<<Taikichiro Mori Memorial Research Fund>>

Graduate Student Researcher Development Grant

Application Form for the Academic Year 2016

Achievement Report

Submission date: 2017/02/24

Full name MYAGMARSUREN ENKHMEND	Graduate School of Media and Governance Grade: M2 / Student ID: 81425331 Program Name: EG
Supervisor WANGLIN YAN	

Theme of fieldwork

Mining and Its Impact on Local Communities in Mongolia, Case study KB (GIS mapping of Groundwater Level Variation)

Mongolia is facing environmental issues as a country such as desertification, lack of water, and air and water pollution. Moreover, the main water source is salty groundwater, and the supply is deficient. Therefore, water resource and quality is a major issue in Mongolia. In other words, this fragile ecosystem of Gobi region is more likely to experience irreversible damage from the current methods of mining operations and policies.

Purpose of work

Khanbogd soum, which located in Gobi South Desert area, is vulnerable to water shortages. The mining operation, which is mirrored by the water scarcity, has contributed to pasture growth, especially its impact on herder's deep and shallow wells. This leads to the following question that research aims to answer:

- How does water consumption in Khanbogd soum for mining affect groundwater levels and pasture quality?

This project addresses this question by investigate the impact of mining activities of Oyu Tolgoi mine on groundwater availability in Khanbogd soum.

Schedule 2017/10/03 ～ 2017/10/17	Actual working days: 11

Location

Ulaanbaatar city, Umnugobi province, Khanbogd soum

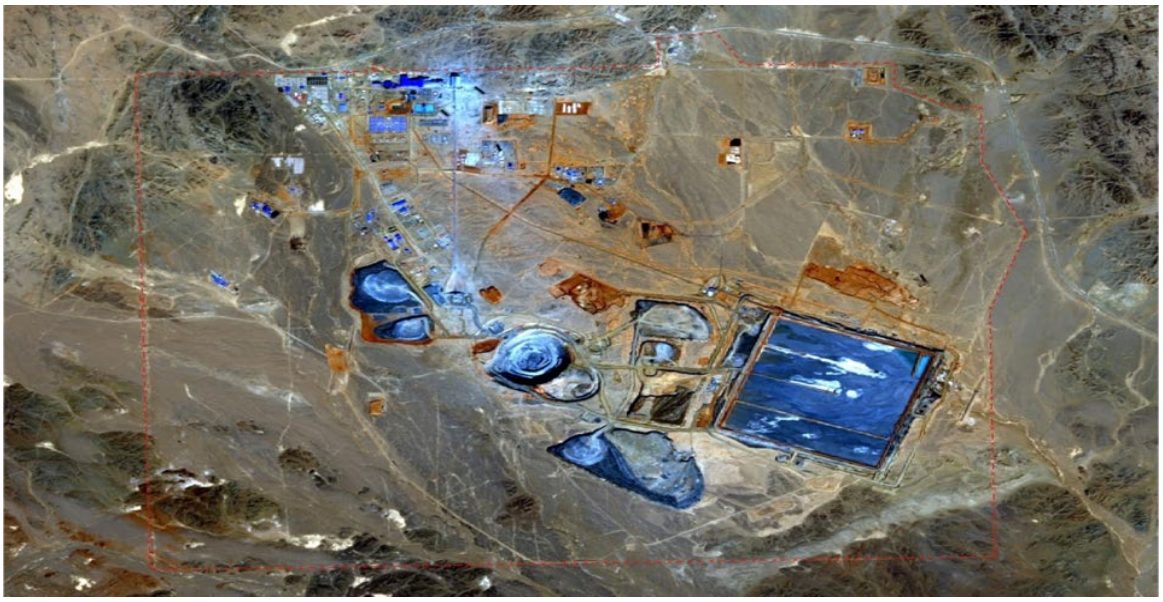
・Name of organization or company: Administration of Galba-Oosh-Doloodyn river basin
・Address: Santi Building II floor, Sainsand city, Dornogobi province, Mongolia
・Tel: 976-70523682
・URL: http://galba.gobiwater.mn
・Name of organization or company: Ministry of Environmental and Green Development, Tourism
・Address: Chingeltei district, UN street, Government building II
・Tel: 976-51-261699
・URL: http://mne.mn

Administratively, Khanbogd is a *soum* (district) of Omnogovi Province in southern Mongolia, which is the site of the Oyu Tolgoi mine. Geographically, Khanbogd soum lies between 43°11'48.29“ north latitude, 107°11'50.82“ east longitude in South Gobi (Total Area: 14964.4 km^2).

Also, the population has been doubled compared to the last 12 years (Population: 5057 (2014)). Khanbogd soum's number of livestock is increased about 24% in last decade (Livestock: 126,467 (2014)).

This location chosen since for the last several years mine booming in Mongolia and Oyu Tolgoi has a world class copper deposit. Also, it is the criterion of rapid development or Dutch Disease.

Figure 1. Oyu Tolgoi mining site 2015



Source: Landsat-8 image, Oyu Tolgoi LLC

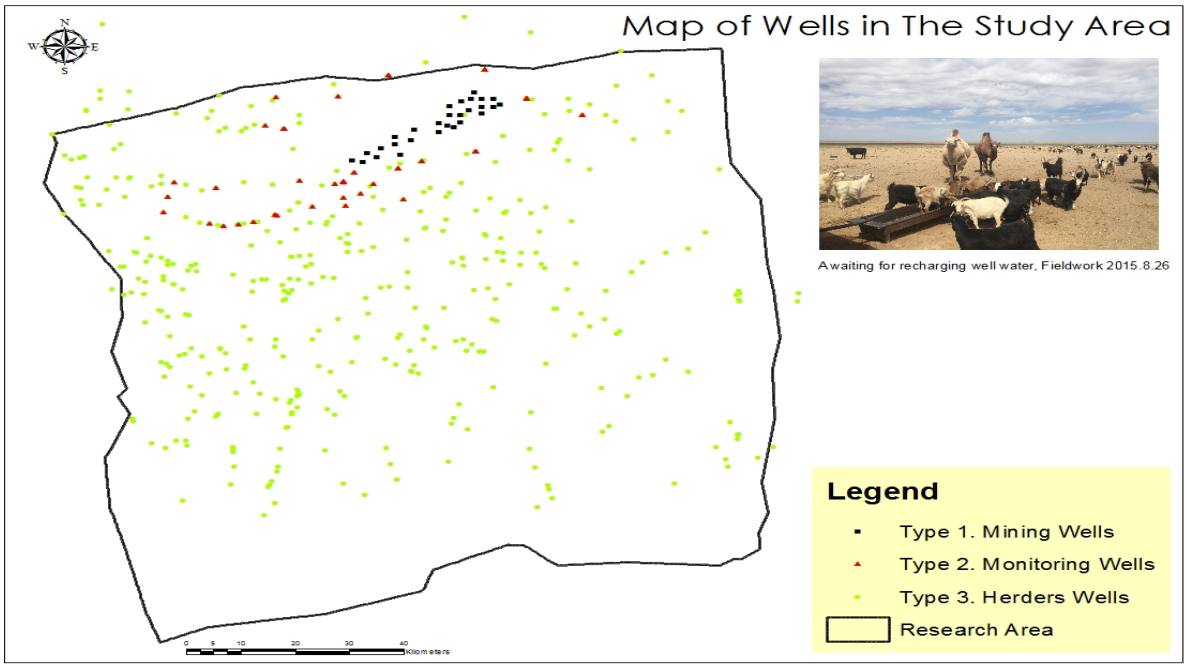
Water consumption: Oyu Tolgoi is currently using a total of 32 deep wells for the project for drinking and farming, processing plant and the water needs of the mining area. Of 30 wells, one well for the Khanbogd nursery grounds and one well for road construction was built between OT Gashuun Sukhait. Oyu Tolgoi mining is water consumption partially Gunii Hooloi aquifer started on January 8, 2011.

The OT Project 28 is currently using a total of 5 wells to collect packages of water purification and bottling plant, water retention ponds, water the plant needs. Active concentrator processes are used to full capacity for industrial and construction needs with a water storage pond to save water[1].
Khanbogd soum's groundwater abstracted from four types of wells: traditional, shaft, shallow, and deep wells.

[1] Report of water usage in Oyu Tolgoi project 2014

In research area have 511 wells (Fig 2) such as 28 wells that owned by the mining company, 46 monitoring wells, and 437 wells that belonging to herders.

Figure 2. Total groundwater wells



Originally the shaft wells, traditional wells, and shallow wells were the main abstraction means. With the introduction of motorized pumps, many higher-yielding deep production wells have been drilled since the late 1970s. After the transition, a large number of these wells have been abandoned due to lack of maintenance and unresolved ownership issues.

At the time of fieldwork in spring and fall, nearly all residents and stated that they had experienced or heard about decreased water levels in herder wells. The water level by comparing the rate of mining activities before (2009) and started (2012) measurement production of water level carried out to determine whether the water level dropped.

Thus, mining water supply wells (Gunii Hooloi pipeline), 10 kilometers of the space at the monitoring wells and 15 km distance at monitoring wells and divided into a total of 4 zones each one of the monitoring wells located far from up to 25 km and 25 km.

In research mentioned nearly every single Khanbogd soum's resident interviewed said that precipitation, ground and surface water resources are drying out, and many commented on the observable changes. Data analysis of this research explains that during 1991 to 2015 average of precipitation was 101 mm. However the focused year of 2009 precipitation was 47 mm lower by 53.5%, and 2012 precipitation was 108 mm higher as 6.9% from 21 years average.

Based on these findings, and discussion in 2012, precipitation was the highest in the last 21 years average, yet the groundwater level of that same year has decreased. In another word, the wells depth ranges between 4.69 to 4.57 mbgl and groundwater level dropped by 0.12 mbgl (Fig 3).

Figure 3. Summary of groundwater wells level changes

In summary of all above, Mongolia needs mining to develop, and mining companies need water to operate. However, the very fragile ecosystem of the Gobi region could be irreversibly damaged by current methods of mining, including negative impacts on herder's deep and shallow wells because mining water consumption has a direct and indirect effect on pasture growth, livestock, and herding lifestyle.