment defines as a key task to discern how the "potential impacts of a proposed development might combine, cumulatively, with the potential impacts of other human activities and other natural stressors such as droughts or extreme climate events" (page 21)[6]. Following this approach, impact assessments and management (avoidance and mitigation) need to take into account the cumulative effects on vulnerable communities – how under a changing climate, the project effects are additional pressure on communities - and plan avoidance and mitigation accordingly.

The study on livestock numbers in Haliv Dugat area showed that increase of numbers is less than half of the rate of increase Soum wide; it is therefore not a main driver of pasture impacts in this area. Livestock policy on national level needs to address the country wide increase in numbers.

In the face of the impacts and risks, livestock husbandry continues as households are adjusting their strategies, local government provides support and OT is responding with assistance to development of livestock and non-livestock livelihood strategies. The viability/sustainability of herders' resources to maintain traditional livestock herding as practiced before the project however is permanently compromised in the Undai River basin.

4. Recommendations

The MDT Report, Component 1 and 3 (Component 2 was not available yet at the time of preparing this report) have made recommendations regarding compensation, and additional data collection, monitoring and studies.

In general, IEP supports all MDT recommendations. To the MDT- Component 1 recommendation on water point development soumwide, IEP adds that wildlife/biodiversity – livestock conflicts be considered, and comments that not all apparently available pasture is indeed suitable for grazing.

In addition, some specific comments and recommendations are provided here:

In line with recommendation in MDT Report Component 1, local government needs to re-establish a grazing system, to adjust for the lost pasture areas. This is a very difficult task, as key pasture areas (summer pasture) have been lost forever. While there may a large territory, not all is suitable pasture due to the terrain and vegetation type.

Local government (Soum and Aimag) should be supported by central government in these efforts by providing national experts and training; it will be important to increase ownership of this efforts – herders, local organizations, and government on all levels (Bag, Soum, Aimag, central government,

[6] IFC 2013: Good Practice Handbook, Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets.

and relevant professional agencies) need to carry this effort, as opposed to external actors (OT, foreign experts).

While TPC has a crucial role in bringing stakeholders together, it is important that the existing institutions and structures of community and government are the key actors (i.e. bag meetings, bag representative khural, Soum khural etc., livestock unit, annual land use planning procedure etc.).

ALAGAC undertakes 5 yearly assessments in each Soum, using professional organizations as sub-contractors. ALACGAC could provide professional support in the process of planning an "adjusted" grazing system in Khanbogd Soum. ALAGAC (Agency for Land Affairs, Geodesy and Cartography) has recently introduced a process of identifying resource use rights and planning land and resource use with local government aiming at documenting and securing customary use rights of herders.

The issue of loss of local community's "Nutag" and of spiritual values remains. These losses will have to be addressed separately.

Support for these programs could be provided from revenue generated through OT (taxes to central government, cooperation fund at Aimag level, others); the lender (IFC) could provide additional support while promoting local ownership of the process of planning and implementation.

More detailed knowledge and transparency is needed on the increase of livestock. The IEP phase 2 study (and the previous CPR studies, 2012) suggest that effected households (both the officially recognized and those considering themselves effected) are mostly not the cause of significant livestock number increase; or that the rate of increase is much less than average. Rather, in general, they are adjusting their livestock number and type. The question of absentee livestock ownership in particular should be further investigated, in order to get a better understanding of the growth of livestock numbers and pasture pressure.

Regarding baseline data on ground water: MDT Report Component 1 refers to the lack of baseline data to establish impacts on alluvial water through connectivity of deep and shallow aquifer. IEP has noted earlier that no records on abstraction prior to 2007 are available. IEP has also made efforts in phase 2 to locate and access data, at local government and the Ministry for Environment and Tourism, but was informed that the data do not exist (at local level) or cannot be shared (by experts at the Ministry). Under this circumstance, experts cannot quantitatively assess impacts over time; in order to make progress, existing data need to be made available.

Review the categories of effected households, and consider inclusion of a) households that were not recognized as impacted so far , that have lost access to any seasonal pasture (winter, or summer/autumn pasture), b) experienced increased pressure on their pasture as others moved away from impacts and into their pastures, c) households that had shared a winter camp site and only one household was recognized, d) households that had winter camps (in MLA, exclusion zone) temporarily not in use because of family circumstances, e) households whose winter camp was recognized by the community and customary rule, but not formally licensed

Names of households effected in different ways as outline above were provided in this report to the best judgement of the expert, though the list is not considered complete. The names are provided based mostly on information received in group discussions, with consensus of discussants. A review of the names is recommended, by a team of individuals elected by TPC (or through a process with broader participation).

Organize discussions with households named in this report on livelihood support strategies (similar to consultations with 59 households after IEP Phase 1 report)

Assess options for fodder growing/production (lessons learnt, information available from programs implemented in other Soums in South Gobi, Uvurkhangai and Bayankhongor). OT to rehabilitate any disturbed/abandoned sites as soon as possible, in order to make pasture available again as soon as possible, to shorten time of dust generation from disturbed sites and minimize risks of accidents the case of quarries. This recommendation is general, not referring to particular sites.

5. Annexes

Annex 1 - Activities during Field Visit to Khanbogd Soum, March 28 – April 1, 2016
Annex 2 a) -Haliv Dugat Pastures, Households and Livestock between 2003 - 2015
2 b) Increase of livestock in Khanbogd Soum and Haliv Dugat pastures between 2003 - 2015
Annex 3 and 4 – Questions/Issues of Semi-Structured Interviews and Household Information
Annex 5 – Records of Group Discussions and Mapping, March 30-31, 2016, Herders' Perceptions
Annex 6 – Photo Documentation, Field Visits March 28 – April 1, 2016 and June 7-8, 2016
Annex 7 – Activities during Field Visit to Khanbogd Soum, June 7-8, 2016
Annex 8 - Information on Ekhen Haliv Households, and Herders Perceptions of Impacts and Changes to Pasture and Water Resources

Included also: Up-dated Annex 5 of IEP Phase 1 Report, with corrected list of household names

Annex 1 – Activities during Field Visit to Khanbogd Soum, March 28 – April 1, 2016

The objectives of the field visit were to a) jointly with TPC members/representatives gather/confirm information on impacts in Haliv Dugat river basin, b) develop a common understanding with TPC members/representatives on approach to assess "cumulative" impacts on the Undai River basin, and c) jointly gather information to assess impacts and effects on herders' pasture and water resources in Haliv Dugat areas.

Activities included:

1. OT site visit, particularly to TSF and seepage area, and to the upper reaches of Ust Bag Mod River, the Gurvan Mod Haliv River, and Haliv and Dugat Rivers. Photos of the sites visited, and impacts on surface drainage such as sand pits/quarries, and diversion channels, are provided in Annex 6.

2. Meeting with TPC members to discuss approach/methodology of field visit, and develop a common understanding of approach to "cumulative impacts". An approach based on the definition in the Mongolian Law on EIA and in the IFC Best Practice Handbook on Cumulative Impact Assessments was proposed. **It is outlined below in Annex 2; there were no objections to apply this approach by the meeting.**

3. TPC members agreed that Battsengel and Namsrai would assist in identifying of households from Haliv Dugat area for individual interviews and group meetings, and in logistics for the meetings.
   Day 3 – 4 were spent with individual meetings, and a group meeting with 16 households still residing in the vicinity of Haliv Dugat, and a meeting with households that formerly resided in the area but now have discontinued livestock herding.

   Participants in group meeting and interviews included:
   a). Herders in Haliv Dugat area: B. Namsraijav, Ts. Tsagdulsuren, D. Munkhbayr, B. Oyunerdene, Ts. Khandsuren, Dolgorsuren, Tseesuren, P. Tsevegdorj, D. Munkhbayr, B. Erdenejargal, Ts. Tsetsegmaa, D. Tuul, D. Tsendoo, S. Jargalsaikhan, L. Battsengel, B. Oyunerdene, D. Namsrai, B. Namsrai, Ts. Tsagaan, B. Okhunduu, Ts. Amartuvshin, Ts. Khandsuren, Ts. Samdan, B. Oyuntulga;
   b). Herders formerly in Haliv Dugat area, now in Soum Center: B. Bilegsaikhan, P. Onon, Ts. Nirgui, L. Mandbayr, P. Tsagaan. (also introduced to Mr. T. Purev), Erdenebayar (TPC); c) . TPC members: Battsengel, L. (TPC Chair), Namsrai (TPC), Battogtokh (TPC).

   Key issues addressed in semi-structured interviews included: changes and reasons for changes in campsite locations, seasonal moving patterns, pasture condition, suitability of pasture, livestock productivity, and livelihoods. Issues and questions addressed in semi-structured interviews are listed in Annex 3.

   The following pasture areas were discussed: Dugat, Khukh Shand, Dugatiin Dugui, Haliv, Ust Bag Mod, Ukhaa Ovoo, Vandan Tolgoi, Shunkhat, Oyut Tolgoi, Khanan Davaa, Mongol Khar, Khar Ovoo, Toin Tsokhio, Oortsog, Bor Khsohuu, Budaa.

   The following water sources were discussed: The following water sources were discussed: 1. Wells: Dugat, Khukh Shand, Shand (Mukhar Ergiin), Koltsog (Khalivin), Khurai (dried up 1998), Haliv, Bor Khoshuu, Koltsog at Bor Khoshuu (not used since 80ies), Oortsog, Erguleegt (Khaliviin), Tesget (dried 1999), Aman Us, Ulaan Khudag, Toin Tsokhio 1, Toin Tsokhio 2; 2. Zadgai/Springs: Dugatiin Zadgai, Khajuukhoovor, Budagiin Zadgai, Oortsgiin Bulag, Bor Khoshuuni Bulag.

   Responses by interviewees, including their own written responses as well as notes recorded by the consultant, are provided in Annex 4.

The process of the focus group discussions, and the visualisations (map and table) produced by the discussants on the water sources of the Haliv Dugat area, and perceived changes over time (2000 – 2015) in resource condition are provided in Annex 5.
Photos taken between March 28 and April 1 of sites and meetings are provided in Annex 6.

4. Brief meetings with the Head of Livestock Unit (Khurelbaatar), Vice Governor (Otgonjargal) and Environmental Inspector for data/information sharing.
5. Wrap-up meeting with TPC members.
6. Meeting with Mr. Munkhbayar (OT, Participatory Monitoring) to discuss monitoring methods on pasture, water, dust, elm and saxaul, and available data by sub-contractors namely Nutag Partners and Wildlife Conservation Society.

Annex 2

2 a) Households and their use of Haliv Dugat pastures 2003 – 2015

Households with Winter Camps in Pasture Areas of Gurvan Modnii Haliv-Dugat																
Dugat Pasture Area. Water Source: Dugat well																
<2000	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Battsengel, L	Battsengel, L	Battsengel, L	Battsengel, L	Battsengel, L												
Baterdene, L	Baterdene, L	Baterdene, L	Baterdene, L	Baterdene, L												
Mandbayar, L.	Mandbayar, L.	Mandbayar, L.	Mandbayar, L.	Mandbayar, L.												
Tsagaan, P.	Tsagaan, P.	Tsagaan, P.	Tsagaan, P.	Tsagaan, P.												
Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.												
Nomintsetseg, L.	Nomintseteg, L.	Nomintsetseg, L.	Nomintsetseg, L.	Nomintsetseg, L.												
Nergui, Ts.	Nergui, Ts.	Nergui, Ts.	Nergui, Ts.	Nergui, Ts.												
These 7 households were resettled in 2004 - Battsengel to Tsagaan Shivee, Baterdene to Ulaan Khoshuu, Mandbayar went to Ulaanbaatar, Tsagaan to Oroin Buuts, Gantogtokh to Toin Tsokhio, Nomintsetseg went to work for OT and left livestock with parents, Nergui to Ulaan Ovoo.																
Battsengel (and Baterdene and Mandbayar) still have a spring camp in Dugat, this has been used a little bit by others - in 2014 and 2015 by Badamsambuu for 2 weeks, and in 2016 by Adiya for 10 days.																
Before 2000, a number of households used Dugat for summer and autumn pasture. These include, but are not be limited to, Badamsambuu, B., Adiya, D.,																

Bandi. S., Bayaraa (son in law of Bandi)

Chuluunbaatar, Kh., Surenkhorol, N., Mendbayar, G., Tsagaan, Ts. Sometimes, and also the 7 households that used to have winter camps here.

Since 2005, few households use the area in summer, because the pasture is close to MLA and airport, and there is not enough water.

Some households that had winter camps South of MLA, used to stay during the autumn before 2000. Around 2010, Ulam-Undrakh A. and Narantsetseg, A. used reside there in autumn.

Khukh Shand Pasture Area. Water Source: Khukh Shand well

<2000	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Purev	Purev	Purev	Purev	Purev												

Purev , with few livestock, also used the area for summer and autumn pasture; his household was resettled in 2004, and in 2005 he moved to the Soum center.

Dugatiin Dugui Pasture, no well, no zadgai (close to Bor Ovoo, about 3 km)

no winter camps

Dugatiin Dugui was part of common pasture, along with pasture areas to the South including Oyu Tolgoi, Vandan Tolgoi, Shunkhat, used by households from Dugat, Gurvan Modnii Haliv and Ulaan Tolgoi (and from other areas depending on weather and pasture conditions). It was the main pasture for camels. Since 2003, the drilling started, then mining camp was established and camel grazing became impossible. In 2012, the MLA expanded its fence and the area fell inside the site. Now the pasture area is not accessible.

Gurvan Modnii Haliv Pasture Area, Water Source: Haliv handwell, Haliv Koltsot well. Inside MLA now

<2000	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Tsagaan, Ts	Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.												

Tsagaan, Ts. Was resettled in 2004, moved to Shavag area, where she spent one year.

Ust Bag Mod Pasture Area, Water Source: Ust bag well. Near MLA fence line

<2000	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Samdan, Ts.	Samdan, Ts.	Samdan, Ts.	Samdan, Ts.	Samdan, Ts.		Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.	Tsagaan, Ts.					

Samdan , Ts. used the winter camp with small livestock, large livestock would graze to the East of here.

Samdan, Ts. was resettled in 2004, moved to Soum Center. Tsagaan Ts. used the winter camp between 2005 and 2010

Samdan also used the area sometimes in summer and autumn

Ukhaa Ovoo Pasture Area

In the past, during the collective's/cooperative's time, some households used this winter camp time to time and from 1990 it wasn't used until when Kh. Khishigsuren got a license.

<2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015

? Comments:

Pasture Areas Vandan Tolgoi (a hill in Gurvan Modnii Haliv area) Shunkhat (near Bor Ovoo) and Oyu Tolgoi

These were common pastures, mainly camel pasture, in the summer used by 59 households listed in phase 1 IEP report, whose winter and spring camps were alongside Undai river and the livestock of the herders, who were mostly residing alongside Gurvan Modnii Khaliv and Dugat rivers, used to graze there.

During exploration phase there was a lot of drilling in the vicinity impacting the pasture of herders residing nearby. From 2004 onwards, these pastures got inside the MLA

Sewage was dumped in Shunkhat area during exploration phase

Khanan Davaa Pasture area, water source - Khanan Davaa 2 deep wells

< 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M	Bayarsaikhan, M

Khanan Davaa pasture area was used in summer and winter by a number of households. These included, but may not be limited to, Munkhtur, Ts., Bayarsaikhan, M., Erdenejargal, B., Gantogtokh, D., Namsraijav, B., Chuluu, R., Tsagaan, Ts., Samdan, Ts., Erdebayar, B., Elbegsaikhan, Ts., Tumurtogoo, Ts., Nergui, Ts., Khandsuren, Ts., Jargalsaikhan, S., Choijilsuren, D., Ganbat, Sh., Purevdorj, M., Munkhbayar, D.
Since around 2009, also Ulam-Undrakh A. and Narantsetseg. A (right name?), have used this area in summer and autumn.

The pasture area size has been reduced due to infrastructure development (powerline, Gunii Kholoi, land acquired by gas supply and transport companies). The concentrator road passes by in the west side, the MLA fence line is crossing in the West. In the North is the Gunii Kholi powerline. The East and South are mountainous area.

Mongol Khar and Khar Ovoo Pasture areas. Water sources: wells at winter camps

Rocky area in the mountains, used by households with winter camps in the surrounding. This area is impacted by dust - **fine white dust from open pit.**

< 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
No winter camps in the area																
The area is used as common pasture by households with winter camps nearby. These households include: Namsrai, B. (winter camp at Toin Tsokhio), Bayarsaikhan, M. (winter camp at Khanan Davaa), Chuluu, R. (winter camp at Oroin Buuts), Ulziibayar, P., (father's name?) (winter camp at Arshand, a very good herder who moves a lot), Khandsuren, Ts. (winter camp at Aman Us), Erdenejargal, B. (winter camp at Zaraa), Munkhbayar, D. (winter camp at Bor Khoshuu).																
The concentrator road is running in the West. Impacts are mostly from dust, as well as a lot of noise created by vehicles.																

Toin Tsokhio Pasture area, Water source: Toin Tsokhio hand well. Khargana khov (rainfed pond)

There were 2 hand wells originally. In 2004, Gantogtokh relocated here, and one deep well was built in 1 km from handwells. The handwells dried up soon after that.

< 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B	Namsrai, B
B. Namsrai became a herder in 1988 and since then he was/is residing in this area in Toin Tsohio being engaged in traditional animal husbandry.																
Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor	Shoovdor
G. Shoovdor was/is residing in this area all through the three regimes, being engaged in traditional animal husbandry and has got a winter camp in "Tuimertiin Khoshuu" in 3 km from Toin Tsohio using water in Toin Tsohio.																
						Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.	Gantogtokh, D.

These households used the area as summer pasture: Namsrai, B., Shoovdor, G., Erdenejargal, B., Erdenebayar, B., Munkhbayar, D., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Battsengel, L., Mandbayar, L., Baterdene, L., Khandsuren, Ts., Doljinsuren, Yo., Purevdorj, B., Turtaivan, B.

Gantogtokh established winter camp here in 2004 that caused a shortage of summer pasture for other households. Some households lost their livestock and gave up herding; in the hope of getting an employment they moved to Soum Center. Those moving to Soum center include: Shoovdor Galsankhuu, Erdenebayar, B., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Doljinsuren, Yo., Purevdorj, B.

Shoovdor was residing in Toin Tsohio valley, and brought up 10 children, who also became herders and live in this area. Were they resettled from here to other place? G. Shoovdor's household has not been covered by neither resettlement nor compensation programs of OT project; in the end of 2004 D. Gantogtokh's household was resettled into the area and since then they are neighbors.

Oortsog Pasture area. Water source: 1 hand well, 1 koltsot well

< 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Ulzii-Orshikh	Ulzii-Orshikh	Ulzii-Orshikh	Ulzii-Orshikh	Ulzii-Orshikh	Ulzii-Orshikh	Ulzii-Orshikh										
Ulzii-Orshikh's household moved to Soum Center in 2005																
					Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaijhan, S.	Jargalsaikhan, S.	Jargalsaikhan, S.	Jargalsaijhan, S.
Jargalsaikhan, S., before 2004, moved to the area that is now inside MLA, then was resettled in 2004, and moved his winter camp back to Oortsog. OT built new winter camp for his household, and they built themselves another winter camp too.																
Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.	Tsendoo, D.
These households used the area as summer pasture: Namsrai, B., Shoovdor, G., Erdenejargal, B., Erdenebayar, B., Munkhbayar, D., Sumiya, I., Jargalsuren, B., Mendbayar, G., Mungunshagai, Ts., Battsengel, L., Mandbayar, L., Baterdene, L., Khandsuren, Ts., Doljinsuren, Yo., Purevdorj, B., Turtaivan, B..																

Bor Khoshuu Pasture area. Water source: Bor Khoshuu hand well

<2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Munkhbayar, D.	Munkhbayar, D.	Munkhbayar D.	Munkhbayar, D.	Munkhbayar, D.	Munkhbayar, D.											

Munkhbayar, D. relocated in 2004 to Khoroot, nearby (deep well drilled by OT).																
Sugarsuren, B.	Sugarsuren, B.	Sugarsuren, B.	Sugarsuren, B.	Sugarsuren, B.	Sugarsuren, B.											
Sugarsuren, B. was relocated in 2004 (and was employed by OT for some time). Munkhbayar, B. also used the area as summer pasture.																
Budaa Pasture area. Water source: Budaa spring																
<2000	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Erdenebayar, B.	Erdenebayar, B.	Erdenebayar, B.	Erdenebayar, B.	Erdenebayar, B.	Erdenebayar, B.											
Erdenebayar, B, in 2004 relocated to Zaraa where his brother Erdenejargal was, and built winter camp in 500 meter distance. Then he moved to Soum Center around 2005																
The area is used as summer pasture by Otgonjav. Kh., Byamba, Ts., Bilegsaikhan, D.																

2 b) Increase in Livestock Numbers Soumwide in Khanbogd Soum, and among Haliv Dugat Households from 2003 – 2015

Increase in Livestock Numbers – Soumwide and in Haliv Dugat Area – between 2003 and 2015			
	2003	2015	Increase
Haliv Dugat Households (12)			
Number of Large Livestock	1523	2191	44 %
Number of Small Livestock	369	840	127 %
Number of Total Livestock	1892	3031	60 %
Khanbogd Soum wide			
Number of Large Livestock	15690	34202	117 %
Number of Small Livestock	37656	98811	162 %
Number of Total Livestock	53346	133013	149 %
Source: Khanbogd Soum government archive, livestock records			

Annex 3 - Semi-structured Interviews – Questions and Issues

- Where was your winter camp in the year of 2000?

- Where do you have your winter pasture now?

- Why did you have to move?

- How is your current winter camp compared to the previous one?

- What is the suitability of the current winter camp location, compared to the previous one?

- How is the current pasture condition compared to the previous one?

- How is the pressure on current winter pasture compared to previous situation?

- Do you share your pasture with other families? (Yes: How many families? With whom?)

- Where was your summer/autumn pasture before?

- Where is your summer pasture now?

- How is your current summer pasture condition now, and how about the pressure?

- What source of water were you using before? Where is the current source of water? How is the condition of current source of water?

- Number of livestock before and now (small and large). What is the reason of change?

- How many livestock of other households's have you been/are herding before/now? What is the reason of change?

- What are the changes in livestock herding practice? Changes in workload and costs of herding ?

- Has there been any change in livestock productivity and health? Now and before.

- Is it possible to maintain livestock herding in the future? What is your plan?

Annex 4 – Responses by Interviewees of Semi-Structured Interviews

The responses of individual respondents to the issues raised in semi-structured interviews are provided below (in italics, in the own words of respondents). Additional information is added from the notes of the consultant during interviews and focus group discussions.

1. S. Jargalsaikhan (son of D. Tsendoo)

- *Winter camp "Shavag" at Undai river*
- *2004 resettlement*
- *There are many households around current winter camp therefore pasture is not enough*
- *Sharing the pasture with 3 households*
- *Used to spend summer in Khaliv Dugat river area*
- *Now spend summer near the winter camp*
- *Summer pasture under pressure*
- *Before used springs as water source, now water from hand well only*
- *Before used to have 30 large and 250 small livestock*
- *Now have got 20 large and 200 small livestock*
- *Reduced in number due to lack of pasture*
- *Work load increased since moved to new pasture*
- *Animal wool and milk declined both in volume and quality*
- *Small animals get running nose time to time, their lungs affected due to eating plants covered by duct*
- *It looks like to be difficult to maintain animal husbandry in the future*
- *If the mining develop a support policy for coexistence then it may be possible to save animal husbandry*

2. D. Tsendoo

Our household moved out to Oortsog under 2004 resettlement program. My son's household was considered as impacted but I was not accounted, so I did not get any compensation. Therefore I would like to request compensation. Now my children have got not many livestock due to pasture capacity; there are many households at one place; a lot of dust and noise from trucks; we cannot move to remote pasture because we do not have transport means; kids live in soum center, there are only 2 of us in the country; I am a elderly person under my children's care; there are 5-6 households in our place therefore pasture access is poor; it is becoming very difficult to raise livestock number. Road dust and dust from mining is terrible, there is a dust fog when the wind is from the west. Water is getting scarce. I want the unemployed local youth to be hired.

3. B. Namsraijav

Around 2000 pasture access was very good. The pasture has been pressurized since 2004 when 3 OT impacted households – Ts. Samdan, D. Gantogtokh and L. Nomintsetseg – moved to our place. Our winter camp in Toin Tsokhio; in the past we used Dugat and nowadays OT airport area as summer pasture. Now we have no possibility to move to summer pasture, instead spending summer around our winter camp. As for the water source, before it was enough, but since 2004 springs started to dry. Now we use deep well water. We have more than 400 livestock, my mother has got 100 and the other three households' more than 300 altogether more than 700 livestock here. In order to graze large animals we have to go to far away. Because of this we lose our livestock to theft and wolves. Livestock health is a problem now. Animals' inner organs, particularly lungs affected by blisters and ulcers.

4. Tserenkhuugiin Tsagaan

After graduating from 8-year school of Khanbogd soum I become a herder in Javkhlant bagh and started herding camels in herders cooperative. I was born in the south from Bor ovoo hill in 1954. It is almost 40 years since I started my herding practice in this area. Married to my husband Luvsandagva and we have got 6 children, and had more than 300 camels. In 2004, OT started its operation and our original winter camp, inherited from our parents and where we lived for years, got inside their fence and we have totally lost our pasture. We lost our camp at Gurvan Modnii Khaliv where we used to water more than 300 camels. The entire land on which OT is located used to be our pasture. Our household was the only household inside OT fence. We filed complaints one after one but the answer was: "we gave you what was supposed". We have got 6 children, except 1 all are unemployed. I, myself, am cleaning the roadside garbage. I would like my kids be employed. They have got education. Nothing left from our traditional camp, they destroyed it digging the land. There were 3 elm trees which they cut off. They do not care about others' spiritual devotion. I love my homeland. My spouse passed away in 2008. I take care of my livestock with kids' help. Now I dare not to say my kids to become a herder. We have no guarantee to our livelihood. No pasture no water. Therefore I would like to get my children employed. I was born here, I was a herder for whole my life. I would like to have a guaranteed livelihood for me and for my children. I would like to get dividends.

- *In 2000 our winter camp was in Khaliv Gurvan Mod.*
- *Now we are spending winter in Shavag.*
- *Our household was resettled by OT in 2004.*
- *We are not yet settled well in the new place where we moved to. Livestock too cannot adopt and run back to old camp area.*
- *In Khaliv Dugat, where we were residing, pasture was plenty, animals were used to the place, had a good water source*
- *New place in Shavag; there are many winter camps, households and livestock, water in deficit, one-direction pasture, lack of space to graze animals, pasture pressure is high*
- *We share our pasture and water at Shavag camp with other herders' households, namely: Mendbayar, Nergui, Narantsetseg, Erdenejargal, Undrakh, Bayarsaikhan etc.*
- *We used to spend summer and autumn in Bor Ovoo, Tsankhi, Khuren Khoshuu and Dugat. But now we spend summer nearby our winter camp.*
- *During summer when we move to remote area, if there is pasture there is no water, if there is water there is no pasture. This is the reality. Therefore we have to spend summer around our winter camp.*
- *In our old winter camp in Khaliv Gurvan Mod, during old times, water was sufficient to water more than 300 camels at once.*
- *Now we use a deep drilled well built during construction of the airport.*
- *In 2004 we had 500 small and 125 large livestock. Now there is no possibility to grow livestock due to lack of pasture and water; it is difficult for young people to become a herder; no livelihood guaranteed; now we have 200 small and 80 large livestock.*
- *Now I am herding my children's few livestock, but I am getting out of strength to herd due lack of pasture, water and shelter/camp. We experience an economical loss both directly and indirectly.*
- *Livestock herding pattern is getting lost. Pasture, water and camp all become scarce, even the plants the animals used to eat disappeared.*
- *A lot of dust. There are roads everywhere.*
- *A road to Khanbogd runs in 1 km in the south from our Shavag camp; a lot of dust; many vehicles create a danger to animals; livestock stressed very much because of the traffic and cannot gain weight*
- *We have lost some livestock (especially large livestock) to wolves when those were on the way to the old camp.*

- *I would like to sustain livestock herding, in which I was engaged from my childhood, and want my kids to inherit it. But it is impossible. Water is of a big concern.*

5. M. Bayarsaikhan

- *Used to spent winter at Khanan Davaa.*
- *Still in Khanan Davaa*
- *Have not been relocated*
- *Lack of pasture. Dust is huge, a lot of roads, pasture is squeezed*
- *We share the winter pasture with 5 households: Erdenejargl, Namsrai, Gantogtokh, Tsagaan, Dolgor and households at Ekhen Khaliv; during summer and autumn share with households who are moving in search of reserve pasture.*
- *Used to spend summer and autumn in Ekhen Khaliv and Tavan Tolgoi which is now occupied by the airport*
- *Now spend summer around the winter camp.*
- *Pasture is getting scarce; other households stay on their way to reserve pasture; other households also experience lack of pasture. Water around the area is scarce. A lot of roads.*
- *Used to water animals from Dugat well. Later repaired an old deep well and still use it now, never been measuring the water level. Water is in 5 km.*
- *In 1996 we had 300 livestock. Now around 200. It is impossible to grow livestock due to lack of pasture.*
- *Now share the pasture with 4 households and there are 500 livestock.*
- *There is no pasture allocation arrangement*
- *Water is lacking, no of possibility to collect hay; we had had to purchase fodder time to time*
- *Livestock is getting sick; there are many cases of eye and lungs infection.*
- *It is not possible to grow livestock due to the lack of pasture and water. Herders and community people are losing their livelihood due to water loss.*

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6. Erdenejargal B.

- *Was residing at Zaraa in 2000*
- *Currently residing at Zaraa too. Used to have summer and autumn pastureland at Toin Tsokhio. But households relocated by OT settled their winter camps there, so we do not have summer and autumn pastureland anymore, we stay all year around at our winter camp at Zaraa.*
- *Compared to the past, pasture condition deteriorated. There are 6 households residing nearby to our winter camp.*
- *Erdenebayar.B, Ts,Tsagaan, Bayarsaikhan, Mendbayar, Dolgor. (Erdenebayar and Tsagaan have been relocated by OT)*
- *Gantogtokh, relocated by OT, settled a winter camp on our summer and autumn pastureland, so we don't have any summer and autumn pastureland now.*
- *Used to have hand well, but due to water scarcity not using it anymore. Now we have deep well, but recharge level is very poor.*
- *Livestock number increased a little bit. Small livestock 310, large - 115. Possibility to grow livestock is very limited due to restrained pasture.*
- *As for herding practice it became better.*
- *Livestock productivity has decreased.*
- *Because of our location close to road, animal and human health is getting affected. (Lung disease). It became hard for herders to graze their livestock due to poor source of water and not enough pastureland. OT and Khan-Bogd road is 0.5 km away from our place and Gunii Khooloi road runs in 1km causing a lot of impacts; many hectares of pastureland have been lost.*

- *A quarry built too close to our winter camp, all surrounding land and vegetation covered by dust, it seems to me that livestock cannot gain a proper weight because of this reason.*
- *Impacts are still there, even more increasing, therefore we would like to request to continue the agreement and fully compensate for damages.*

7. Samdan Tserenkhuu

- *Our household was residing at Ust Bag Mod in 2000*
- *Now our winter camp is at Ikher Khondon*
- *We have been relocated by OT*
- *Compared to our previous winter camp, current one is very poor, many families around, not enough pastureland to graze livestock.*
- *Surrounded by 4 other families: Mungunshagai, Nasmrai, Khandsuren, Gantogtokh.*
- *Summer and autumn pasture was at Khaliv, Dugat, Bor Ovoo and Bumbat.*
- *Now staying around our winter camp during summer and autumn.*
- *Used to have more than 150 livestock, but it is decreased now to 70, have given up large livestock because condition is not good for herding large livestock, therefore finished with all large livestock.*
- *Conditions for herding has become very bad, poor source of water, not enough pastureland.*

8. Munkhbayar. D

- Was residing at Bor Khoshuu in 2000
- Moved to Khoroot
- Moved out because of dust made by OT
- Used to have 3 shelters at previous winter camp, it was very comfortable for livestock, it was a camp since old time
- Current winter pasture has 1 shelter made of wood, very cold during winter, livestock miscarriage cases increased
- Compared to previous camp, the current camp has no pasture space, roads have blocked pasture
- Herd has to cross roads to graze, automobiles run over them. We have 3 colts now, mothers been ran over by trucks
- Many family live very close to each other, so we graze our herd at west side of pastureland, which is blocked by newly put roads, no space for grazing
- We share pastureland with 3 other families: Jargalsaikhan, Khandsuren, Tsagaan; east side of pastureland has many other families so we don't have grazing space
- Summer pasture used to be at Bor Ovoo, Budaa and Dugat
- We will use our winter pasture for summer grazing. We lost our summer pastureland to OT's fences. In order to reach the summer pastureland one has to cross the paved road; dust made by OT is too much.

- *Now we are using an old hand well, not enough source of water. Livestock don't get enough water. Deep well water level is also become low.*
- *Small livestock number is 300, large livestock 210, increased a bit.*
- *Cannot increase livestock any more, because of lack of pastureland.*
- *Livestock productivity has decreased, because not enough source of water and plants to feed the livestock. Volume of wool per goat has been decreased. Lungs of an animal used for food purpose are covered blisters and pus; their inner organs have got adhesions; before we haven't seen these kind of things. In the future we need more pasture and water, the raining pattern has not been changed but plants do not grow now, the soil polluted too much.*

9. Khandsuren Ts

- *Our winter camp was at Khairtsagt Aman Us in 2000, now we still live here.*
- *We have not been relocated, but others moved in and grazing pasture and source of water became very scarce, making everyone's life not comfortable.*
- *We share our pasture with Jargalsaikhan and Tsagaan, therefore we cannot move to far away places to spend the summer.*
- *We used to have very healthy source of water nearby our winter camp. This source of water receded in 2005-2006. After that we were watering our livestock from water sources in the pasture around Khaliv area, but not soon water was reduced and become not enough for all livestock. We used to spend the summer at Khaliv, Ukhaa Ovoo and Bor Ovoo pasturelands, this area served as reserve pasture.*
- *Currently we have 5 neighbors on 5 sides, plants and water are becoming scarce, raising livestock is getting a very hard job.*
- *We are sharing pastures with Munkhbaatar, Namsraijav, Samdan, Tsagaan and Jargalsaikhan. Our summer and autumn pasturelands are now inside OT's fenced zone, including Khaliv, Bor Ovoo and Ukhaa Ovoo. Our children's winter pasture's source of water is also got inside OT's fence, they can not water their livestock there, so we are keeping all of them together at the same winter camp.*
- *This is making our life very hard as herders. And we face many detriments.*
- *Besides this, dust made by OT and by roads is affecting our daily life so much. People and livestock both getting sick by it.*
- *Raising livestock would give benefits for us and for our children in the future, but these impacts are making us puzzled, we do not know how to sustain our livelihood. Not really sure about how to cope with it. We also don't want to see our ancestral land from our descendants to become a deserted land besides our concern about the sources of water and pastureland, These impacts are making it hard to have reassurance to inherit our livestock to our children. We do not have enough money to send our children to school, on top of it OT's impacts are causing pressure on our lives. What we want is to get our homeland rehabilitated and impacts compensated. We need help in order make our children get a good education and job place. As long as OT exists, it will continue affect our land, our life and our children's livelihood every single moment of its operation. I do really want to get help to give my children a good education and have a good life, this is what I wish.*

10. Tsagaan Purev

- Was residing at Dugat in 2000
- Winter pasture is at Ergen Us
- Our winter camp occupied by OT mining licensed area and we have been relocated
- Relocated pasture is not suitable; there is no leeward, poor source of water
- As for pasture it is squeezed and of bad quality
- On all sides surrounded by many other families
- Before we used summer and autumn pastureland at OT, Bor Ovoo and Bumbat area
- Now we have no summer or autumn pasture
- Having no summer pasture brings bad consequences
- Used to use the hand well at Dugat
- At Ergen Us, hand well supply is poor, livestock never had enough water
- Before we had 180 small and 5 large livestock (camels)
- No livestock at the moment (lost due to bad pasture, we moved from mountainous pasture to valley and livestock could not adopt, water was not sufficient, there was no shelter for livestock to stand harsh weather)

- Never herded other families livestock before
- Now, we are not herding anymore (no income from herding, livestock has been lost, herding labor has been increased, had had to follow the livestock all the time, had to water them 2 to 3 times a day)
- not available, because have no livestock at the moment
- Ideas: to turn the pasture into a plantation, repair the wells, build a greenhouse

11. Gantogtokh Damdin

- Used to have a winter camp at Khukh Uzuur in 2000
- Moved to Toin Tsokhio in 2004
- Was relocated because our camp fell inside OT licensed area
- Current pasture has got many herders' households around, not suitable
- Pasture condition is so-so, too much pressure
- Allocation of pasture is bad
- Used to have summer and autumn pastures at Dugat
- There are many families around our winter camp, pasture is on one side
- No summer pasture
- Used to use hand well at Dugat, now use the deep well at Toin Tsokhio
- Now we are herding small livestock along with horses and camels, livestock number has increased
- Labor increased, expenses increased (buying hay/forage etc.)
- Livestock still giving yields, spend a lot to take care of livestock, the well works on generator and we purchase fuel which increases the cost too
- We pay more attention to health and growth of livestock
- At the moment have a plan to fix and make warm our winter camp, besides this have no other plans

12. Tuvshintugs Tsevegdorjiin

- Was residing at Gashuun Sukhait in 2000
- Now winter camp is at Gashuun sukhait
- Bought Tesget camp because current pasture and source of water become poorer.
- Tesget camp also has not a good source of water, pasture is squeezed, 5 different families are sharing together: Khandsuren, Ts. Tsagaan, S. Jargalsaikhan, B Togoo etc.
- Used to use water from Tesget before, but now water is not sufficient anymore, therefore go to another source of water.
- Used to have 540 small livestock, 35 large; now have got 440 small and 25 large livestock.
- I keep also my father's and sister's livestock together with mine.
- Pasture and source of water decreased during construction of improved road by OT.

13. Munkhbaatar Luvsandagva

I was born in 1989, I have a secondary school education. I herd my livestock with my mother. I have got the camp at Ust, which is licensed on my name. I am married, live with my wife and one child. I tried to apply for OT employment, but I couldn't get any job. After I bought winter camp at Ust, OT developed 3 km road to Gashuun Sukhait, the dust and noise from construction and trucks were terrible, destroyed a huge area of pastureland around there. They have set up a sand quarry in only 800 meters away from our winter camp covering 600 hectares of land, made 20-30 meter deep hole. They heavily destroyed the land with big vehicles disturbing life both for humans and livestock. I have got no compensation for the damages nor didn't I get any employment. Therefore I am raising a complaint.

14. Mrs Dolgorsuren (mother of Namsrai)

In 2005, spent winter at winter camp Khukh Khad. This winter camp was under Namsrai's name, but several families were living here. In 2005, Namsrai moved out (relocation). OT considered only Namsrai as the holder of the winter camp certificate for compensation. Therefore, his mother Dolgorsuren was not considered. She was only registered as co-user but did not hold a certificate.

Now, in 2015, she has hired a herder, and made winter camp at Baishand (at Budaa gol) where spring camp used to be, and winter camp certificate was issued later for there. It is now used by the younger son, for camel grazing. The livestock of Dolgorsuren and her son, herded by the hired herder, grazes at both Khukh Khad and Baishand, wherever there is grass. Sometimes, when Baishand is overcrowded, the livestock is brought to Namsrai's current area.

To compare the previous and current winter pasture – the current pasture type/quality is ok, but there is too many livestock. Khukh Khad area previously was used by two households (Namsrai and mother Dolgorsuren). Now, Baishand area is being used by Odgairig, Tuvshintugs, Namsrai, and Khurlee.

The summer pasture before was plenty, and shared by many households. It included the pasture areas of now MLA including Bor Ovoo, and Haliv Dugat area, both now inside and outside near the fenced area.

According to Mrs. Dolgorsuren, at least 10 households shared summer pasture in the Haliv Dugat area. The "regular" ones included: Badamsambuu, Jargalsaikhan, Dolgorsuren, Tsagaan, Ts., Bandi, Iderborgil, Namsrai, Odgairig, Tuvshintugs, Khurlee; also the households of children of these regular households, as well as others who came on a less regular basis, when the summer pasture was not so good. Those latter ones would stay only about 20 days (except lazier ones stayed longer).

Now, these practices are not possible any more, and herders have to spend more time in winter camp. Now, they stay in winter camp until spring. Before they would spend about 3 months in winter camp. Now, they stay longer, or make only a very short move. The reason is that summer pasture was lost, and when you move, you move into other households traditional winter and spring areas.

My summer pasture is South of the MLA fence and around winter camp. Camels go to Tsankhi or Budaa. Small livestock stay around winter camp mostly.

As for the quality of summer pasture – carrying capacity and quality have decreased now. The pasture in the North was much better/suitable, with more nutritious plants. Haliv Dugat area was very good, with high yield and nutritious. Further South, it is more desert. Baishand is in the downstream section of Haliv Dugat.

Mrs Dolgorsuren also mentioned an increase in insects, and/or in-migration of new insect species (sand flies?), and different grass hoppers. She thinks it may be related to big open water areas, but is not sure. (this may also be a result of climate change?); she observed these insects first in 2005.

Mrs. Dolgorsuren used to have 200-300 livestock, now she has about 50. There are several reasons: a) livestock was divided among children, b) there is not enough pasture and water and she adjusts the number of livestock to the carrying capacity, c) reproduction rate is not so well.

The yield of milk and wool is reduced – before cashmere yield was about 1 kg/goat, now it is rather 700-800 grams/goat. Camel wool yield is the same as before.

15. Mrs. Tsesuren, M. (Battsengel's mother), age 86

Mrs. Tsesuren's winter camp used to be at "Dugat Khuren Del", using the Dugat well.

She was asked in 2004 by the bag governor to move, and was told if she did not move, she would be moved by force. A lady from OT came every day requesting her to move. She was promised a new camp and well, and eventually moved to a new place; the well there dried up 2-3 years later.

The Oyut Tolgoi area was very beautiful, now the pasture is reduced year by year. The livestock quality has become poorer. With reduced numbers and quality of livestock, she gave up herding, and in 2007/8 moved to the Soum Center. Life in Soum center is very different. Herding, I was happy, drinking camel milk, but in Soum center, health deteriorated. She worries about the livelihood of her children, and about what will happen to the Nutag.

Originally, there were 3 households at the winter camp site – her own (Tsesuren) and those of her sons Baterdene and Mendbayar. In 2004, all were relocated to "Builsen Khovor" area near the airport. She had signed the paper/agreement to be relocated when she was home alone. The paper only recognized 1 household as impacted, not 3.

At the new location, the road was close, and many vehicle tracks scarred the pasture, very close to the ger. The camp of a drilling company was close. Livestock and a young boy drowned in pits that were unprotected.

Baterdene, with 100 small livestock and 20 camels, moved north to "Ilgen". But there was no pasture and water that the livestock could adapt to and he came back to Dugat. Evemtually, he lost all livestock.

Mendbayar, with 100 small livestock and 5-6 camels, moved with the parents. When they had no livestock anymore, he took a job.

Today, Tsesuren has about 20 livestock. Earlier, she had 300-400 small livestock, and some 10 camels; she lost some livestock to Dzud also.

Tsesuren's comments on changes in water resources:

There was always plenty of shallow ground water. During the 1990ies, it was difficult to find a place for a ship dip, because water would come up at many places the vet tried to dig a sheep dip.

By 2010, water in wells and zadgai was gone; first, the levels in wells had started to drop, and then all springs dried up.

16. Mr. Bilegsaikhan

Mr. Bilegsaikhan's winter camp used to be at Khar Tolgoiin Hand at the Undai River, but he would spend summer and autumn in the Haliv Dugat area. Since 1996 he lived like that. He had been just newly married, and had no license for the winter camp, which was just established. He saw a lot of bore hole drilling, and he felt that the area may not be suitable anymore for livestock herding. Bor Ovoo was the main water source.

In 2000, Bilegsaikhan moved out to Northern part of Gavilud Bag, and he stayed there for one year until 2001. Then, he moved to Gurvan Shavagtai, 30 km from the Soum Center. He was there or 7 years (2001 – 2006). Due to conflict with neighbors, he moved 2 km away in 2006, and was there until 2013. Six households were using one well there (Shavagtai well). In 2007, he got a winter camp license for this

place in Shavagtai. He called this licensed place “Uzuriin Khand”. In 2015, he moved to the Soum center.

In 2000, the Dugat area pasture was good, but much drilling was going on. He moved away to find suitable conditions to pursue livestock husbandry.

Bilegsaikhan’s winter camp establishment at the Undai fell between the registration of the Socialist times and the new licensing practice. He was young and just newly married. Because he had no certificate for his winter camp at the Undai, he was not considered for compensation. In 2016, he has about 100 livestock (herded by someone else?).

17. Ms. P. Onon, and husband G. Mendbayar

The winter camp used to be at Tsankhi, from about 1993 to 2002. At that time, there was lots of pasture, and four households shared the camp site. They could pasture the livestock to the West. In 2003 they moved to Ikh Gerlan, to have their own winter camp; they repaired the winter camp that used to be Ts. Nirgui’s. In summer and autumn, they used Haliv Dugat pasture areas.

In 2004, they wanted to settle in Dugat area, but it was not allowed anymore. Now their oldest son is grown up but cannot have his own camp. They cannot follow the tradition to give land and livestock to their children, and cannot increase the number of livestock. They had hoped that OT would employ their children, but this did not happen. Two elder children are unemployed.

The Haliv Dugat area had good vegetation, and was summer, spring and autumn pasture. In the socialist time, many livestock activities, such as sheep dipping and categorizing, was done there.

Today, there is lots of conflict among households, even among relatives, causing lots of stress. When they come to other areas, people say “You sold your land to OT”. “In the socialist time, we were rewarded for setting up winter camps, now we are blamed. “ Onon feels there are serious effects on culture, traditions and the mental wellbeing of people.

In 2011, the household was considered impacted, and hired as garbage collectors under a year contract. The husband got sick. (the contract will be extended). Onon states that they “really need a particular activity that will provide a sustainable livelihood.”

18. Mrs. Nergui

Mrs Nergui has two daughters, one is a herder, the other is unemployed. Nergui states that as long as there is a shortage of pasture and water, we need to limit the livestock numbers. Therefore we need compensation to maintain a sustainable livelihood.

19. L. Mandbayar

Used to be at Khuren Del well, 4 families altogether. Pasture and water was good for herding. In 2004, winter camp license was issued, in the mother’s name, as four households were considered one family. He had to move out and lost many livestock. He went to Ulaanbaatar and took different jobs, such as guard. He has nothing and was not considered impacted. He is still in Ulaanbaatar with his family. He would like

to be considered impacted because he lost land and livelihood to OT. If OT was not there, he and his brothers would be herders.

Erdenebayar, B.

Erdenebayar's winter camp was at "Modod Tsankhi" hill (Khuren Khoshuu camp), now in the NE corner of the MLA, 400-500 meter from the fence line. Erdenebayar's account:

Since 1993, Erdenebayar had built a shelter and dug a handwell himself. At that time, there was no shortage of pasture, and herders were able to increase livestock numbers. Erdenebayar spent winters at this camp until 1999. In 1999, rainfall had been scarce, therefore in the 1999/2000 winter Erdenebayar moved eastwards, where he spent two winters. In 2001/2 he returned to his Khuren Khoshuu camp. Around 2003, he moved to stay with his sister, in 4 km distance at Bor Khoshuu. (there were small children, and it was better if two families camped together, so the children would not be alone when somebody was out herding livestock). In 2004, rumors about relocation started. Two children of Erdenebayar were already in school and his wife lived with them in the Soum center. They did not really know about resettlement. The resettlement program started, but Erdenebayar was never asked. He did not know about the compensation. The company and local government, when they visited households, they threatened people that if they did not accept the resettlement, with Soum support, that they would be forcefully moved and be left with nothing. They also said the contracts would be strictly confidential, and were not to be shared with others. However, nobody approached Erdenebayar at all.

His livestock was at his sister's place, his wife and kids in the Soum Center, and he was going back and forth between places. His own winter camp may have looked abandoned. He went to meet OT people, and requested to consider his situation. He was told he was left behind, that he was not covered by the study, and would not be considered as household to be resettled. And, that he could not use his winter camp anymore. He got no contract, and no compensation. Erdenebayar emphasizes that everybody in the local area knows that this was his winter camp before OT operations began. Erdenebayar requested help from OT to build winter shelter elsewhere. OT requested recommendation letter from local government to build a new shelter for him. He requested and received such letter from the Soum Governor finally, and a shelter was built at Tsaragiin Borkhant. It was only a wooden fence (half moon shaped), and a "summer house", but he still received no compensation and no resettlement contract.

Erdenebayar's pasture was all gone. He was still a young man, under 30 years old, and just started his own life as a herder, being self-sufficient and following the tradition of nomadic livestock husbandry. He would have had all possibilities to increase his livestock (he had 200-300 livestock) if there was pasture and water. Today (March 2016) he has 40-50 small livestock, 4 camels and 17 horses. He has relatively more horses and camels than small livestock, because now the "summer house"area is being impacted by the Gunii Kholoi power line and the pipeline, in 40 meters distance. In 500 meters distance is the OT supply road (OT-Manlai-UB). The road is very close to his well, trucks used to drive even over his well, damaging the lid. To the West, in 4-5 kn distance, is the airport. It is almost impossible to pasture livestock, as they have to cross the road.

In 2011, Erdenebayar was finally considered impacted by Gunii Kholoi infrastructure. He asked OT to repair the well damaged by road/trucks, and help with a new water source.

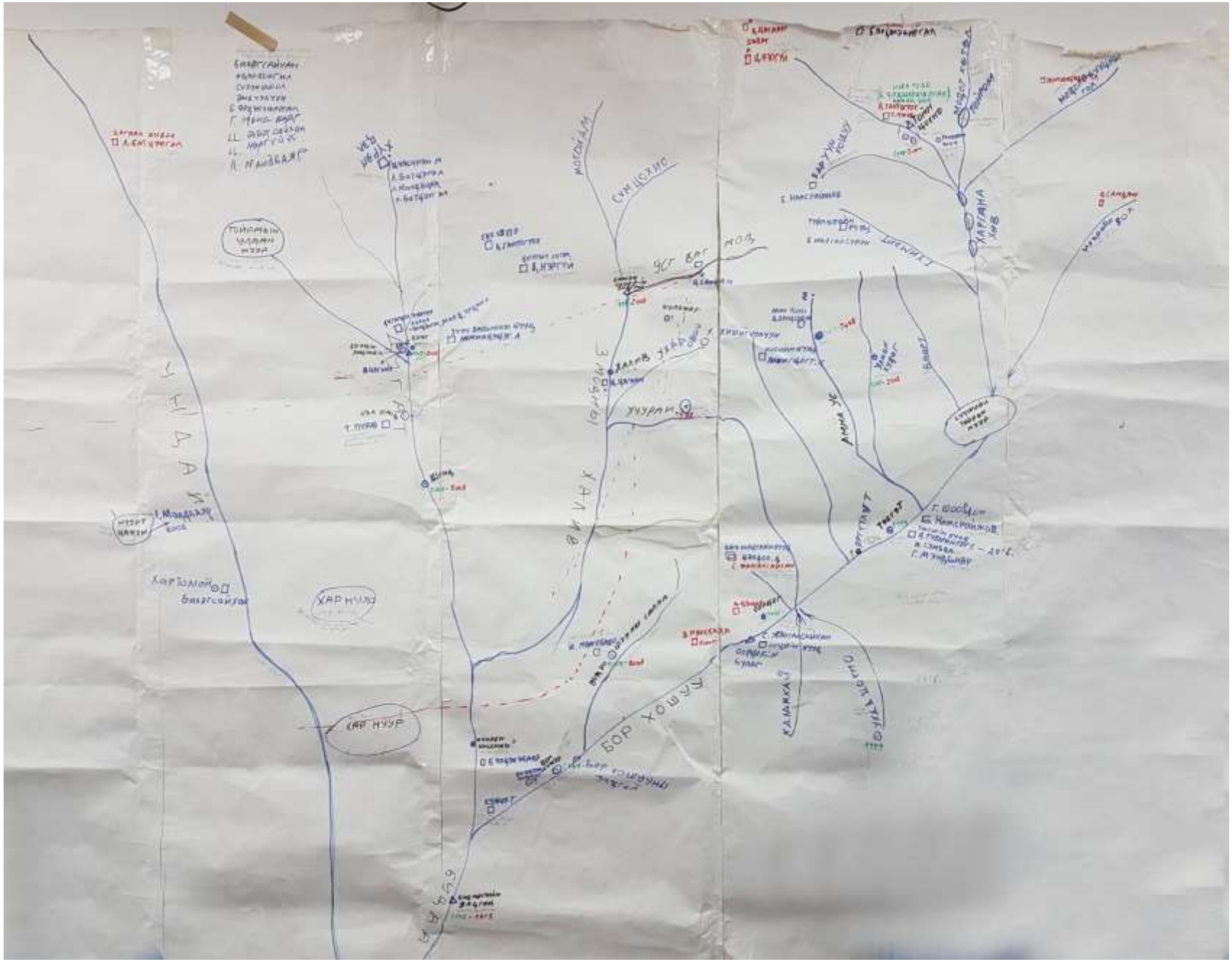
Purev, T.

Spent his whole life until 2004 at winter camp site Khukh Shand, resettled in 2004 to Toin Tsokhio, together with son in law Gantogtokh. Purev moved to Soum center 7 years ago, Gantogtokh (who now works for OT) is still taking care of Purev's livestock.

Annex 5 – Group Discussion March 30/31, 2016

Discussions were structured to generate information on herders' perceptions on changes in condition of and access to pasture and water resources in the Haliv Dugat area in the time frame from before/around 2000 to 2015 and beyond, determining the condition and access in consecutive 5 year periods.

The group first drafted a map detailing all water and pasture resources in the Haliv Dugat area, using local location names. Then the group proceeded to discuss changes in condition of water and pasture resources over time, allocating a score (0-5) for the assessed condition, whereby 5 is the best condition. The table below represents the assessment and comments by the discussants, in their own words.


ХАРТОЛГОЙ
ХАР НУУР
БОР ХОШУУ

Herders Perceptions on Changes of Condition of Water Sources and Pasture Pressure							
Resource	<2000	2000-/5	2005/10	2010/15	>2015	Reasons for Change	Mitigation, solutions
Wells						Directly impacted by open pit and underground mining. Number of wells and boreholes increased.	Exploration work started 1996, in 20 years water sources disappeared that much; if we assume mining will operate at full capacity and for 60 years, they should guarantee water supply that will support our life. In the future, protect zadgai which are left now, and create ponds and water points as many as possible. To cultivate plants in order to keep/protect soil moisture. To rehabilitate properly everywhere on time.
Dugat	4	4	2	1	1	Exploration drillings, deep drilled wells, washing samples using well water,	
Khukh Shand	4	3	0	0	0	Exploration drilling, road, quarry, crusher, drilling holes	
Shand (Mukhar Ergiin)	4	3	0	0	0	Exploration drilling, road, quarry, crusher, drilling holes	
Koltsot (Khaliviin)	4	3	?			Quarry at beginning of Haliv, Exploration drilling, road, crusher, drilling holes	
KHurai (dried 1998)	0	0	0	0	0	Drilling boreholes, Quarry at beginning of Haliv, Exploration drilling, road, crusher,	
Haliv	4	3	2	?		Quarry at beginning of Haliv, Exploration drilling, road, crusher, drilling holes	
Bor Khoshuuni Salaa	4	3	0	0	0	Gravel quarry, drilling, road	

Khuren Khoshuu	4					Ask Erdenebayar	
Bor Khoshuu	4	2	2	2	0	Sand quarry, drilling, road	
Koltsot at Bor Khoshuu (wasn't used since 80ies)	?					Hasn't been used since 80ies	
Oortsog	4	3	2	2	0	Abstraction of water from Haliv Koltsot	
Erguleegt (Khaliviin)	4	3	2	2	0	Used for drilling	
Tesget (dried 1999)						Used for drilling	
Ukhaa Tsokhio (dried 1999)						Used for drilling	
Aman Us	4	3	0	0	0	Water from Koltsot and Tesget was used	
ULaan Khudag	4	3	0	0	0	Water from Koltsot and Tesget was used	
Toin Tsokhio 1	4	2	0	0	0	Used for drilling	
Toin Tsokhio 2	4	2	0	0	0	Used water for drilling	
Pasture Pressure on Pasture Areas of Haliv Dugat						Dust	As a replacement for pasture they took, provide compensation sufficient to guarantee future livelihood. Fully compensate damages occurred in the past. Cover the costs for education to children, provide employment after graduation, and provide permanent employment. Compensate for emotional trauma due to worry about the future
Dugat	4	2	0	0	0	MLA	
Khukh Shand	4	0	0	0	0	MLA	

Dugatiin Dugui	4	0	0	0	0	MLA	
Haliv	4	0	0	0	0	MLA	
Ust Bag Mod	4	3	1	1	1	Squeezed by fence in the West, by rocks in the East, 5 hhs share, dust	
Ukhaa Ovoo	4	3	1	1	1	Squeezed by fence in West, 4 hhs share, dust	
Vandan Tolgoi	4	0	0	0	0	MLA	
Shunkhat	4	0	0	0	0	MLA	
Oyut Tolgoi	4	0	0	0	0	MLA	
KHanan Davaa	4	3	1	1	1	Squeezed by fence in West, airport in the North, 2 impacted hhs moved into area, 2 others moved in voluntarily, altogether 10 families, rocky, mountains, scarce vegetation, wolves, lynx. Reserve pasture occupied by Gunii Kholoi pipeline and airport	
Mongola Khar	4	3	1	1	1		
KHar Ovoo	4	3	1	1	1		
Toin Tsokhio	4	3	1	1	1	Impacted 3 households came in, total 5 hhs, every year 3-4 hhs come to use this area as reserve pasture, rocky,	
Oortsog	4	3	1	1	1	55 hhs share, 3 of those impacted, otor hhs transit through , road 1 km, dangerous for LS, had accidents	
Bor Khoshuu	4	3	2	1	1		
BUdaa	4	3	2	1	1	No water, only very early in the summer used for few days	
Zadgai/Springs						Haliv and Dugat rivers were blocked	When building new roads, build culverts of sufficient big size, and in every place where water flow occurs.
Dugatiin Zadgai	4	0	0	0	0		
Khajuukhoovor	4	4	3	0	0		
Budagiin zadgai	4	4	3	0	0		
Oortsgiin Bulag	4	4	3	0	0	Due to infrastructure	

Bor Khoshuuni Bulag	4	4	3	0	0		
Rainfall	4	4	4	4			
Livestock Productivity	4	3	2	2	-	Due to shortage of pasture, Road and dust, LS cannot gain weight. Wool polluted (dust), wool and milk yield reduced	
Livestock Health	4	3	2	2	-	Due to dust and dirty water, LS is very distressed, herders cannot afford veterinary costs, LS is experience mineral deficiency because cannot move to reserve pasture	OT to cover vet services expenses.
Vegetation (growth)	4	3	2	2	-	Pasture overloaded, polluted, lost soil moisture, perennials growth reduced; 1 year plants, garbage plants increased. infrastructure	

Annex 6 - Photo Documentation during Field Visit March 28 – April 1, 2016 and June 7-8, 2016

Diversion ditches in Haliv Dugat area, north of Tailing Storage Facility.

These earthworks are ditches to prevent flooding of facilities, they are not constructed as channels with concrete lining to divert flood water back to the river channel downstream. (photo by Sabine, March, 2016, during joint field visit).

Budaa River, where the MLA fence line crosses it, and just below. (photo by Sabine, March 2016. According to Namsrai, in summer 2015, flood water came mostly from Khurai River, and some also from the diversion ditches in Haliv Dugat area North of Tailing Storage Facility.

Sand quarry in Gurvan Mod Haliv River (Photo March 2016, Sabine)

Sand quarry in Ust Bag Mod/Gurvan Mod Haliv. This sand is to be mined for years ahead, needed for cement for underground mine (according to Tserennadmid).


Seepage pond near Tailing Storage Facility, March 2016 (Photo Sabine)

Open water on the Tailing Storage Facility, March 2016. Flock of White Swans. (Photo Sabine)

Group Discussion, producing the map of Haliv Dugat water and pasture resources,

March 30/31, 2016

Group Discussion - mapping all water sources in Haliv Dugat basin, and
assessing changes in condition of water and pasture resources 2000 – 2015, March 30/31, 2016.

Annex 7 – Work in Khanbogd Soum June 7/8 2016

IEP member Sabine Schmidt returned to Khanbogd Soum on June 7-8, 2016, to follow up on meetings of March/April compile further information on changes to herders' winter camp sites, seasonal movements and livestock numbers.

During the field visit June 7-8, the following activities were undertaken: Meetings were held with TPC MU, TPC members and experts of OT working on pasture and water issues, with the TPC chairman, and the head of Khanbogd Soum livestock unit. Herders from the Ekhen Haliv area joint the meeting on June 7 to bring to the attention of IEP that they were/are users of summer/autumn pasture in the Haliv-Dugat area and consider themselves impacted therefore. Several of the herders from Ekhen Haliv had participated in meetings in phase 1.

Mr. Ulam-Undrakh, herder in Ekhen Haliv area, approached IEP to express his concern that the Haliv Dugat areas are included in IEP work, he also pointed out that water provision by OT (20 km radius) (following preliminary IEP report phase 1) is causing pasture degradation around these water points. IEP acknowledged and responded to his letter prior to returning to Khanbogd Soum June 7-8, 2016.

It was agreed that IEP member Sabine Schmidt would hold a separate meeting with these households to undertake the same process of mapping natural resources (pasture and water), assess changes to resource condition and effects on access and quality of herders' resources. This meeting took place on June 8 in Ekhen Haliv area. Participants provided also information for their households on changes and reasons for changes in campsite locations, seasonal moving patterns, pasture condition, suitability of pasture, livestock productivity, and livelihoods.

During the meeting June 7 with TPC representatives and community/pasture/water experts of OT, a study to assess changes in livestock concentration for 11 defined pasture areas in and surrounding Haliv Dugat was jointly designed, and the contracting of a local assistant to collect the data from the Soum archive was agreed.

The TPC chairman provided information on households' winter camps from 2000 – 2015 for the pastures in question, and as agreed the information has been verified/added to by the Vice Governor and Head of Livestock Unit. Data from the Soum archive were provided in August, and completion/confirmation of data sets is ongoing.

Annex 8 – Information on Ekhen Haliv Households, and Herders Perceptions of Impacts and Changes to Pasture and Water Resources

Herders from the Ekhen Haliv area joint the meeting on June 7, 2016 to bring to the attention of IEP that they were/are users of summer/autumn pasture in the Haliv-Dugat area and consider themselves impacted therefore. Several of the herders from Ekhen Haliv had participated in meetings in IEP phase 1.

It was agreed that IEP member Sabine Schmidt would hold a separate meeting with these households to undertake the same process of mapping natural resources (pasture and water), assess changes to resource condition and effects on access and quality of herders' resources. This meeting took place on June 8 in Ekhen Haliv area.

Participants provided also information for their households on changes and reasons for changes in campsite locations, seasonal moving patterns, pasture condition, suitability of pasture, livestock productivity, and livelihoods.

	Changes to Water Sources observed by herders of Ekhen Khaliv						
User's name	Name of water source	2000	2000-2005	2005-2010	2010-2015	2016	Reason for change
	Tsankhiin Khov	used to have permanent water	used to have permanent water	stopped having water permanently	dried up	if there is water it is not kept for long	now there is no water
	Ekhen Bor Tolgoin Khuv	used to have water	there was water during summer				now there is no water, if there is water the thirsty land absorbes it within 10 days
	Dund Bor Tolgoin Khuv	used to have permanent water	was good	used to have permanent water	used to spend the summer	if water collected there, it cannot stay for long	now this Khuv has got no water
	Adag Bor Tolgoin Khuv	used to have enough water	there was water	there was water	Water disappeared very fast	no water	no water
	Olon Khudgiin Khuren	3 households shared the well	became poor	the household moved out because there was no	guess its condition is still bad	water for drinking	there is water for drinking only

				water			
	Kharganiin Khuv	used to have permanent water	was good	used to have permanent water	used to spend the summer	if water collected there, it cannot stay for long	no water
D. Tuya Ch. Demberel	Elgen - SPW (simple pit well - hand well)	was not bad, because we had fewer livestock	deteriorated	started to extract even from the bottom	have been repaired, but the condition is still the same	the same	now there is less water, have to water livestock in turn every other day, however livestock cannot get enough
	Togoogiin Shand - SPW		was not bad	deteriorated	there was water only enough for drinking	there is water for drinking only	now there is wet earth in the bottom
M. Purevdorj	Amnii Usnii Well - SPW				digged a well for drinking water next to our camp, was serving its purpose	water became less	now dried up
M. Purevdorj	Ekhen Khaliv - SPW	used to have pritty good amount of water	started to deteriorate	had had to extract from the bottom	used water brought/filled by OT	repaired	no water, dried up
Sh. Ganbat	Ekhen Khaliv Koltsot, used to be equipped with short tube, now SPW	the Koltsot was good at that time	average	recharge rate became slower	recharge rate got even slower, the well could not reach the level over night	started to extract from the bottom, have to wait in order to water the livestock	there is not enough water

Ts. Tumurtogoo	Tuimertiin Us Sukhain SPW	was very good, could water 1000 animals	could water many livestock	deteriorated	started to extract from the bottom, water level dropped drammatically	got a bit better but not for long	now have to extract from the bottom in order to water 400 small livestock
M. Bayarsaikhan	Well built by Akhbayar		have been buried during this period	no water	no water	no water	no water
A. Narantsetseg	Deep Drilled Well built by OT				built in 2015, 2 households started using it since 2016	water recharge rate became slow	now even 300 livestock cannot get enough water
A. Ulam-Undrakh	Dund Khaliv, used to be short tube well, now SPW	used to have plenty of water	it could reach 40 cm below the upper edge and never have got out of water. Just next to it, the wild asses used to dig 40 cm to get water	water level became lower	was out of water, OT re-drilled it, but the water level could not reach higher then 54 cm , therefore OT was transporting water for well	water level was the same, watered the livestock every other day	Now 300 animals cannot get enough water. In 2014 it was drilled again 16 cm deeper but the water level was at 54 cm, water became much less. In 2015 OT was bringing water for our well but the quality of that water was not suitable for livestock health.
A. Ulam-Undrakh	Upper Dund Khaliv, OT built 350 m deep Koltsot well				built in 2012	Water level have not been raised, recharge rate is slow	Now there is water for drinking only which means around 100 liters a day
A. Narantsetseg	Adag Khaliv	used to have water	800 small livestock and more than 60 camels from 2 households were watered	deteriorated	it got out of water	had to water livestock at Shavagt and Gun ereg	Now getting only water for drinking

Ts. Nergui Ts. Elbegsaikhan G. Mendbayar Ts. Tsagaan	3 wells at Shavag SPW - used to be 2 short tube wells, 1 deep well	used to have water	Deep well had plenty of water, the livestock of 3 households could get enough water from the other 2 wells	started to extract from the bottom	was not enough, and started to use the nearby borehole	have to extract from the bottom, one well had dried up and collapsed.	Now all three wells are not enough, even have to extract from the bottom of deep well which used to have water all the time.
U. Tsatsralt	Khanan well		newly built	first years no household was using it	had had to extract from the bottom	it gets out of water after filling a water trough only twice, then have to wait for it to be recharged	the condition is the same

HERDERS' HOUSEHOLDS IN EKHEN KHALIV AREA

1. Dorjiin Tuya

- *Was at Elgen winter pasture in 2000*
- *We spend our winters there since 1992 to up to date*
- *Spent many years here, its suitable for us.*
- *Since OT established in 2005, pastures became poor, water recharge level started slow down.*
- *Share the pasture with 3-4 other families*
- *We usually stay at the same pasture all year around, even during summer and autumn*
- *Choose summer pasture depending on the rainfall*
- *Water usage depends on number of the livestock, now the livestock of 2 households drink from 2 sides. There are more number of large livestock, so water became scarce. Still use the same water source. Before the number of both small and large livestock was high. Since we started to extract from the bottom of the well the livestock could not have sufficient water, their water intake was limited resulting in poor wool production. If there is abundant rain, livestock wool grow healthy.*
- *We still want to continue herding livestock in the future, however because of lack of pasture and poor water source there is limited possibility to grow the livestock. If there are enough pastureland and water for the livestock, we, the herders whose livelihood depends on animal husbandry, still want to raise our livestock*.

2. Myadagiin Purevdorj

Ekhenekhaliv winter camp was built in 1988, living here for 28 years since then.We are still residing in this winter camp.

Our water source is only enough for drinking. Our well dried up 3 years ago Water source became scarce, we have been supplied water from OT for 3 years now.

We share the pasture with 4 other families. Now herd livestock of 3 families as of now, including my two sons'. Sold 40 camels, 20 horses due to water problems. Now we have got only 350 small livestock.

Livestock productivity is still good, livestock health is normal.

We would like our 2 sons to inherit our herding practice in the future, but water source is not enough. Will move to a place with rich pasture and good water source. Aiming to become a Herder with 1000 livestock. Family of 7, with 5 children, all got married and lives on their own.

INCOME:
In 2000:
Goat – 10; 7kg cashmere x 20,000 = 140,000 tugrug
Camel – 35; 100kg wool x 1000 = 100,000 tugrug
5 female camels with colts; 5 liter milk a day – 150 liter per month = 150,000 tugrug
150,000 x 12 months = 1,800,000 tugrug
Horse - 25
TOTAL: 2,040,000 tugrug
In 2005:
Goat – 200 x 750gr cashmere=150 kg cashmere x 40,000=6,000,000 tugrug
Camel – 50. 250 kg wool c 3000=750,000 tugrug
Horse – 35 …..
Mother's 10 female camels with colts, 10 liter milk a day
10 liter milk x 2000 x 30 = 600,000 x 12 = 7,200,000 tugrug
TOTAL: 13,950,000 tugrug
In 2010:
Goat – 400 x 740 gr cashmere =300 kg x 40,000 = 12,000,000 tugrug
Camel – 50 x 3000 x 250 kg = 750,000 tugrug
Horse – 40
Milk – 10 female camel in a month 600,000 x 12 = 7,200,000 tugrug
TOTAL: 19,950,000
In 2015:
Goat – 300. Cashmere 210kg x 49.000=10,290,000 tugrug
Sheep – 80
Camel – 30 x 5kg=150kg wool x 3.000=450.000 tugrug

Horse – 20
Road maintenance worker at OT, monthly pay 900.000 x 12months=9.800.000 tugrug
TOTAL: 20.540.000

3. Jadambiin Myadag

- *Was at Ekhen Khaliv in 2000*
- *Now residing at Khajuu Ulaan winter camp*
- *Number of livestock has been increased, and had had to establish new winter camp.*
- *Winter pasture's condition is the same*
- *Compare to previous pasture the current pasture is limited and has more pressure*
- *We share with Purevdorj in the west, Baatarchuluun in the north and Tumurtogoo in the east.*
- *Our summer pasture is located in the south of winter camp, in 500 meters north of Airport.*
- *Used the Ekhen Khalivs Koltsot well, still using it. Water level has lowered.*
- *Used to have 25large livestock and over 200small livestock. Sold the large livestock, because of lack of pasture, and cannot raise the small livestock to great numbers. Health of livestock is bad, because of dust. When we prepared meat for ourselves, lungs of livestock were blackened.*
- *It is hard to continue herding livestock in the future, it is impossible to raise livestock number because of poor pasture and bad water source.*

4. Sharaviin Ganbat

- *Was at Ekhen Khaliv in 2000*
- *Now residing at Zamiin Ulaan winter camp*
- *Had to move, because livestock increased in number*
- *Winter camp has the same suitable condition*
- *Lack of pasture compare to previous one*
- *Pasture is overloaded compare to previous one*
- *Share with Purevdorj in the west, Baatarchuluun in the north and Tumurtogoo in the east.*
- *Summer pasture is in the south of winter camp, at 500 meters near to Airport*
- *Used the Ekhen Khaliv Koltsot well, still using it. Water level has lowered*
- *Used to have around 20 large livestock, over 300 small livestock, sold the large livestock, because of pasture is poor. Cannot raise the small livestock to great numbers. Health of livestock is bad, because of dust. When we prepare meat for ourselves, lungs of livestock are blackened.*
- *It is hard to herd livestock anymore, because of poor pasture and bad water source. Not thinking of raising the number of livestock.*

INCOME:	*EXPENDITURE:*
2000	*2000*
Meat – 20 livestock - 1,000,000	*Food - 1,000,000*
Milk & Airag - 400,000	*Fuel – 1,800,000*
Labor wage (welding) - 1,500,000	*School Tuition – 900,000*

Wool & Cashmere - 1,000,000

2005	*2005*
Meat - 900,000	*Food - 1,500,000*
Milk & Airag - 300,000	*Fuel – 2,000,000*
Wool & Cashmere - 1,500,000	*School Tuition – 800,000*
2010	*2010*
Meat - 1,500,000	*Food – 1,500,000*
Milk & Airag - 500,000	*Fuel – 1,500,000*
Wool & Cashmere - 2,500,000	*School tuition – 1,000,000*
2015	*2015*
Meat - 1,500,000	*Food – 2,000,000*
Milk & Airag - 500,000	*Fuel – 1,300,000*
Wool & Cashmere - 2,600,000	*School tuition – 1,000,000*
Work fee - 8,400,000	

5. Ch. Demberel

- *Was at Olon Khudgiin Khuren winter camp*
- *Now residing at Ulaan Khoshuu winter camp in the east of previous pasture, north of Airport*
- *Moved because of water became scarce*
- *Of course it was suitable*
- *Pastures is becoming degraded*
- *A lot of pressure, many livestock*
- *As the saying goes "eat as long as muzzle gets in; settle as long as a space for ger" we all share our pastureland. We share with D. Tuya, J. Nergui, M. Purevdorj and B. Baatarchuluun.*
- *Summer and autumn pasture is close to our 2 winter camps.*
- *Now still at the same pasture, close to winter camp*
- *Summer pasture condition is hard, over capacitated.*
- *As for water source, if there is abundant rain, we water from lakes and backwaters, if less, we use our hand well and also use water brought by OT.*
- *There is no source of water, nowhere.*
- *Small livestock - over 300, large livestock - over 100, small livestock number is still the same, large livestock number has risen a little bit. Need to raise the number of livestock in order to improve our livelihood.*

- *Traditional herding practice has been disturbed, herders spend more money on livestock nowadays*
- *Productivity and health of livestock has drastically lessened and got worse. Used to have healthy livestock before.*
- *Future doesn't look bright. It is becoming very hard to continue herding livestock.*

6. Bayanmunkhiin Baatarchuluun, herder of Gaviluud bagh

- Since 2000 up to date have been living at Kharaat winter camp.
- We still spend the winter at our old wintercamp in Kharaat, we did not move out
- Pasture became scarce, because of mining impact. Pasture deteriorated, vegetation growth worsened, a lot of pressure.
- We share the pasture with 5 other families: Gurdorj, Demberel, Ganbat, Tumurtogoo and Purevdorj.
- Our summer pastureland is in 2.5 km east of winter camp
- Used to spend the autumn at airport area, but now water source has become so worse. Airport was built on our autumn pastureland.
- In 2000, our well easily watered 300 camels, now it is not even enough for 100 camels. Source of water was good before, now it is worsened. Since OT started getting groundwater through pipeline the radix, wells and springs are dried up, want to have a deep well made.
- Herding around 500 livestock as of now. Used to be 700. Horse 60, camel 50, sheep 250, goat 200.
- The possibility to herd livestock is reduced because of mining, roads, holes and dust.
- Livestock productivity has changed because of lack of pasture and water source; dust from crusher etc. Livestock health is becoming worse, because of poor pasture, bad water source and dust. OT, airport, dust may cause danger not only to livestock health but also to humans.
- In the future, would like to be engaged in intensive livestock herding improving the quality of meat and milk. Need to provide vaccination to keep the livestock healthy.

7. A. Ulamundrakh

- *Was at Khuliin winter camp in 2000. Our parents were living there.*
- *Now we have a winter camp at Shar Khooloi.*
- *We herd our livestock only to the west and south, because there are other families in the north and east side. We are blocked by Airport in the west and living between spring and winter pasturelands only. Winter camp source of water has become scarce, not even enough for 300 livestock. Last year we used water brought from OT to our well. That water was not suited for livestock. Our winter pasture not only squeezed on top of that there is no water which makes it even more difficult. Our livestock graze between spring and winter pastures, when there is nothing to eat during spring we lose 50-100 livestock. Herding became harder and harder. A lot of pressure, we share the pasture with other households. All herders from Khaliv river come to our winter camp area and herders from Bayan, Javkhlant and Khaliv bring their livestock into our spring pasture and eat up everything during spring and autumn then they leave causing the settled families like us a lot of damage. Livestock from Oyutiin river and Dugat comes to our winter pastureland too.*
- *Summer pasture is at Khanan, even if we have deep well there, it is still not enough for livestock. We full up 2 watering tubs before we bring the livestock. It seems the recharge rate is faster than winter camp's. 10-15 minutes later, we start up the pump, water comes out normally. When water comes out in small amount, we have to turn the pump off, otherwise it might break.*
- *Small livestock – 350, large livestock - 20, including livestock of our 4 children.*

- *Airport is in the west, roads in the south, so we have to go around the roads, have to climb up the tall barriers alongside the roads and the dust from roads cause low visibility.*
- *Lately it became hard to raise the livestock, because of poor pasture and bad water source. If we reduce the number of our livestock, it will be not enough to sustain our livelihood. Not really sure what to do.*
- *Eating dusty grass has makes the lungs of livestock bloody and watery. When there is too much dust in the morning when we get up our eyes get itchy and nose gets blocked. At 6 am in the morning, there is usually full of dust, one cannot even see in the range of 200-300 meters due to the dust.*
- *Seems to me, there is 1 or are 2 ways to sustain the animal husbandry. To get the mining industry to support animal husbandry, the herders. A strong government policy need to be in place. Need to understand each other.*

8. U. TUVSHINTUGS, Gaviluud bagh

- *In 2000 grandparents were rsiding at Khots winter camp.*
- *Now the winter camp is at Bumbatiin Khukh Uzuur.*
- *In 2013 the vegetation yield was bad. Manu households livestock grazed eating all the grasses and it was impossible to spend winter, so moved to "Sumt" in Bayan-Ovoo soum, and moved back in June 2014. During this movement a lot of livestock died. The other households from our river area were moved to Tsogt-Tsetsii.*
- *Our current winter camp area is used by many other households during summer and autumn. There was installed a water tank in our pasture in Oyu Tolgoi and so many camels and small livestock from Javkhlant, Bayan and Gaviluud baghs came over to get water. After that there was no grass left to feed our animals making it not possible to spend winter and spring there. We could not afford moving out therefore we have lost a lot animals including young ones.*
- *Pasture pressure is high. Before, the camels used to graze in "Oyut" valley, "Dugat" and "Undai" river areas. Now all the camels came to our pasture. Those camels used to water from Dugat spring are coming to Khaliv river in search of water. But there is no water in Khaliv river, and it is difficult because the camels have no water.*
- *Summer pasture at Dugat, Tavan Tolgoi, Salhit and Khanan Davaa. Hare the pasture with other households. During summer: Nergui, Elbegsaikhan, Munkhtur, Tsagaan, Narantsetseg, Ch. Mandal, Enkhsaikhan, Mendbayar, Jargalsaikhan, Boyog ?, Shirnen – from Javkhlant; Khayan, Duger, Natsagdorj, Garavaa, Saikhnaa from Bayan etc. stayed for the whole summer and autumn.*
- *Before we easil get water from hand well, spring, radix and moist land. Now we water our animals from deep well using pump (deep well). Though this requires less physical labour but not economical. It gets out of order if the water recharge would be low.*
- *Livestock number: goat 50, sheep 50*
- *There is a lot of dust created alongside the Oyu-Tolgoi-Khanbogd road. Road crossings, less of animal crossings make it difficult to run animal husbandry. We need to ride around the road, need to get over a high road causing injury to kidneys and spine etc.*
- *Livestock productivity – livestock products' price is decreasing. A sheep hide is not worth a price of one khuushuur. Last summer our 14 young goats were run over by the truck, poor young goats lost their mother. The trucks exceed the speed limit on the road.*
- *We would like to raise the number of livestock inherited from our grandparents but it is difficult due to the lack of water and pasture.*

9. Ulam-Undrakh TSATSRALT, Gaviluud bagh

- *In 2000 our grandparents were at Kholiin buuts, since 2002 at Modon Khond.*
- *Moved out giving their winter camp to Tsagaan who was relocated.*
- *Current Khanan Salkhit is located near to Gunii Khooloi, UB-OT, OT-KHB roads and the airport. During summer and autumn the households from Javkhlant, Bayan and Gaviluud, whose pastures were squeezed by the mining, are coming here and causing the degradation of pasture, therefore we loose a lot of animals during winter and spring.*
- *One autumn, we spend the winter and spring in "Sumt" in Bayan-ovoo soum. All other households from our river went to Tsogts-Tsetsii. Our pasture is squeezed by the airport in the west, and by the road in the south.*
- *Yes. Tsagaan, Nergui, Mendbayar, Narantsetseg, Munkhtur, Ayush, Saikhnaa, Khayan, Ddiya, Duger, Natsagdorj, Garavaa, Bum, Jargalsaikhan and many other households in order to protect their winter camp pasture come to our area as reserve pasture during summer causing damage to us. On top of that we loose a lot of animals due to approximate location to OT. A young goat was run over on the road.*
- *Used to move to any place we liked. Dugat, Dundan, Bumbat, Tavan Tolgoi etc.*
- *Now spend 4 seasons of the year here. Stay in Shar khooloi in November, December, January and February. It means we have got no summer pasture.*
- *A lot of large livestock come here during summer and autumn.*
- *The only water source is the water in Khanan. We have to fill the two water troughs before the animals come to water site.*
- *There is a lack of possibility to raise livestock.*
- *Expenses increased. Have to follow the detour route. It is not possible to cross the roads with a sharp edge and the metal mesh fence. Labour increased in order to protect our animals from the crows. The trucks run over the animals therefore we need to look after the livestock all the time.*
- *Livestock heatlh: many animals die during spring due to wasting. The young ones also die if the mother dies. A lot of dust. Before the vegetation yield was good and there was water. Households did not move to others' winter camps. OT installed water tanks near to our winter and spring camp area, and we are the ones who bear the damages. It is difficult to be alive, to maintain our livelihood. We want to keep out livestock in the place where there is pasture and water. Both livestock and mining would succeed through close cooperation with Oyu Tolgoi.*

10. Amitan NARANTSETSEG

In 2000 our winter camp was at Modon Buuts.

Now we still reside at Modon Buuts.

We did not move out, there is no place or pasture in our bagh.

Compare to previous condition, the pasture is getting overloaded day by day and the pasture yield is deteriorating.

We share the pasture with 5 more households within 2.5 km all around. Before we used to spend summer and autumn at Dugat and the airport area. Now we spend all four seasons around our winter camp.

Water sourcecalled Adag Khaliv. The mining used the well, but the recharge rate was getting slower and since 2008 was using water sources in Ekhen Khaliv, Undur Khudag, Zaaragt, Shavag, sometimes survived installing deep pump in the drilling boreholes and in the autumn of 2015 there was built a deep well at Undur Ereg but last spring the recharge was interrupted therefore closed it temporarily.

Before we had more than 170 livestock converted to small cattle head. We have tried to raise the number of livestock but it was not possible due to the lack of pasture and water. It became normal for large cattle to get scattered/disbanded/lost in a search of pasture and water.

Because of livestock of many households had have to share the same pasture there is nothing to eat for horses and camels used for transport, therefore we have to travel using "yava' motorcycles, and it is not rare for us elderly people to get injured and incur an economical damage.

Water level is getting low due to the poor recharge rate, and it is been a long time since we started to water our livestock installing electrical pump in the well.

Before there was almost no case of animal disease. But now there is a tendency to increase of occurrences of lung disorder, esophageal ulcer, and liver and omentum cling to ribs etc.

In the future the opportunity to maintain animal herding is bad, and the possibility to be engaged in another trade is poor, water issues is getting crucial. All these difficulties mentioned above are seriously affecting the herders' economical ability.

The relocation of households from Dugat and Oyu Tolgoi was done without any economical feasibility thus created current overload. Moreover, there were a lot of drilling all over the livestock pasture, and I think, the groundwater and soil moisture were lost through these holes affecting vegetation yield and water recharge rate.

There are so many places that are not rehabilitated like Tavan Tolgoi quarry, temporary airport, Dugat spring, sand quarry at Khuis Tovog etc.

11. Ts. NERGUI

- *In 2000 was at Dugatiin Khotol.*
- *Now at Gyalaan winter camp.*
- *Relocated according to Oyu Tolgoi decision.*
- *Pasture and water access in current winter camp is not sufficient compare to previous winter camp area.*
- *Lack of pasture in current winter camp.*
- *The pasture is under pressure.*
- *We share pasture and water with 5 households: Munkhtur, Narantsetseg, Choijilsuren, Tsagaan and Mendbayar. Before during summer and autumn we used to move to any place we wanted to in Dugat, Tavan Tolgoi and Khanangiin Ar.*
- *Now we have no reserve pasture for summer, and have to spend the summer in our winter camp.*
- *Pasture is overcrowded.*
- *Before small livestock drank from Dugat water, and the large animals drank from Bor Ovoo spring.*
- *Now 4 households use Shavagiin Khoroot Khaliv to water their small and large livestock, water is in deficit, need to extract the water from the bottom.*
- *In 2000 small livestock - 500, large livestock – 80.*

- *Now, married out, small livestock – 100, large – 20.*
- *Number of livestock reduced due to lack of pasture and water.*
- *Never been herding other households' livestock.*
- *Pasture and water deficit make it difficult to maintain animal husbandry. Livestock diseases increased due to dust.*
- *Before livestock health was normally good.*
- *Now the animals die because of blown stomach; and blocked nose that makes it difficult to breath.*
- *I would like to continue maintaining the animal husbandry.*

12. Tsetsegmaa MUNKHTUR

Since 1992, my mother was residing at winter camp at Deliin Buuts, Gaviluud bagh, Khanbogd soum, together with us, her children, and in 2002 the winter camp was transferred to my name, and we live here up to date. As a young person, there was nothing nice than to be engaged in animal husbandry. But now, we face a lot of difficulties, challenges and impacts that are beyond our control. What causes all of these, from my point of view, mining impacts more. The pasture has been squeezed since the mining came over and started its operation, for example, we now share our pasture with 4 other households. Water issue is even worse. Because, before we all used the water at Adag Khaliv, and it was sufficient for all of us. But now it cannot even supply drinking water for households let alone watering the livestock of one household. We would not hide the fact that we now have to move from one deep well to another one and use pumps in order to water our animals. And I consider it right to say that using pump to water animals is another challenge for herders' whose economic situation is weak. Before there was a good time for us when we used to move around freely using the reserve pasture during summer and autumn. Now it is opposite. No pasture for summer and autumn, therefore have to spend four seasons of the year around our winter camps. Before I was herding livestock of my mother, all my siblings and plus the livestock of soum kindergarden. Now it is not the same. Though we reduced the number of own livestock, lack of access to pasture and water is still affecting us making it impossible to raise livestock. Having few livestock is not sufficient for young herders to sustain our livelihood. We would want to increase the number of livestock but there are not sufficient pasture and water. What is the reason? There were drilled a lot of boreholes everywhere on livestock pasture and those were not filled or rehabilitated; the soil water is lost causing low vegetation growth and reduction of plant types. Water recharge rate become slow, number of roads has been increased causing a lot of dust, which in its turn causes livestock intestine disorders. It is really difficult to maintain livestock herding in the future.

13. Ts. ELBEGSAIKHAN

- *In 2000 was at Dugatiin Khotol.*
- *Current winter camp is at Khaliviin Ulaan Ovoo.*
- *Relocated according to Oyu Tolgoi decision.*
- *Pasture and water access in current winter camp is not sufficient compare to previous winter camp area.*
- *Lack of pasture in current winter camp.*
- *The pasture is under pressure.*
- *We share pasture and water with 5 households: Tsagaan, Choijilsuren, Munkhtur, Narantsetseg and Mendbayar.*
- *Before during summer and autumn we used to move to any place we wanted to in Dugat, Tavan Tolgoi and Khanangiin Ar.*
- *Now we have no reserve pasture for summer, and have to spend the summer in our winter camp.*
- *Pasture is overcrowded.*

- *Before small livestock drank from Dugat water, and the large animals drank from Bor Ovoo spring.*
- *Now 4 households use Shavagiin Khoroot Khaliv to water their small and large livestock, water is in deficit, need to extract the water from the bottom.*
- *In 2000: small livestock - 500, large livestock – 80.*
- *Now, married out, small livestock – 140, large – 20.*
- *Number of livestock reduced due to lack of pasture and water. In 2014, because of lack of pasture and water, we moved to Tsogt-Tsetsii soum loading our livestock on trucks, and during the journey run into a road accident and 3 persons got severe injuries*
- *Never been herding other households' livestock.*
- *Pasture and water deficit make it difficult to maintain animal husbandry. Livestock diseases increased due to dust.*
- *Before livestock health was normally good.*
- *Now the animals die because of blown stomach; and blocked nose that makes it difficult to breath.*
- *I would like to continue maintaining the animal husbandry.*

Ekhen Haliv Pasture Users and Condition – Information provided by Herders of Ekhen Haliv (June 8, 2016)

∂/∂	***Name of pasture area***	***2000***	***2000-2005***	***2005-2010***	***2010-2015***	***Reason***
1	*inwards from Elgenii Enger, Kharaat Uul*	*D. Tuya Elgen* *Ch. Demberel Ulaan Khoshuu* *B. Baatarchuluun Kharaat 4*	*D. Tuya Elgen* *Ch. Demberel Ulaan Khoshuu* *B. Baatarchuluun Xapaam 3*	*D. Tuya Elgen* *Ch. Demberel Ulaan Khoshuu* *B. Baatarchuluun Kharaat* *D. Borbandi Modon Shand*	*D. Tuya Elgen* *Ch. Demberel Ulaan Khoshuu* *B. Baatarchuluun Kharaat*	*In 2009 there was lack of animal feed and occurred livestock losses.*
2	*Beginning of Khongil, Khaliv river, Zamiin Ulaanii Tsavuu*	*B. Khashchuluun Zamiin Ulaan* *Sh. Ganbat Khajuu-Ulaan* *J. Myadag Khongil* *M. Purevdorj Ekhen Khaliv 4*	*B. Khashchuluun Zamiin Ulaan* *Sh. Ganbat Khajuu-Ulaan* *J. Myadag Khongil* *M. Purevdorj Ekhen Khaliv 3*	*B. Khashchuluun Zamiin Ulaan* *Sh. Ganbat Khajuu-Ulaan* *J. Myadag Khongil* *M. Purevdorj Ekhen Khaliv*	*B. Khashchuluun Zamiin Ulaan* *Sh. Ganbat Khajuu-Ulaan* *J. Myadag Khongil* *M. Purevdorj Ekhen Khaliv*	*In 2009 there was lack of animal feed and occurred livestock losses.* *In 2013-2014 M. Purevdorj's household moved to reserve pasture in Bayan-Ovoo soum*
3	*Khaliviin Uuls*	*Ts. Tsetsegmaa Del* *B. Damdin Tuimert* *M. Amitan Khul* *Ts. Nergui Ulaanovoo*	*A. Narantsetseg Modonkhond* *B. Damdin Tuimert* *Ts. Munkhtur Del*	*Ts. Munkhtur Del* *A. Narantsetseg Modonkhond* *Ts. Nergui Ulaanovoo*	*Ts. Munkhtur Del* *A. Narantsetseg Modonkhond* *U. Nandintsetseg*	*In 2009 there was lack of animal feed and occurred livestock losses.*

		Ts. Elbegsaikhan Ulaanovoo *Mendbayar Gyalaan* 4	*Ts. Nergui Ulaanovoo* *Ts. Elbegsaikhan Ulaanovoo* *Mendbayar Gyalaan* *Ts. Tumurtogoo Tuimert* 3	*Ts. Elbegsaikhan Ulaanovoo* *Mendbayar Gyalaan* *Ts. Tumurtogoo Tuimert*	*Myangatkhond* *Ts. Nergui Ulaanovoo* *Ts. Elbegsaikhan Ulaanovoo* *Mendbayar Gyalaan* *Ts. Tumurtogoo Tuimert* *Ts. Saikhandelger Tuimert*	*In 2014 Munkhtur, Narantsetseg, Nergui, Elbegsaikhan, Mendbayar, nandintsetseg and Tumurtogoo's households moved to remote pasture in Tsogt-Tsetsii and got some losses*
4	*Tavan Tolgoin Tal*	*B. Damdin Tuimert* *M. Amitan Khul* *Ts. Tsetsegmaa Del* *D. Bandi Ekhen Khaliv* *M. Byambaa Ikhriin Ulaan* *M. Purevdorj Ekhen Khaliv* 4	*A. Narantsetseg Modonkhond* *B. Damdin Tuimert* *M. Purevdorj Ekhen Khaliv* *Ts. Munkhtur Del* *Ts. Tsagaan Khul* 3	*A. Ulam-Undrakh Sharkhooloi* *Ts. Munkhtur Del* *A. Narantsetseg Modonkhond* *Ts. Tsagaan Khul* 0[1]	*A. Ulam-Undrakh Sharkhooloi* *Ts. Munkhtur Del* *A. Narantsetseg Modonkhond* *Ts. Tsagaan Khul* *Kh. Khayan* *Ts. Battogtokh* 0[2]	*In 2009 there was lack of animal feed and occurred livestock losses.* *In 2013-2014 there was not sufficient vegetaion and water, and A. Ulam-Undrakh, Tsatsralt and Tuvshintugs moved to remote pasture in Bayan-Ovoo soum, though the vegetation was good there, 68 livestock died and 54 were lost, and they*

[1] Asia gold company drilled a lot boreholes and water became scarce.
A great size of pastue was taken for building Oyut airport and pasture was fragmented. In the east of the airport a big piece of pasture became bare due to technological failure. Pasture was damaged because there was no biological rehabilitation done at quarries and alongside the roads in Bumbatiin Khukh Uzuur and in the south west of Tavan Tolgoi
Area 6709A was fenced and the large livestock that used to be grazing there for 4 seasons of the year come to other pasture and graze permanently eating small animals feed

[2] Khanbumbat airport was built ;created a lot of dust; and fragmented pastures causing lack of access to pasture
A big peace of land occupied by 2 quarries at 2 hills in the east of Tavan Tolgoi were left without rehabilitation leaving yellow dust rising in the air
"A" camp settled on the pasture. Now it became a local garbage collection let alone the rehabilitation
Herders from Javkhlant bagh and Undai river area, whose who lost their pasture and water, came over, water tank installed and they used to stay for summer and autumn. It causes a loss of approximately 100 livestock each year.
Gunii Khooloi construction work created a lot of dust making the condition worse, and a certain amount of pastureland was lost.

						moved back to their place.
5	*Shiveegiin Khondii*	*J. Myadag Khongil* *Ts. Battogtokh Khukh Uzuur* *4*	*J. Myadag Khongil* *Ts. Battogtokh Khukh Uzuur*	*J. Myadag Khongil* *Ts. Battogtokh Khukh Uzuur*	*U. Battogtokh Gog*	*In 2009 there was lack of animal feed and occurred livestock losses.*
6	*Khanangiin Khyar, Khanangiin khundii*	*M. Bayarsaikhan Khanandavaa*		*A. Ulam-Undrakh Khanan Salkhit*	*U. Tsatsralt Khanan Salkhit*	*In 2009 there was lack of animal feed and occurred livestock losses.* *Tsatsralt's household moved to remote pasture in 2013-14*
7	*Alongside Khaliv river*	*4*			*J. Enkhsaikhan* *S. Bum-Erdene* *Ch. Mandal*	*In 2009 there was lack of animal feed and occurred livestock losses.*
8	*Dugat, Bumbatiin Khukh Uzuur area pasture*	*3- 4* *Reason: Here, there were drilling going on all the time and the vehicles running back and forward*	*3*	*2* *At this time there were improved gravel roads built on two sides*	*0* *U. Tuvshintugs* *Bumbatiin Khukh Uzuur* *Because of the road built without any bridges the possibility for animals to reach the water was reduced, besides, loss of access to Dugat spring became a serious issue. Dugat almost dried up* *The water level in its well was lowered.*	*In 2009 there was lack of animal feed and occurred livestock losses.*

Impacts on Pasture, Water and Herders – observations/information by A. Ulam-Undrakh, June 8, 2016,

The table includes sections on physical impacts as provided by A. Ulam-Undrakh[3]

№	*Impact*	*Affects whome/what*	*How it afftects*	*How long*	*Additional comments*
1	*6709A Mining licensed area*	*Human and livestock*	*The current fenced site 6709A and next to be fenced sites 6708A,6710A are used to be surrounded by more than ten springs like Dundan, Ulaan Tolgoi, Bumbat, Dugat, Khar Khad, Khukh Khad and Bor-Ovoo and was the main pastureland where around 3000 large livestock were grazing all over the year, since this area was fensed the large livestock that were grazing there from Gaviluud, Javkhlant, Kharzag and Mogoit baghs moved to pastures in Tavan Tolgoin Tal, Oortsog, Khanan, Shivee valleys, Untaakhai, Zamiin Khoovor and further to Sumt valley occupying small livestock pastures. Due to the loss of pasture access in the spring deaths of small livestock caused by emaciatation are*	*Continually*	

[3] The information provided refers also to impacts on human rights and mental well being, including by "*the contractor Bambai Securities company that seriously voilated human rights"* and concerns about the policy of TPC that members do not make public statements without all members consent.

			ышаашөшёйиэлн increased. For example: During last sprind, our household have lost more than 30 young animals and the same number of adult livestock. This is a great loss for herder's household economy.		
2	*Impacts caused by relocated herders' households*	*livestock*	*OT relocated households from its licensed site without any serious planning moving them where they wanted to and built winter camps and wells for them; but this created a burden for those herders who were residing there before they moved in, the pasture and water are squeezed by moved-in households. The cases of herders argueing and fighting over pasture and water are increasing and may in the future drive to community conflict.*	*Continually*	
3	*Boreholes in Gunii Khooloi through which the soil water is leaking deep to the ground*		*A number of water exploration and monitoring boreholes drilled within 30 km raduis around Oyu Tolgoi in Gunii Khooli and Galbiin Govi Гare leaking and the water is joining the groundwater where Oyu Tolgoi LLC is getting its water supply, thus the soil water used by herders for drinking and watering their livestock is apparently lost. Water issue is the prime demand not only for herders and for entire mankind therefore no compensation would be able to replace it. However, as long as it relates to water, it must be conpensated. We do believe and look forward to compensation.*	*Continually It will be still affecting in the future, because the natural ecosystem has been disturbed.*	
4	*Quarries used during construction phase and roads towards those quarries*		*Oyu Tolgoi LLC did not rehabilitate the gravel and sand quarries and roads towards the quarries used during its construction phase; as long as a big mining was establishing there were built infrastucture to transport logistics and 25000 – 30000 hectars of pastureland was lost due to the many roads connecting those*	*Until the biological rehabilitation will be completed*	1. *There was no temporary road built between the quarries and and supply point, many wide earth roads that were used by them are not recovered so far* 2. *Oyu Tolgoi – Gashuun*

			infrastuctures. This is equal to the territory of current Gaviluud bagh. It is ovbious that this will be continued as long as the OT contractors establish their camps around the project area. Below is the list of the biggest quarries that occupy the most main biggest pastures, and used with wrong technology and abondoned due without rehabilitation. - *2 quarries at two eastern hills of Tavan Tolgoi* - *Quarry at south-western hill of Tavan Tolgoi and left with no rehabilitation* - *Quarry at Bumbatiin Khukh Uzuur* - *Ust river quarry* - *A wide range of land was damaged because the did not build a temporary road to the quarry at the south-west of Tavan Tolgoi, and no plant is growing there so far.* - *Oyut airport road* - *The valley densely populated by Eurotia was destroyed during the construction of Oyut airport* - *A very wide auto road from Ulaanbaatar to Oyu Tolgoi*		*Sikhait Consentration road cuts through the pastures.* 3. *The improved gravel roads between Manlia-Khanbogd, Khanbogd-Oyu Tolgoi, Oyu Tolgoi-Del are occupying a wide range of land creating a huge thread to livestock to be hit by trucks.* 4. *70 km improved road in Gunii Khooloi.*
5	*Impact on wildlife - predators' accustomation to humanbeings and livestock, domestication, gradual adaptation towards habits of domestic animals*		*The more people work in Oyu Tolgoi the more garbage created and thrown to landfill; and the behavior of carrion scavengers like himalayan griffon(vulture), bearded vulture(lammergeier), raven etc. that feed on garbage is changing; they are getting adapted to being close to human and livestock, no longer fear of them; they pull-out the tongue of young animals, dig their eyes, shove their beak through armpit of alive livestock to pull out liver, heart and lungs; eat*	*Continually*	

			alive the loin meat through aminal's anus etc. – there is a household that lost 50% of young animals. It would be very soon when blue wolves and foxes may behave in the same manner.		
6	*Dust from roads and white dust from the plant*		*The road dust and the white dust from the plant are currently measured and we are told it is within normal rate; however this is banging the death gong for humans and livestock. Too much dust whirl up in the morning and in the evening, if there is no wind the dust stays for whole day and night. This spreads silicon and lead dioxide, carbon monoxide, carbonic acid, nitric oxide/dioxide, it is similar like nuclear weapon. I am suffering from bronchial asthma for a year already though I do not have a chance to get it diagnosed. The fact that inner organs of livestock prepared for food are affected by diseases shows how bad the situation is.*	*Continually, and in the future too*	
7	*Severe violations of human rights*		*We have been requesting to take measures against the contractor which severely violated human rights in a criminal manner but there was no action taken, in desperation we contacted Oyu Tolgoi LLC, they too did take no measure. Logically, Bambai Securities company that seriously voilated human right does not have both legal and moral right to be work here. Moreover, recently, I have attended the Tripartite Council meeting, which organized with Oyu Tolgoi LLC involvement, with no right to speech. This is a serious violation of the provisions of paragraph 16 of Article 16 of the Mongolian Constitution. Undermining the Constitution of the country means they do not respect the country they run their operation. And the fact that he members of tripartite council*	*It is tent to be occuring continually*	

			have no right to publish or to give a speech without each others' permission attracts an attention creating a question what kind of organization is working there? I would like to request to specifically focus on this.		
8	*Mental pressure from some of the company management*		*Mental pressure from some of the company management spreading rumors like:* - *Do not let the herders to overindulge* - *Herders fill their wells with stones* - *OT provides animal feed thus blocking private businesses etc.* *When we move out to remote reserve pasture the local herders ask pointedly:"You handed over all your pastures to Oyu Tolgoi, and where are you going now? Why you are not staying next to your Oyu Tolgoi, why you are moving here squeezing our pasture?*	*At certain time, certain managers behave like this*	
9	*Influence of dark principles*		*Recently it is becoming obvious that there is a conspiracy with local authorities; this might create a crack in local government and herders relationship.*	*The issue is existing right now*	*1. It moves the govermnment waway from people* *2. It creates fight within the government* *3. The unethical business owners tent to a operational principle to lobby the party that will serve him/her*
10	*"Oyut" old airport impact*		*This occupies a large pastureland and also fragments the pastures.*	*Until the biological rehabilitation will be completed*	
11	*"Khanbumbat" airport*		*This occupies much larger territory than the previous "Oyut" airport, and also cuts off the pastures. These two airports together dividing the Tavan Tolgoi field*	*Continually, and in the future too*	
12	*Impacts of Gunii Khooloi and its roads*		*70 км bare strip*	*Continually, in the future too*	
13	*Water lagoons*		*These lagoons occupy and fensed not a small size*	*Continually, in*	

			of pastureland	*the future too*	
14	*Impact related to Auto road safety*		*Speeding trucks hit the livestock to death a lot*	*This inmpact is existing as a matter of fact, but it can be mitigated or eliminated through the efforts of all concerned parties*	
15	*Auto road noise, road traffic impact*		*It happens often that the livestock grazing close to the roads are frightened by truck noice and thus got lost loosing their way.* *The road sides dug deep and makes it impossible for motocycle riders to cross over, and they have have to get around. Maximum it is 80 - 90 см high, it is a real challenge for herders plus life threatening too, there is a danger for motocyclists of getting injurred of falling or being hit by a truck in a attempt to cross over.*	*Continaully*	
16	*Impact from striking lights*		*Under the striking lights of the vehicles the livestock cannot move anywhere, they get stuck in the mid of the road and hit by trucks.*	*Contimually*	

Annex 5 of Phase 1 Report, corrected and completed household names

Households that lost Summer Pasture through loss of Bor Ovoo Spring that were named in Focus Group Discussions and Interviews during IEP Phase 1

The pastures along the Undai, and namely around Bor Ovoo and the current Mine License area were summer pasture not only for all herders of Javkhalant Bag, but were also used by herders of other bag of Khanbogd Soum and by herders from neighboring Soums at times.

The names of 59 households were listed by local herders and former Soum and Bag Government representatives to have suffered loss of summer pasture through the loss of Bor Ovoo spring. (The list is not presented here as a complete list of all effected households; as pointed out, the impacts are on community level.)

Households with winter camps along Undai River that lost summer pasture area (listed by Focus Group Discussants in December 2013) – total 22

Ts. Battogtokh, O. Enkhbayr, S. Gochoosuren, "Batbaatar"(=U. Bolchuluun), D. Enkhchuluun, Ch. Tsogt, Ts. Binderya, U.. Battogtokh, D. Namsrai, U.. Chuluu (passed away, wife's name Ts. Bandi), B. Shinebayr, R. Tsend Ayush, T. Nyamsuren, N. Shirnen, I. Doljinsuren, U. Nadmid, Kh. Sodnomdorj, Kh. Jargalsaikhan, (passed away, wife's name is Ts. Dolgorjav), D. Adiya, A. Ankhbayr, Ts. Altangerel (passed away, wife's name M. Nasan-Ulzii)

Households (from areas other than along Undai River) that lost summer and spring pasture (listed by Focus Group Discussants in December 2013) – total 28

D. Borkhuu, Kh.. Surenkhuu, R. Demberelnorov (passed away, wife' name Ts. Badarchuluun), Ts. Badamsuren, U. Ser-Od, Ts. Iderborgil, B. Enkh-Erdene, Ch. Demberel, Ch. Nansalmaa, D.. Luvsandagva, D. Boldbayar (passed away, wife' name Ch. Namdagmaa), Ts. Byamba, Ts. Jargalsaikhan, Kh. Otgonjav, Kh. Gantulga, M. Khonikhuu, P. Urjin, B. Erdenebayar, D. Munkhbayar, Ts. Khandsuren, Ts. Nergui, G.. Mendbayar, Ts. Munkhtur, S. Jargalsaikhan, Kh. Chuluunbaatar, P. Tsevegdorj, Kh. Ganbold, L. Battsengel

Households that have shared summer pasture around Bor Ovoo spring (listed by Namsrai, October 2014) and Undai River during the last 10 years (previously there were more households). (those already mentioned above are in brackets) – total 9 in addition to the above.

B. Badamsambuu (not coming any more now), (Kh. Surenkhuu), B. Odkhuu, B. Badamsuren, (Ts. Iderborgil), (U. Ser-Od), A. Enkhbayar, D. Adiya, (D. Munkhbayar), Ts. Tsagaan, (L. Battsengel), (U. Battogtokh), (R. Tsend Ayush), (I. Doljinsuren), D. Namsrai (since 1962), E. Surenkhorloo, (Kh. Otgonjav), (D. Borkhuu), (B. Shinebayar), (O. Enkhbayar), (Ts. Binderya), Ts. Baatarchuluun, (plus those who passed away: D. Boldbayar, R. Demberelnorov, Ts. Altangerel).