



NATIONAL STATISTICAL OFFICE OF MONGOLIA

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National Development Policy and Planning”
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Survey on impact of mining sector to economic, social and environmental status of Khanbogd soum, Omnogovi province, 2015

2015

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CHAPTER 1. CONCEPTS, METHODOLOGY AND ORGANIZATION

1.1. Background

The joint initiative of Mongolia and Australia to establish “Ulaanbaatar City Group on Statistics for Economies based on Natural Resources” was discussed and endorsed by the United Nations Statistical Commission (UNSC) during its 43rd Session, held in New York, the USA, from 24 February, 2012, to 2 March, 2012. The primary goals of the Ulaanbaatar City Group (UB Group) were to develop methodological and practical guidelines on statistical measurement for economies based on natural resources. The group will also make recommendations by establishing best practices in concepts and methods to track mining industry activities, investment in mining, accurately measuring the industry contribution to the economy and assessing mining impacts on other social and economic sectors within the framework of the System of National Accounts. The National Statistical Office of Mongolia jointly with the project on “Strengthening the Government Capacity of National Development Policy and Planning” conducted a survey to determine the impacts of mining to the economic, social and environmental status of Khanbodg soum, Omnogovi province in order to develop the practical guidelines.

The survey covered 3 main pillars of economy, society and environment under mining impact and the related issues were addresses in simple and coherent ways.

1.2. Concepts and definitions

Mining activities:

Mining activities include exploration activity, mine development, mineral production, and mine remediation exploration.

Impact of the mining activities:

Mining activities make considerable impact on the development of a country as a whole. We considered the following 3 pillars in order to measure these impacts by statistics indicators:

- 1) The economic impact: It is measured in terms of their contribution to GDP, employment income and other macroeconomic indicators.
- 2) The social impact: It is reflected by employment opportunities and public services created by these activities.
- 3) Environmental impact: The impact on environment is measured by indicators related to the use of natural resources and emissions of mining industry to air, water, and soil.

Employment:

Employment is expressed by the number of additional jobs created as a result of the expenditures made by mining activities.

Local government revenue:

Local budget consists of the budget of the aimag, the capital city, the soum and the district. Revenue consists of the tax revenue, non-tax revenue and other payment.

Remediation:

Complex activities, directed to restoring the economic importance and land fertility of destroyed land and to improve the environment under public interests.

Destroyed land:

Land, destroyed by mining activities, lost initial economic value and may have negative impact to the environment.

Used water:

Water source, used for mineral resource enrichment and processing, underground or surface water.

Hazardous waste:

Waste, hazardous to humans, animals and plants, able to smite, destroy them, have hazardous impact to their gens, negative impact to the environment, poisonous, corrosive, oxidant, explosive, flammable, radio-active, infectious as well solid, gas and liquid.

1.3. Survey objectives

Survey objective is to determine the mining impact factors, which have impact to the living level of the households, population subsistence in Khanbogd soum, Omnogovi province, the local infrastructure, economy and environment and to measure the impacts.

1.4. Survey scope and timing

Survey covered whole Khanbogd soum of Omnogovi province. The survey was organized by following 3 target groups:

- Household sampling survey (by questionnaire)
- Survey from administrative units (by forms)
- Survey from Oyu Tolgoi LLC (by form)

Data collection was conducted in November 2015.

1.5. Survey sampling

We made the household sampling, considering the representativeness of the soum and financial supplies. According to the population and household database of Mongolia as of September 2015 the households of Khanbogd soum, Omnogovi province was 1713, which was the data sampling size. Considering the survey goal we created 5 strata by the economic activities of the household heads. Khairkhan and Bayan bags had the smallest population, therefore, they were combined as one group. And we selected 250 households to represent 20 groups. The survey sampling was made by stratified sampling with Probability Proportional to Size (PPS).

Table 1: Number of selected households, distribution to strata

Baghs	Total selected households	Activities of the household head				
		Herder	Government officer	Household businesses	Mining and quarrying	Others
Total	250	65	16	31	71	67
Nomgon	47	11	3	8	11	14
Gaviluud	62	19	4	7	20	12
Javkhlant	87	18	4	8	30	27
Bayan&Khairkhan	54	17	5	8	10	14

From 250 households 240 were responded to the survey, involvement was 96.0 percent. We considered that 5 percent of the questionnaire to have non-response, therefore, the involvement percentage doesn't have negative impact to the survey results.

Sampling weight is determined by following formula:

$$M_{srij} = \frac{P_s \times H_{srij}}{n_{sr} \times p_{sri} \times h_{srij}} \text{ - formula to calculate sample unit weight per sampling}$$

Here: P, p, n, H & h values

- P – total population of the soum;
- p – total population of the strata;
- n – number of strata the sampling;
- H – total households of the strata;
- h – selected household per sample strata.

1.6. Survey questionnaire

We organized 3 groups in order to show the mining impact to the economy, society and environment by certain statistics indicators at current situation. Additionally, in analysis we also used the data on commodity goods and services price of the soums, collected by the NSO each month. The collected indicators are as follows:

Indicators to determine economic impacts:

- Soum market cost;
- Income of mining workers;
- Average wage of mining sector;
- Revenue to the budget from mining sector;
- Donations and supports from mining sector.

Indicators to determine social impacts:

- Social infrastructure conditions;
- Education, health, safety and security;

- Changes in lifestyles (elimination of traditional lifestyle, which is part of “intangible” cultural heritages of Mongolia);
- Population migration;
- Gender equality;
- Employment and population subsistence.

Indicators to determine environmental impacts:

- Dust, air emissions;
- Water consumption, waste water;
- Hazardous waste;
- Destroyed land, remediation.

1.7. Survey data processing

We conducted data entry, checking and editing works by CPro5.0 set program for census and survey data processing. And the results were developed by using the statistics package program IPM SPSS 21.0.

CHAPTER 2. GENERAL SUMMARY

Here are shown impacts of the mining sector to the economy, social and environment of the Khanbogd soum in brief.

Impacts	Positive	Negative
1. Impacts of the mining boom on household income	<ul style="list-style-type: none"> – 30.2 percent of households of the soum depend on mining sector’s activities. – Monthly average wage for mining sector is highest level and reached to the 881.7 thousand tugrug. – 716.8 million tugrug in average was gained from mining sector’s direct activities in a month. 	
2. Impacts of the mining boom on labor force	<ul style="list-style-type: none"> – 37.6 percent of employers of the soum or 815 person work in mining activities. 	
3. Impacts of the mining boom on local government revenue	<ul style="list-style-type: none"> – 57.9 percent of local government revenue was composed of revenue from mining sector in 2014. 	
4. Impacts of the mining boom on market price		<ul style="list-style-type: none"> – Prices of consumers’ goods and services, except meat are higher than Tsogtsetsii soum and aimag’s centre in Khanbogd soum.
5. Impacts of the mining boom on other economic sectors	<ul style="list-style-type: none"> – Income of 179.7 million tugrug was earned by production and service industries of the soum due to increase in household income from mining activities in direct way. 	<ul style="list-style-type: none"> – However number of population and household of the soum has increased intensively, number of herder households has decreased since 2011

		continuously.
6. Impacts of the mining boom on migration		<ul style="list-style-type: none"> – Number of participants to the migration is high. – Over centralization to hospitals and schools is increasing.
7. Impacts of the mining boom on gender aspects		<ul style="list-style-type: none"> – Women right and equity including employment opportunity, family violence, and financial dependency and becoming criminal victims have lost.
8. Impacts of the mining boom on access of social basic services		<ul style="list-style-type: none"> – Increasing insufficient access to health and school service.
9. Impacts of the mining boom on infrastructure	<ul style="list-style-type: none"> – Investment of 7.2 billion tugrug was made for soum infrastructure since 2010. – Tourism sector is developing. 	
10. Impacts of the mining boom on citizens' education and awareness	<ul style="list-style-type: none"> – State budget income and investment of education sector are increasing. 	<ul style="list-style-type: none"> – Poor parental control has negative impact to the children's achievements and education. – Increasing the school over centralization also have negative impact to the children's studies.
11. Impacts of the mining boom on citizens' health and safety		<ul style="list-style-type: none"> – Respiratory system diseases and allergies are increasing due to much dust along the mining. – Hospital burden is

		increasing.
12. Impact of the mining boom on traditional lifestyle, customs and civilization		<ul style="list-style-type: none"> – Form of traditional livestock breeding is lost. – Face to face communication between people is increasing.
13. Impact of the mining boom on centralization and burden	<ul style="list-style-type: none"> – Production and service market is extending. 	<ul style="list-style-type: none"> – Number of registered crimes per 1000 population is twice higher in Khanbogd soum compared to the number of Umnugobi province.
14. Impacts of the mining boom on air quality		<ul style="list-style-type: none"> – The air quality is worsen, if area is closer to the mining site.
15. Impacts of the mining boom on water quality		<ul style="list-style-type: none"> – Between 2010-2014 the mining activities produced 1960.5 million m³ waste water and 3718 tons of hazardous waste.
16. Impact of the mining boom on land destruction		<ul style="list-style-type: none"> – Rehabilitation of mined land is insufficient. – The size of the land, destroyed by the infrastructure along the mining activities is much higher.

Looking at the above table general trend of economic impacts of the mining sector is positive, social impacts are both positive and negative and environmental impacts are negative.

CHAPTER 3. MINING ACTIVITIES IN KHANBOGD SOUM

Khanbogd soum, Umnugobi province borders with Tsogtsetsii soum on north-west, Bayan-Ovoo on west, Manlai soum on north and Mandakh and Khatanbulag soums of Dornogobi province in eastern part. And it borders with China on southern part. It is the most suburban soum on the south-eastern part of the Omnogovi province. It is located 650 km far from Ulaanbaatar city and 250 km far from the province center.

Figure 1: Location of Khanbogd soum

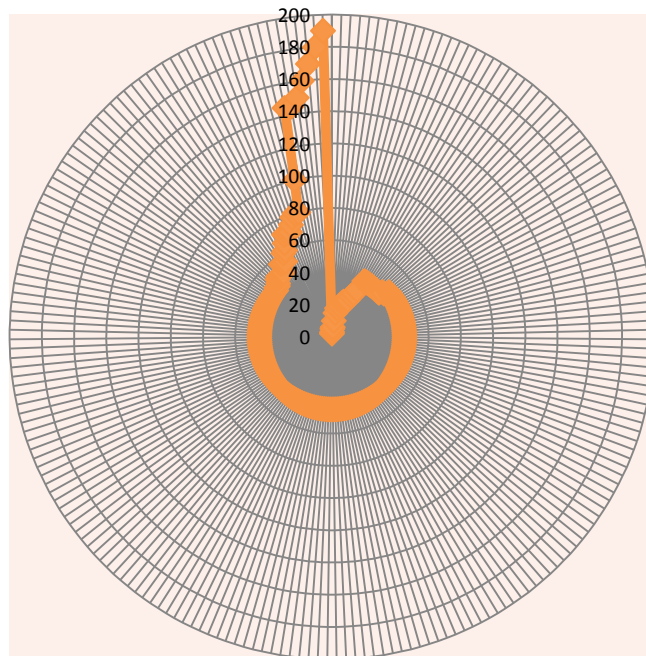


Khanbogd soum is the main mining region. Since 2002 there are 22 registered mining fields in Khanbogd soum, from which 3 have special permission on exploitation (mine) and the others have special permissions for exploration. The owner of the 3 special permissions for exploitation is the “Oyu Tolgoi” LLC .

The “Oyu Tolgoi” LLC, one of largest mining companies with stable activities, is located in this soum. The “Oyu Tolgoi” LLC is the world biggest mine with unused copper and gold. Also a paved and asphalt road of 140 km for transporting coal from Tavantolgoi Gashuun Sukhait passes through the territory of the soum. Also the construction of railway to Gashuun sukhait was launched in 2013. It causes operational and environmental impacts by other assistant sectors in Khanbogd soum.

The nearest household lives in 3 km far from the mining site and the farthest lives about 200 km far. The figure below shows the distance from the mining site to all the households in Khanbogd soum.

Figure 2: Distance from the mining site to the households in Khanbogd soum, 2015



92.2 percent of total households in Khanbogd soum is located the closes to a mining activities by the “Oyu Tolgoi” LLC.

The economic and social impact to Khanbogd soum from the “Oyu Tolgoi” LLC can be considered as the impact by the mining sector to the soum. But as for environment, there is indirect impact along the coal transportation road between Tavantolgoi Gashuun sukhait.

CHAPTER 4. ECONOMIC IMPACTS

Mining activities provide employment, earnings and income to the economy of the country at national, regional and local level. It pays taxes, deductions and payments from operational income. This part includes the economic benefits from mining sector to the local employment, tax revenue, payments and deductions. Also we showd the analysis of market costs along the mining development.

4.1. Impacts of the mining boom on household income

We concerned the sources of primary income of the households in Khanbogd soum: 30.2 percent of total households have mining activities, 24.8 percent livestock activities, 19.4 percent wages and salaries from the industries other than mining, 13.9 percent household businesses, 8.7 percent pension and allowances and 3.1 percent others. It shows that mining sector provides major percentage of household income.

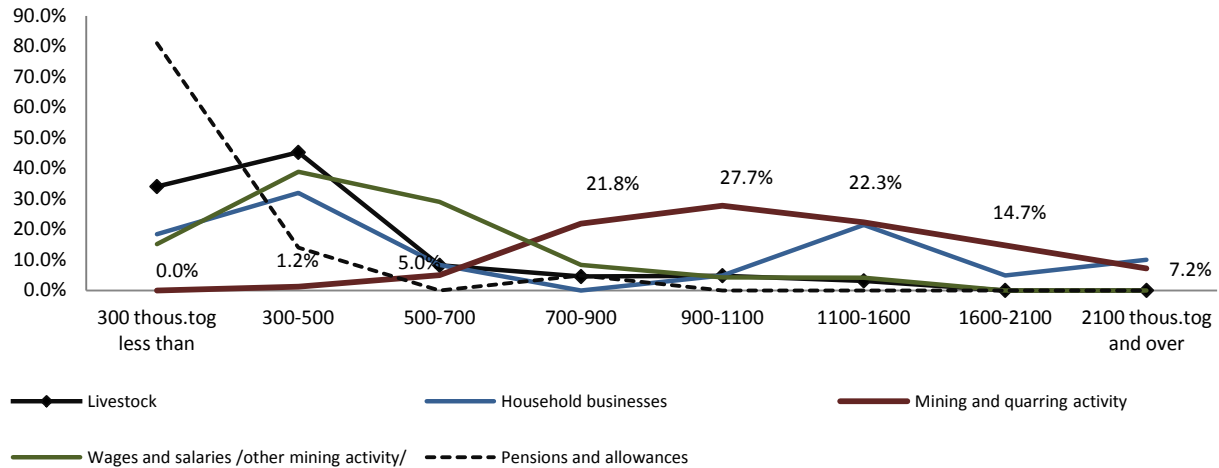
At bagh level: the household income in Javkhlant bagh depends from the mining the highest. Tthe household income depends from the livestock the lowest in this bagh.

Table 2: Primary sources for household income, by baghs, 2015

Income source	Total households	Baghs			
		Nomgon	Gaviluud	Javkhlant	Bayan&Khairkhan
Total households	100.0	100.0	100.0	100.0	100.0
Livestock	24.8	26.1	31.4	12.2	31.3
Household businesses	13.9	15.2	14.8	17.1	8.7
Mining industry	30.2	22.9	28.7	35.5	30.8
Wages and salaries (other than mining sector)	19.4	20.9	21.1	18.6	17.7
Pensions, allowances	8.7	12.4	3.9	9.3	9.6
Others	3.1	2.5	0.0	7.2	1.9

The figure below shows that the average income of the households from mining sector is relatively high than other sources.

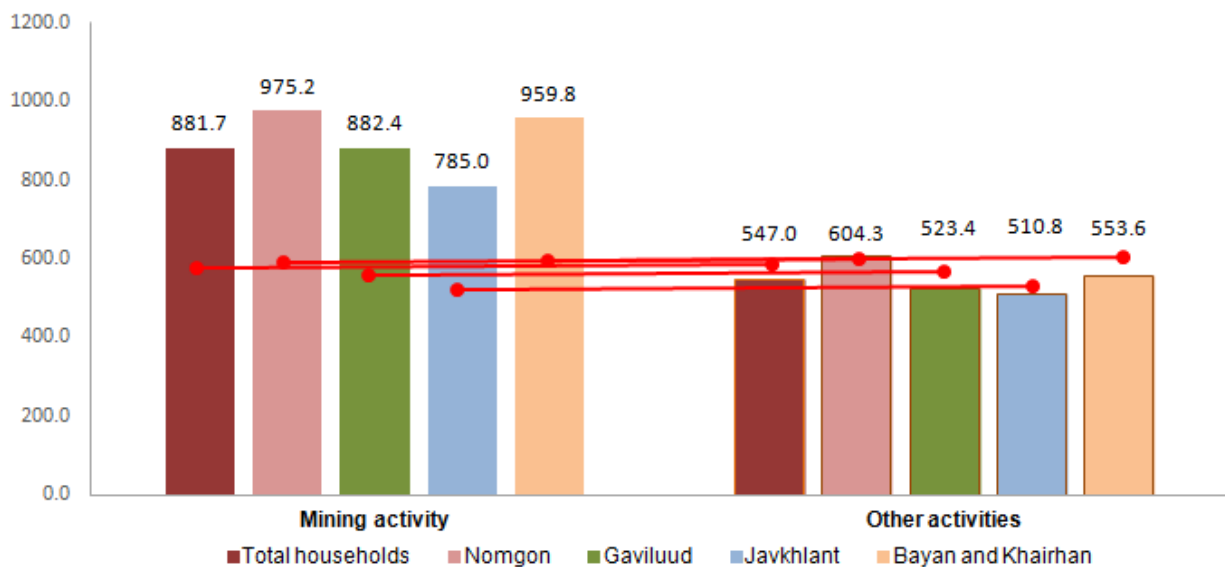
Figure 3: Household grouping, by monetary income group, share to total, by income primary source, thous.MNT, 2015



Average monetary income per rural household was 704.5 thousand MNT in national level, but it is 757.8 thousand MNT in Khanbogd soum.

Average wages and salaries of the workers in Khanbogd soum: 881.7 thousand MNT in mining sector and 547.0 thousand MNT in sectors other than mining. The average wages and salaries of the workers in industries other than the mining is lower by 247-406 thousand MNT than in mining industry in all baghs.

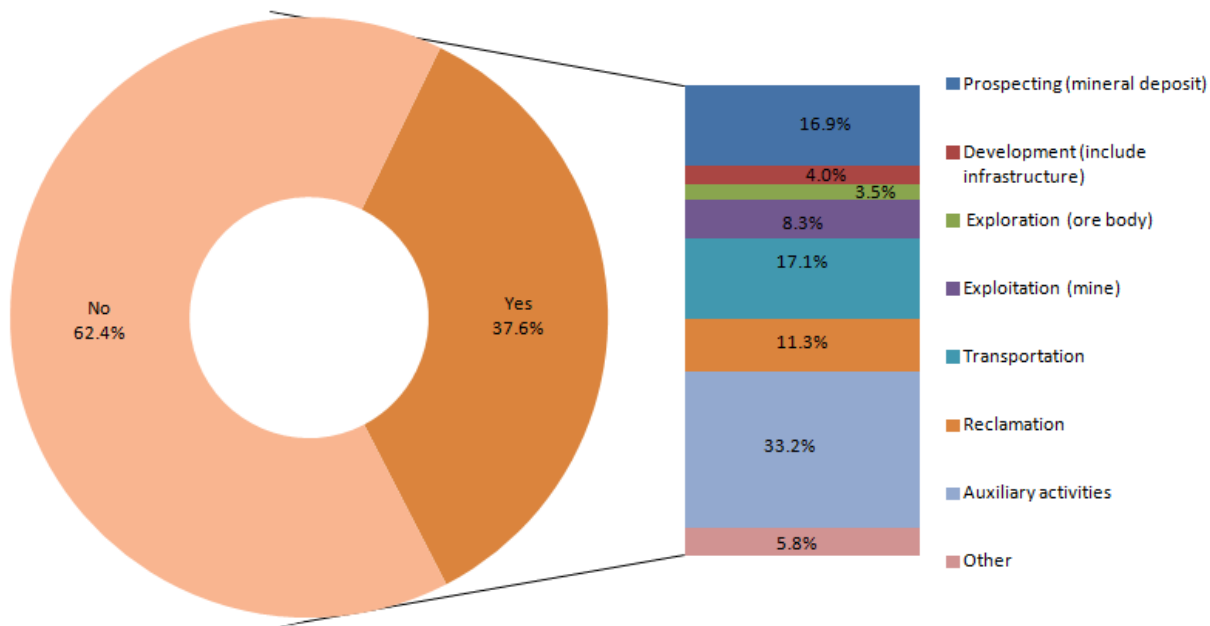
Figure 4: Monthly average wage and salaries of workers in mining industry, by baghs, thousand MNT, 2015



4.2. Impact of the mining boom on workforce

37.6 percent of total employees of 815 people in Khanbogd soum participate in mining activities. And 33.2 percent of the total mining employees participate auxiliary activities, 17.1 transportation activities, 16.9 percent prospecting and 11.3 percent waste cleaning and environment remediation works.

Figure 5: Employed in the mining activities by mining procedure, 2015



815 employees provide the income of average 718.6 million MNT a month from direct mining activities.

4.3. Impact of the mining boom on budget

We calculated the impact of local revenue from mining sector to the soum economic conditions. The following types of taxes, payments and other income is accumulated to the local budget revenue.

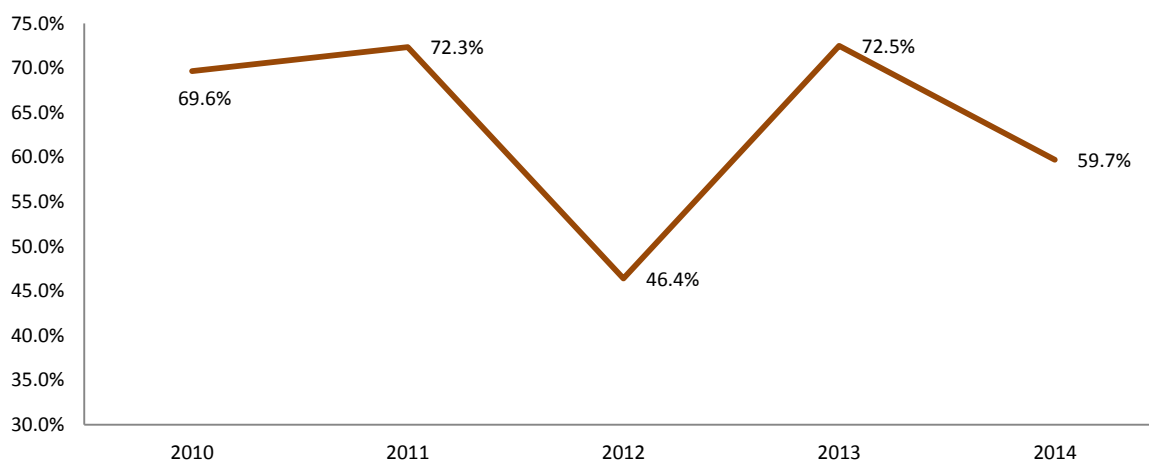
Table 3: Taxes, payments and fees paid by mining industry to the local budget, million MNT, selected year

No.	Indicators	2010	2011	2012	2013	2014
Total		2 130.4	15 358.9	22 913.8	57 367.1	43 598.0
1	Taxes	101.2	144.0	259.9	5 822.3	8 362.7
1.1	Real estate tax	84.4	117.1	191.4	5 764.3	8 302.5
1.2	Tax on automobile and self moving vehicles	16.8	26.9	68.5	57.9	60.2
2	Payments	2 020.8	9 183.4	5 116.2	24 386.1	11 325.5
2.1	Land payment	333.7	1 414.9	1 778.0	1 760.4	1 804.6
2.2	Water payment	13.7	22.5	91.4	15 415.6	9 520.9
2.3	Exploitation of mineral resources (royalty fees)	226.4	1 406.6	3 246.8	1 670.6	-
2.4	Foreign specialists and workers accommodation payment	1 447.0	6 339.3	-	5 539.5	-
3	Others	8.5	6 031.5	17 537.7	27 158.8	23 909.8
3.1	Fines	-	-	1 873.8	19.0	23.9
3.2	50 percent of environment protection expenses transferred to special account	6.9	193.4	172.3	397.0	109.7
3.3	Others	1.6	5 838.1	15 491.6	26 742.8	23 776.2

Source: Mongolia extractive industries transparency initiative

59.7 percent of local budget revenue in 2014 was made by mining sector.

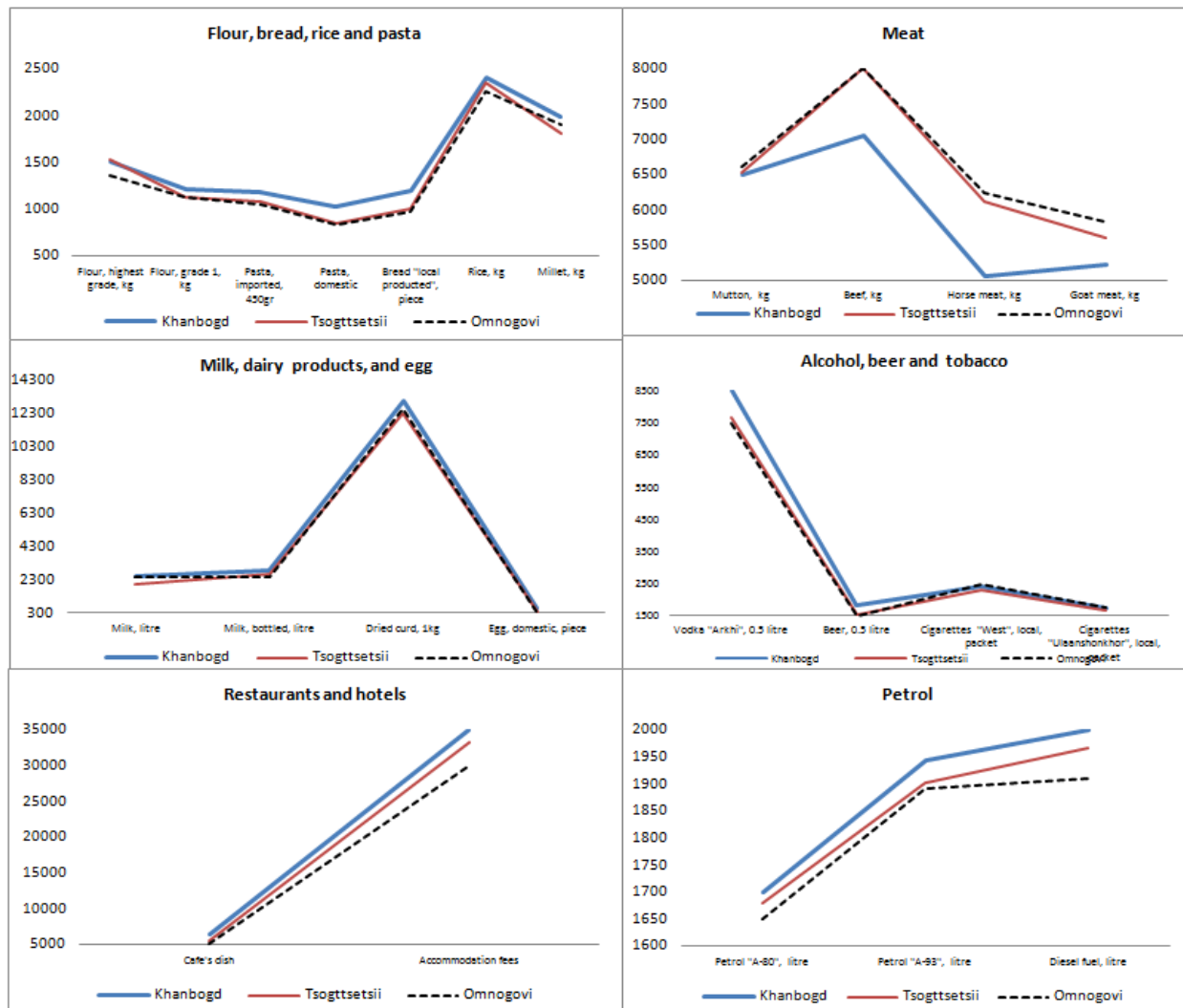
Figure 6: The share of total revenue of the mining industry to the local government revenue, by selected year



4.4. Impact of the mining boom on market costs

We compared and analysed the cost of commodity goods and services in Khanbogd soum with the nearby Tsogttsetsii soum and the province center. We used the average data as of first 8 months 2015 for the analysis. The figure below shows that the cost of the commodity goods except meat is higher than in Tsogttsetsii soum and province center.

Figure 7: In the first 9 months of 2015, the average prices of some consumer goods and services



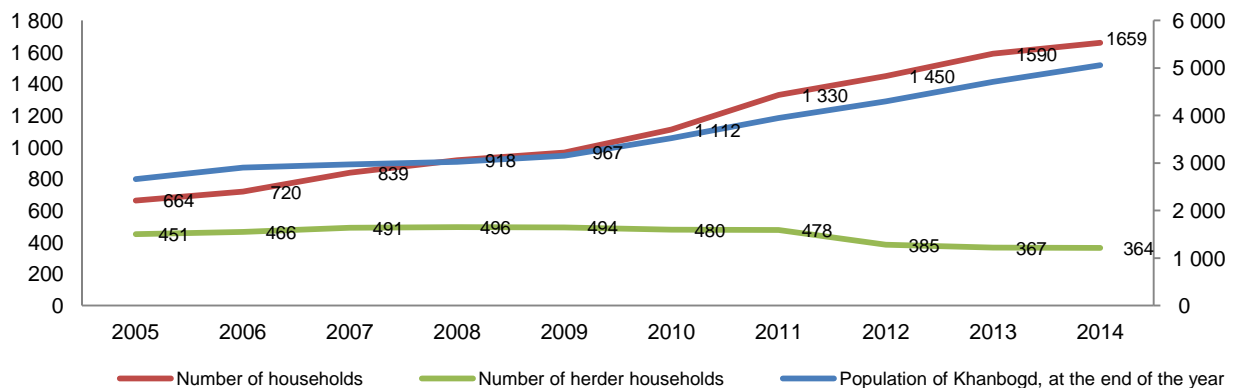
Hotel price is higher by 16.2 percent than in Tsogttsetsii soum and by 30.0 percent higher than in province center, café's dish cost is higher by 5.0 percent than in Tsogttsetsii soum and by 16.7 percent higher than in province center. Cost for petrol A92 is higher by 2.2 percent than in Tsogttsetsii soum and by 2.9 percent than in

province center. 24.5 percent of the respondents in survey buy their commodity goods from other soums and province.

4.5. Impact of the mining boom on other economic sectors

- To agricultural sector:** We asked the survey respondents in mining sector about their previous work experiences: 37.8 percent were engaged in agriculture sector, 36.3 percent in other enterprises, 10.8 percent were household businessmen, 10.1 were unemployed and 5.0 were students. As we can see the employment in agricultural sector reduced under the impact of mining sector. The figure below shows that the number of main population and households in Khanbogd soum has been rapidly increasing, however, the number of herder households has been reducing continuously since 2011.

Figure 8: Number of households and number of herder households by selected year



- To production and service sectors other than mining:** As we mentioned above the income of average 718.6 million MNT a month comes directly from mining sector. As the result of business wages and salaries changes under direct impact the supply of other goods and services also increase by the market rules. This increase follows the income growth of the workers in industries and services. It is called indirect mining impact. The indirect impact is calculated by the “Input-output analysis” multiplier method. We calculated the indirect impact of

national mining sector by coefficient and on average 179.7 million MNT was created on other production and service sectors.

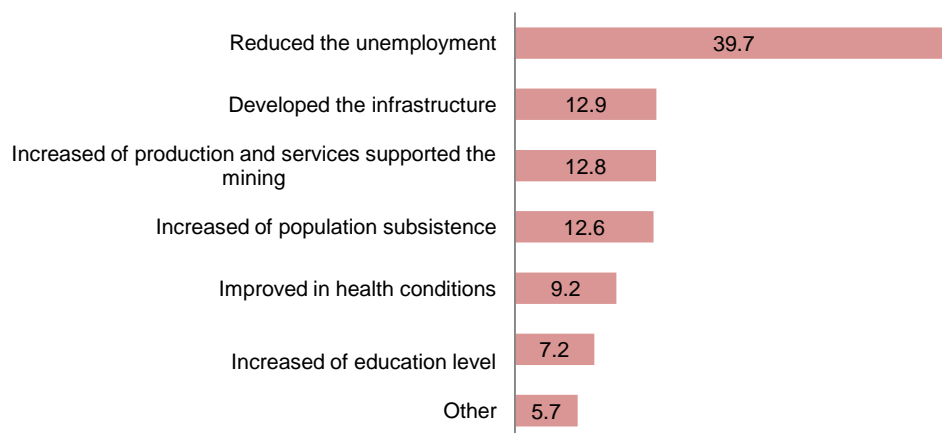
CHAPTER 5. SOCIAL IMPACTS

Geographically, the deposits with active mining activities are isolated from settlements. During the development process mining faces such problems as moving the households from the target region, paying compensations and solving land-related issues. Benefits of mining activities to the citizens, living in target region, is creating workplaces and developing the infrastructure. On the contrary, it destroys traditional lifestyle, causes health problems, safety and equality problems and increases social tensions and troubles. This chapter shows such impacts.

5.1. General impact of the mining boom on society

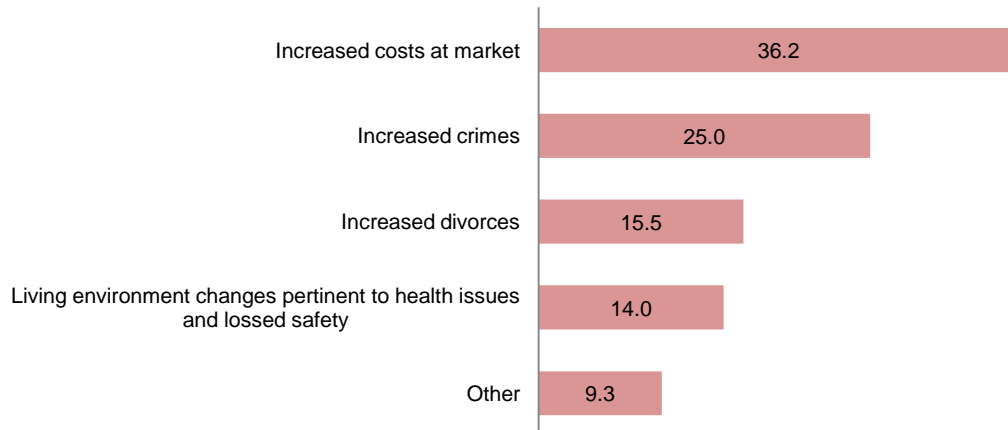
We asked the respondents about their opinions about the positive impacts of mining to the society and 39.7 percent of total respondents mentioned unemployment decrease, 12.9 percent infrastructure development, 12.8 percent production and services supported the mining expansion, 12.6 percent increase of population subsistence, 9.2 percent health service improvement, 7.2 percent increase in civil education level and 5.7 percent mentioned other positive impacts.

Figure 9: The positive impacts of the mining activities on society, share to total, 2015



Negative impacts of mining to the society: 36.2 percent of the respondents mentioned increase of market costs, 25.0 percent increase of crimes, 15.5 percent family divorces, and 14.0 percent considered health and safety problems.

Figure 10: The negative impacts of the mining activities on society, share to total, 2015



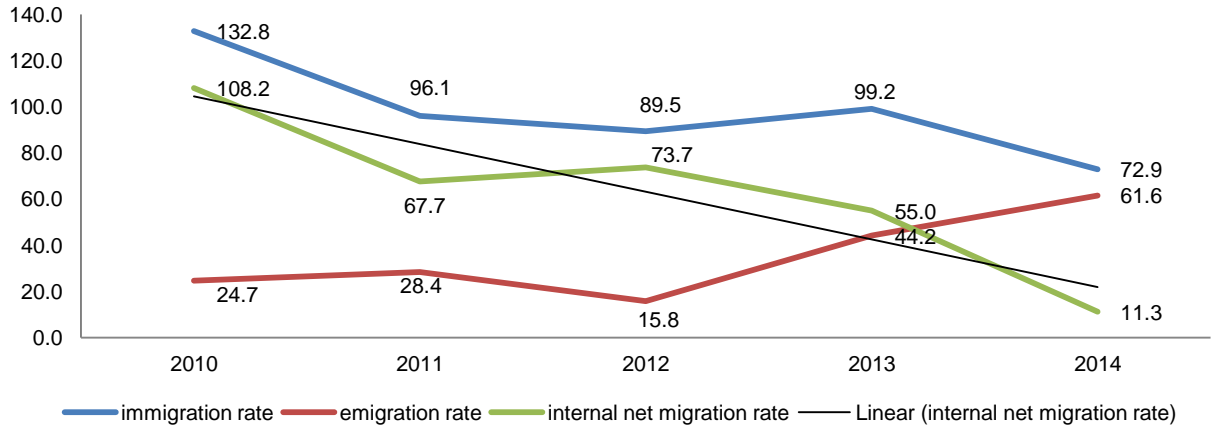
5.2. Impact of the mining boom on migration

We calculated the important indicators, related to demography migration studies, as the immigration rate, emigration rate and internal net migration rate. These indicators are expressed by the number of migration participants per 1000 people.

Immigration rate was 132.8 in 2010 but reduced to 72.9 in 2014. And the emigration rate was 24.7 in 2010 but increased to 61.6 in 2014. It shows the reduction of the internal net migration rate. We can conclude that although the mining sector creates mining-supported workplaces, this tends to reduce after a while.

We asked the reason for immigrants and 70.3 of total respondents answered that they follow the mining activities.

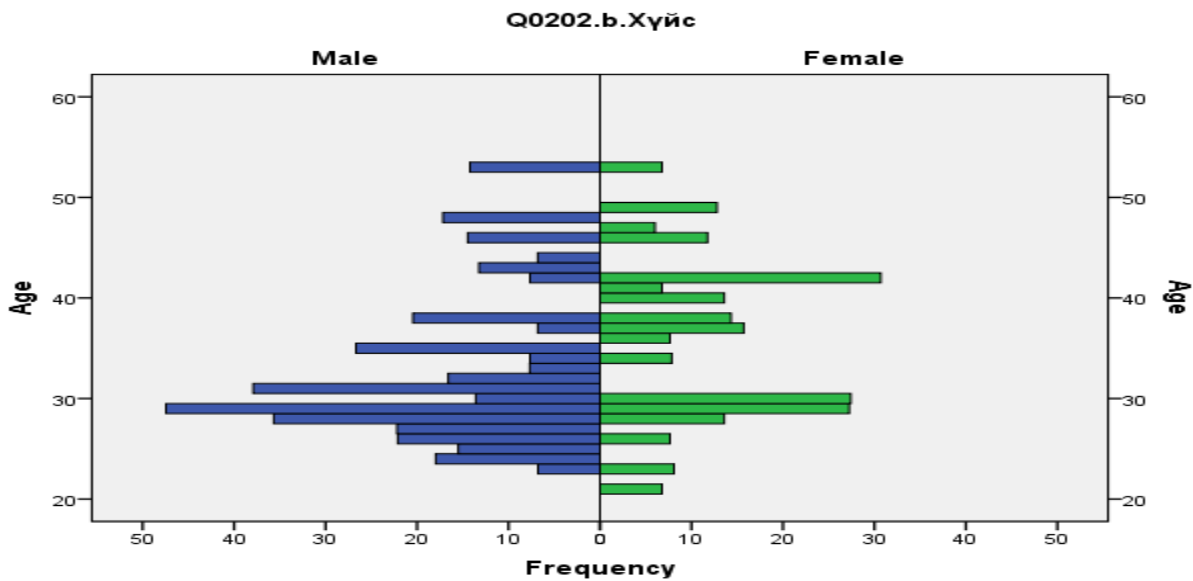
Figure 11: Migration rate, by selected year



5.3. Impact of the mining boom on employment

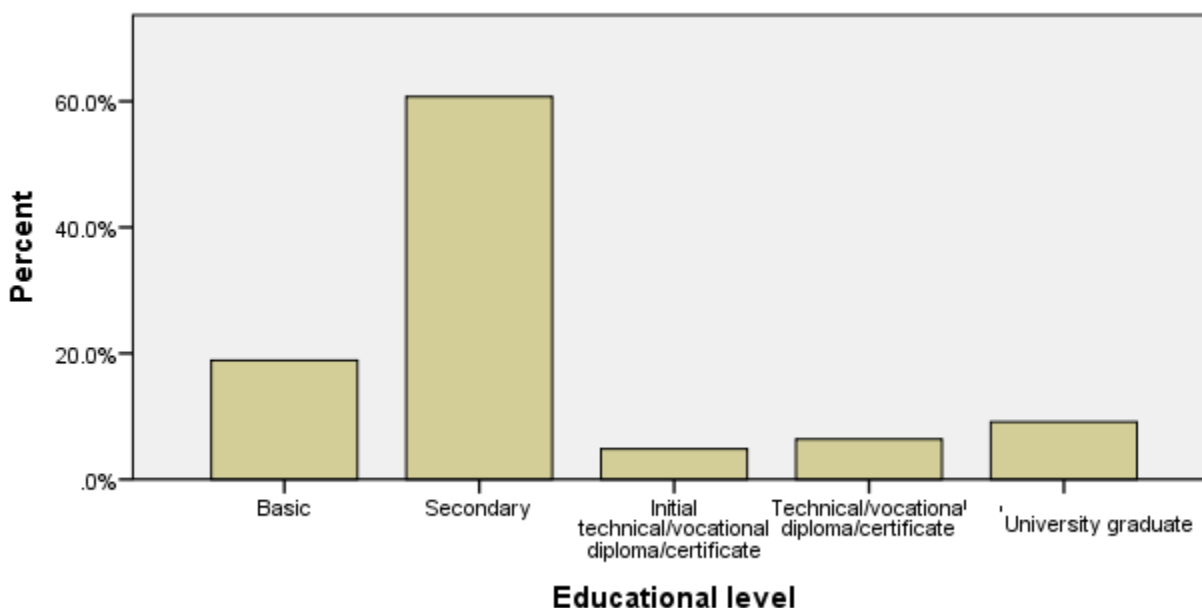
We concerned the ages and gender groups of mining workers: 62.7 percent is male, 37.3 percent is female. And 93.4 percent of total workers are between 25-55 years old. And majority of the workers are male around 30 years old.

Figure 12: Employed in the mining activities, population pyramid, 2015



By education level: 79.6 percent of the mining workers from Khanbogd soum have lower than secondary education, which shows that they mostly engaged in auxiliary activities.

Figure 13: Employed in the mining activities by educational level, share to total, 2015



As for profession 10.9 percent are engineers, 7.5 percent are cooks, and 2.0 with other occupations. The rest 79.6 percent do not have professions and most of them are drivers.

The table below shows the age, gender and education groups of the mining workers by baghs.

Table 4: Information about mining workers, share to total, 2015

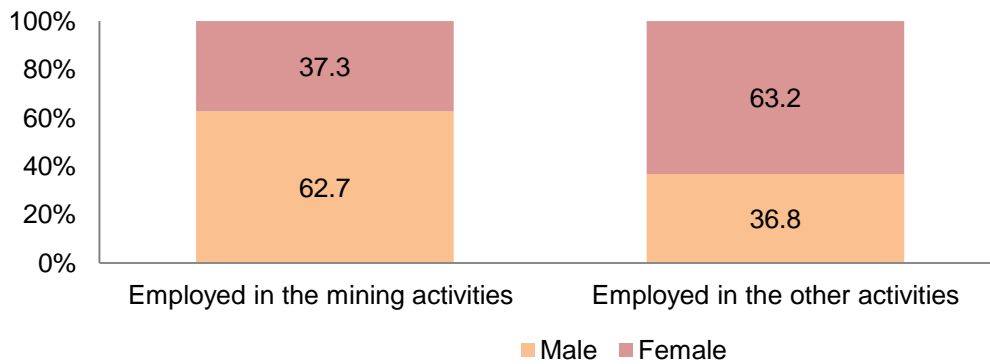
Indicators		Total households	Baghs			
			Nomgon	Gaviluud	Javkhlant	Bayan& Khairkhan
Total households		100.0	100.0	100.0	100.0	100.0
Gender	Male	62.7	66.9	54.6	68.0	63.0
	Female	37.3	33.1	45.4	32.0	37.0
Age group	15-24	6.6	10.5	12.9	0.0	6.6
	25-55	93.4	89.5	87.1	100.0	93.4
Education	Basic	18.9	32.8	12.1	21.9	16.8

level	Secondary	60.7	56.9	58.6	74.3	48.3
	Initial Technical and vocational	4.8	0.0	4.0	0.0	13.2
	Technical and vocational diploma	6.4	0.0	8.1	0.0	14.8
	University graduate	9.1	10.3	17.2	3.8	6.9

5.4. Impact of the mining boom on gender issues

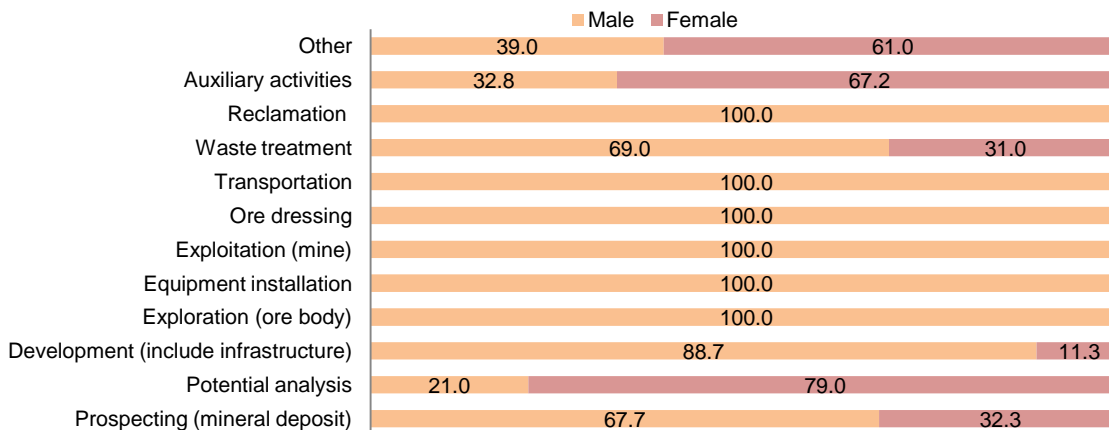
37.3 percent of the mining workers from Khanbogd soum are female. On the other hand, participation of women in other sectors than mining is high.

Figure 14: Employed in the mining by gender, share to total, 2015



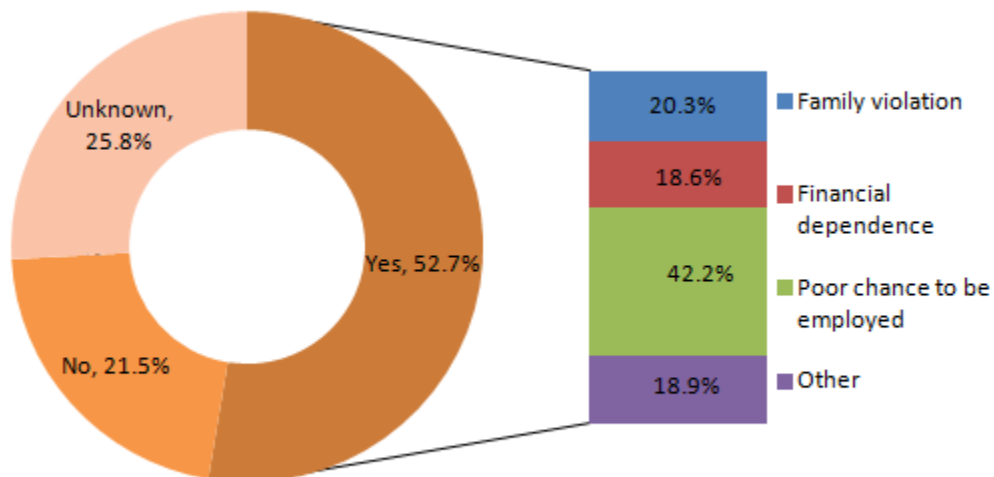
Female workers in mining usually engaged in auxiliary activities, research works and waste cleaning activities.

Figure 15: Employed in the mining activities by gender, share to total, 2015



52.7 percent of the survey respondents considered that the women’s rights and equality are violated in Kahnbogd soum. We clarified the violation of the women’s rights and equality and 42.2 percent considered poor chance to be employed, 20.3 family violation, and 18.6 percent considered financial dependence, 20.3 family violation, and 18.6 percent considered financial dependence.

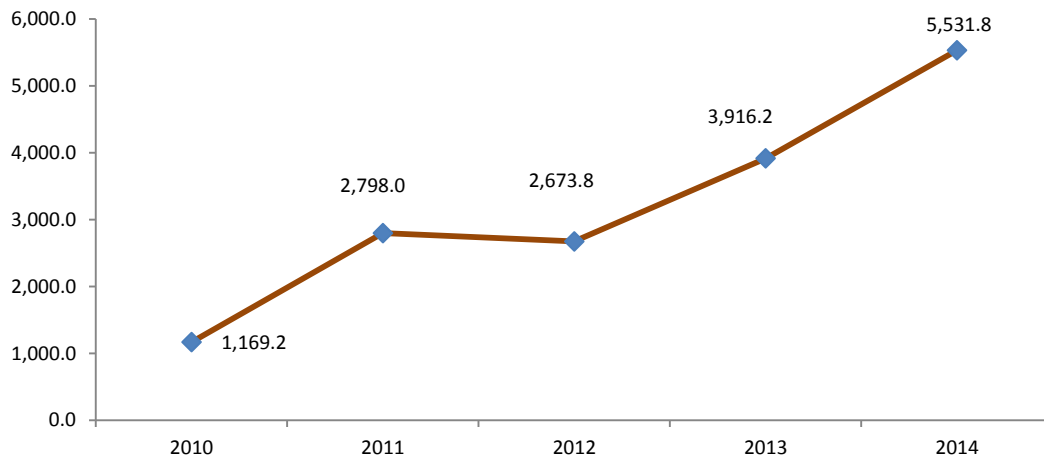
Figure 16: Violation of women’s rights and equality, share to total, 2015



5.5. Impact of the mining boom on acces to basic social services and infrastructure

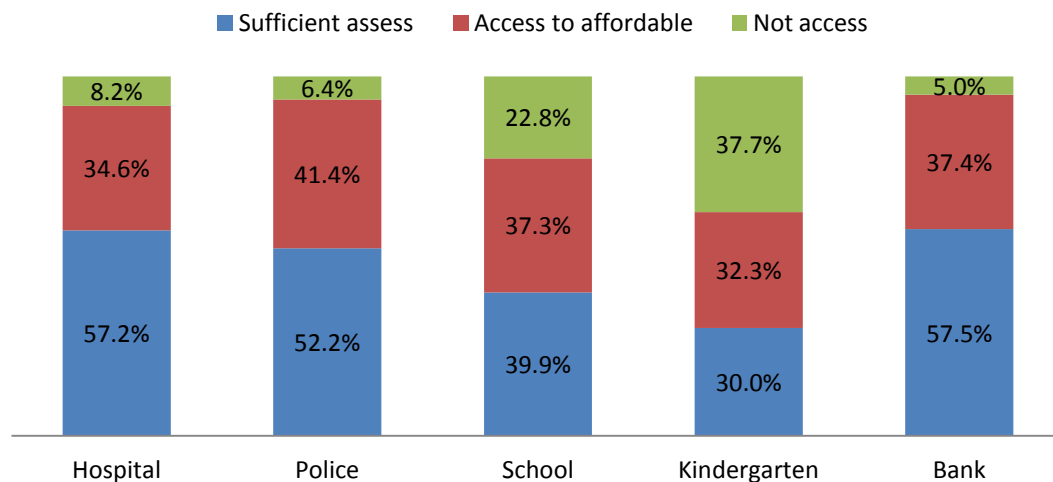
The donations and supports from the “Oyu Tolgoi” LLC to the local area have been increasing each year. Since 2010 the company invested 33.5 billion MNT to education and 7.2 billion MNT to soum infrastructure.

Figure 17: Total donations and supports to the local area, million MNT, by selected year



8.2 percent of the survey respondents considered bad access to hospital services, 6.4 percent – police services, 22.8 percent - schools, 37.7 percent – kindergartens and 5.0 bank services.

Figure 18: Access to basic services, share to total, 2015



Infrastructure supply.

Electricity access: Khanbogd soum is connected to the Oyu Tolgoi project site by 35 kW Electricity distribution air line. It receives the energy from China through the Oyu Tolgoi mining.

Water access: There are 1 public water reservoir with capacity of 1 ton of drinking water in soum center and more than 30 private Abyssinian wells. All water is portable. The households with private wells and private houses established water supply system for own consumption. There is no central water supply system there.

Heating access: There is one centralized steamboiler in soum center, which provides the nearby organizations as hospital, school, kindergarten, school dormitory and court building with heat. Also there are steamboilers at the Vocational training and production center of “Oyu Tolgoi” LLC and the newly built kindergarten for 175 children. The Governor’s office works on electric heater. Khan bank, Golomt bank, Savings bank and Khas bank decided their heat by low pressure stove.

5.6. Impact of the mining boom on citizens’ education

Mining sector has been influencing to the citizens’ education by following 3 ways:

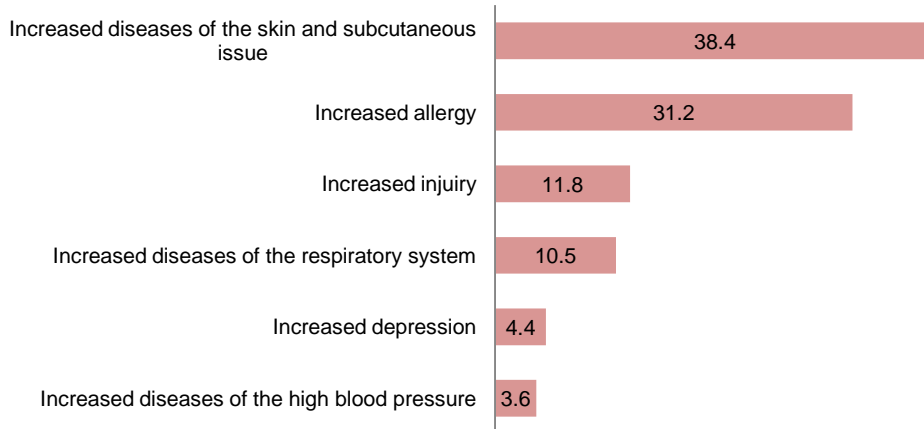
- 1) Poor parental control has negative impact to the children’s achievements and education. 20.5 percent of the students at the high school of Khanbogd soum are the children of mining workers. And from them 12.4 percent of the children have parents, both working in the mining activity. Survey results show that the parental control of the children, whose parents work in mining, is poor, which has negative impact to their studies.
- 2) Increasing the school loads also have negative impact to the children’s studies. The high school has much load. It has the capacity for 400 children, however, there are 830 children now. And 13.0 percent of the students followed their family to work in the mining.

3) Donations and supports are provided to the education sector. Looking at the donations and supports provided by the mining companies to the education sector of Khanbogd soum, 10.6 million tugrug was provided for decoration of geography training room, 45.7 million tugrug for extension of kindergarten building, 60.9 million tugrug for purchasing Britanica encyclopedia in 2011, and 2.0 million tugrug provided for supplying personal computers to the secondary schools.

5.7. Impact of the mining boom on citizens’ health and safety

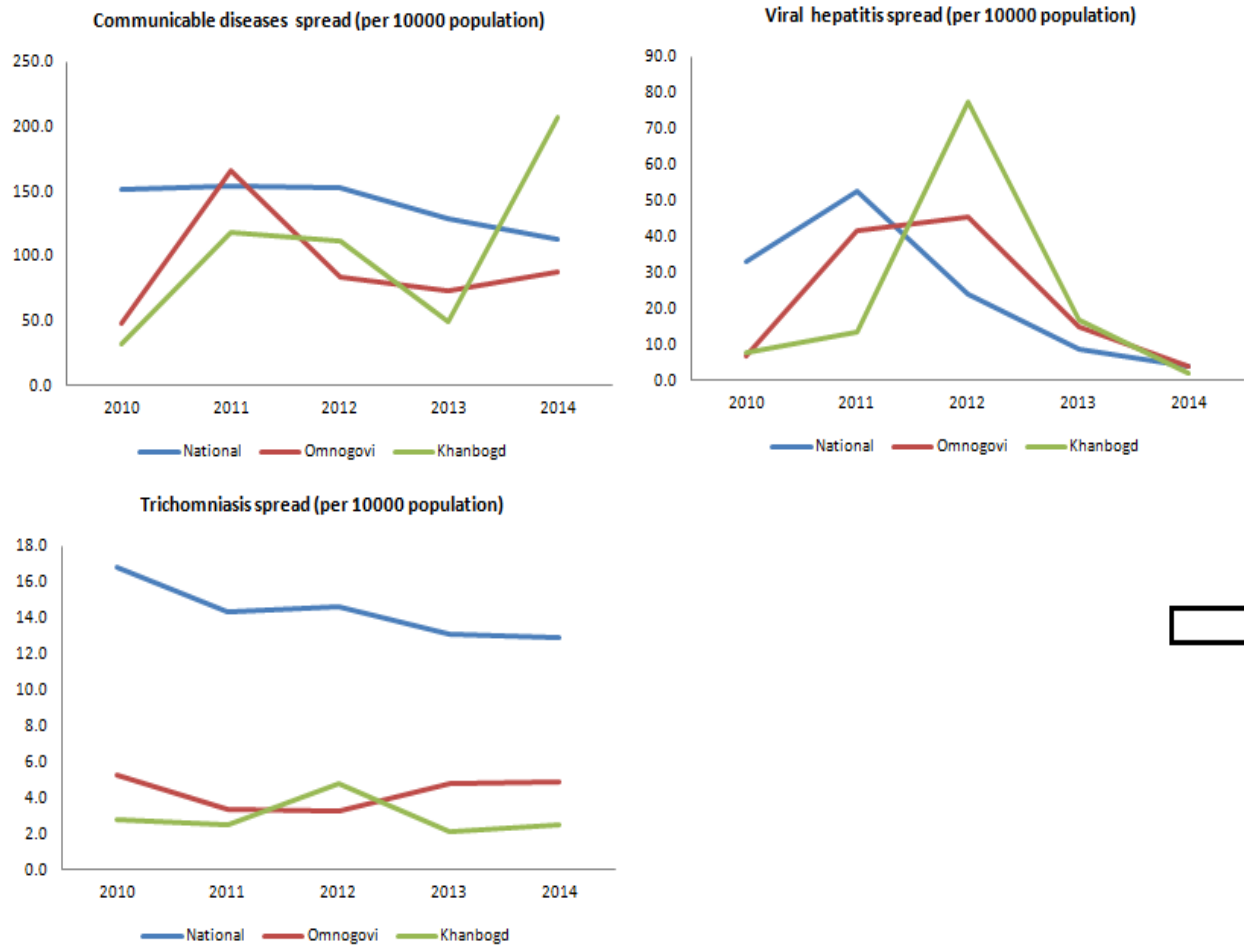
38.4 percent of the respondents have skin and subcutaneous diseases, 31.2 percent have allergies, 11.8 percent have injuries and traumas, 10.5 percent have respiratory system diseases, 4.4 percent have stress and 3.6 percent have high blood pressure, which they considered all related to the mining activities.

Figure 19: Health problems prevalent in the mining belts, share to total, 2015



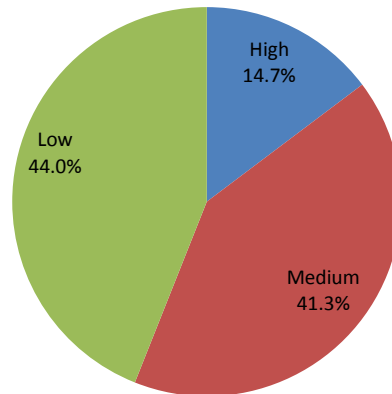
17.3 percent of the total residents used to suffer from respiratory system diseases, from which 80.3 percent considered it related to mining activities. There is much dust along the mining, which increases allergies.

Figure 20: Disease spread per 10000 population, by selected year



14.7 percent of the survey respondents consider there is high percentage of injuries and traumas, related to the mining activities, 41.3 percentage medium and 44.0 percentage low level.

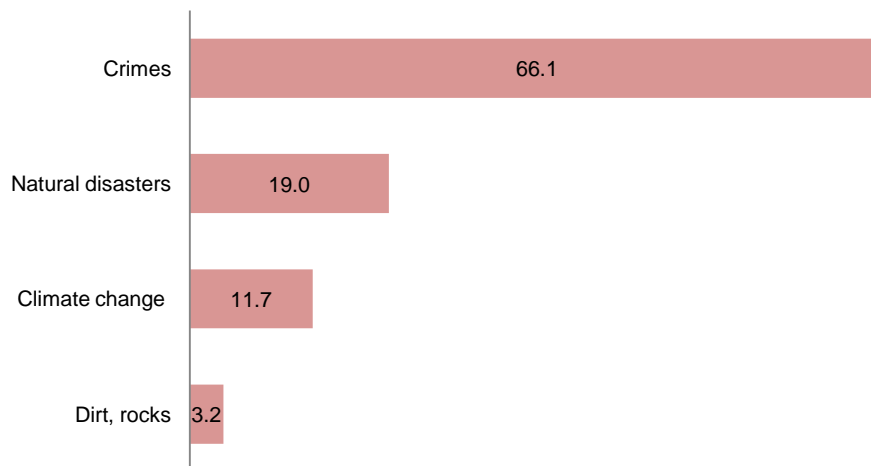
Figure 21: Level of injuries and accidents related to mining activities, share to total, 2015



93.2 percent of mining workers use labor protective uniforms.

28.3 percent of the survey respondents considered that the safety is violated after settling in mining region.

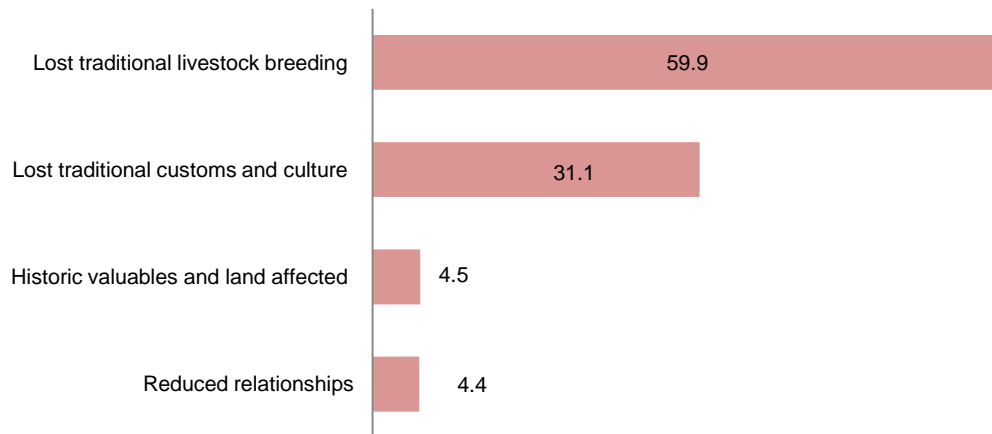
Figure 22: Forms of safety violations, share to total, 2015



5.8. Impact of the mining boom on traditional lifestyle, customs and civilization

29.6 percent of survey respondents considered that the mining activities have impact to the regional traditional lifestyle, customs and civilization. And about 60 percent of these respondents considered that the form of traditional livestock breeding is lost.

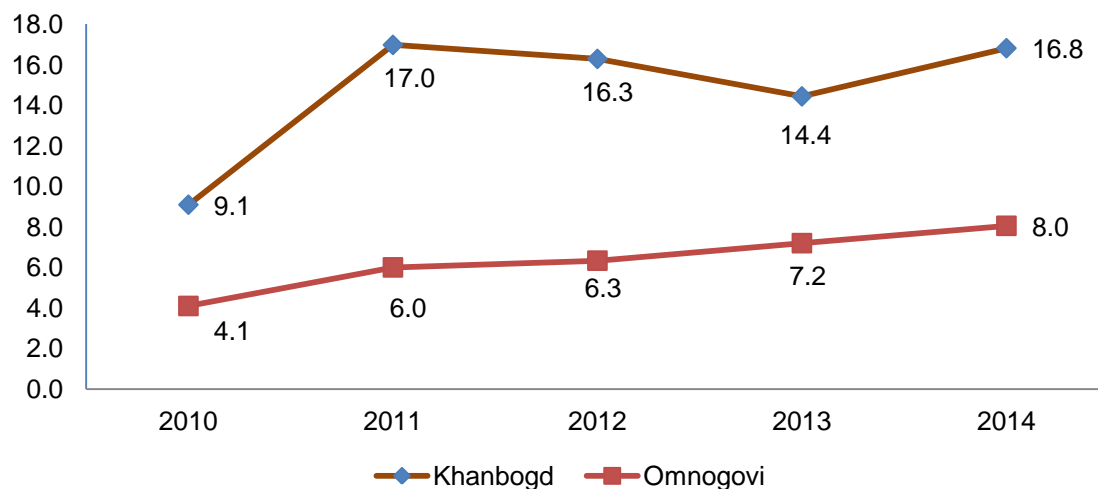
Figure 23: Forms of impact of the mining activities on traditional lifestyle, customs and civilization, share to total, 2015



5.9. Impact of the mining boom on centralization and burden

91.7 percent of the respondents considered that mining activities cause much population centralization in the region. And 70.2 percent of the respondents considered that this centralization causes much crime. We compared the number of registered crimes per 1000 population with Omnogovi province and this number is twice higher in Khanbogd soum.

Figure 24: Number of registered crimes (per 1000 population)



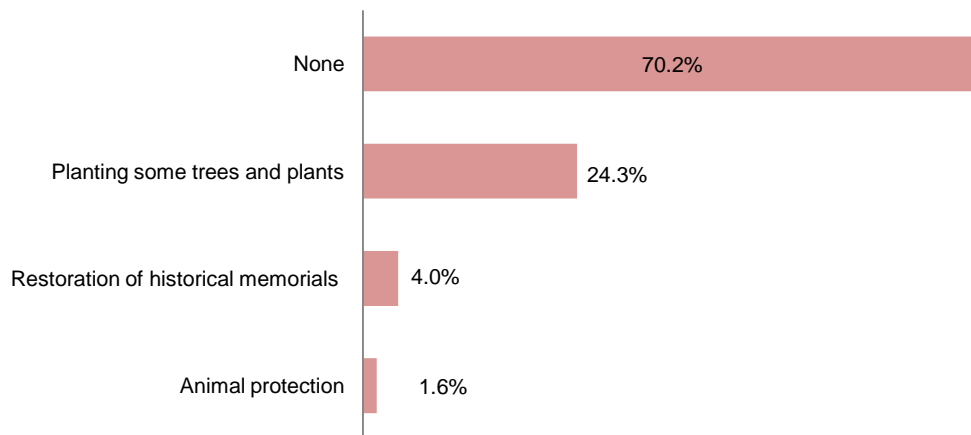
CHAPTER 6. ENVIRONMENTAL IMPACT

In this chapter we included the impacts to the environment and the land destrcuton, air quality and water level caused by mining activities.

6.1. General impact of the mining boom on environment

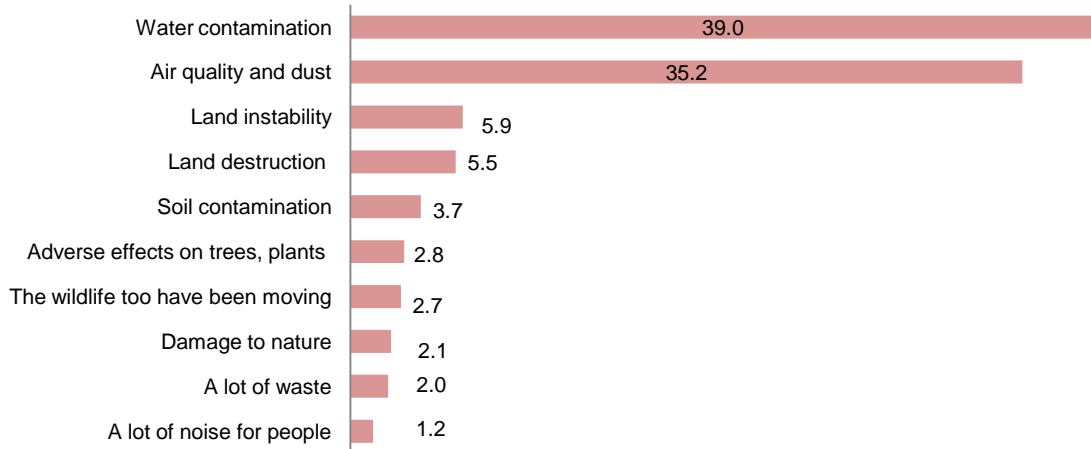
We asked the respondents if there are any positive impacts of mining activities to the environment and 70.2 percent of the respondents said there is no such impact, 24.3 percent said about planting some trees and plants, 4.0 percent mentioned about restoration of historical memorials and 1.6 percent mentioned about animal protection.

Figure 25: Positive impacts of the mining activities on environment, share to total, 2015



We asked the respondents about the urgent negative impact to the environment and 39.0 percent said water pollution and shortage, 35.2 percent bad air quality and 11.4 percent much land destruction and deterioration of animal pasture lands.

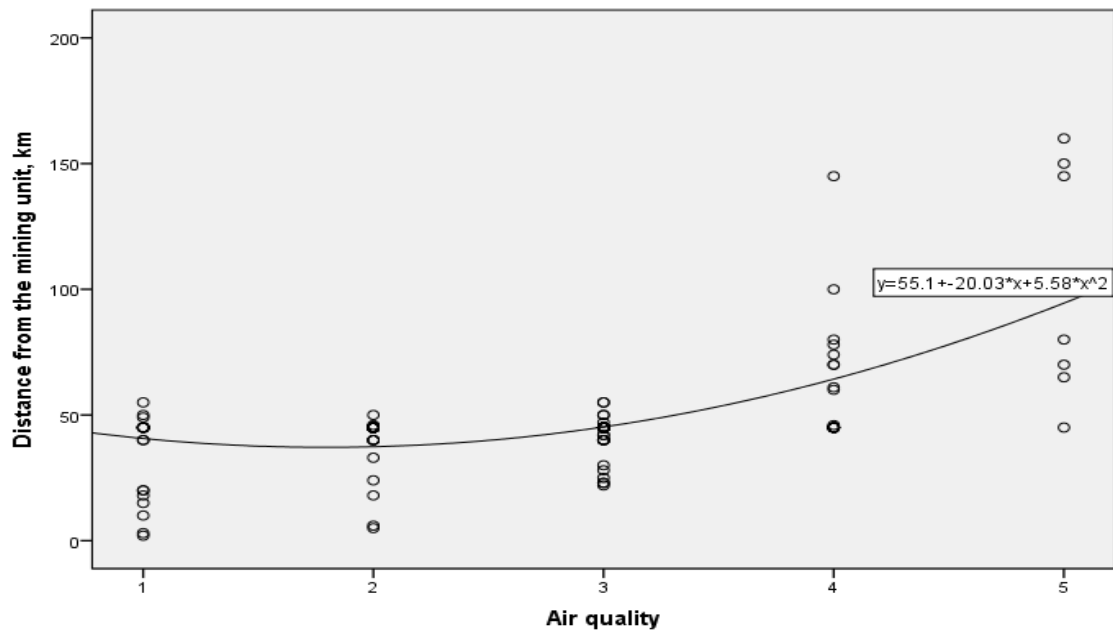
Figure 26: Negative impacts of the mining activities on environment, share to total, 2015



6.2. Impact of the mining on air quality

We made an analysis to the dependence of air quality to the distance from mining site and the figure below shows the direct dependence. It means the air quality worsens closer to the mining site.

Figure 27: Dependence of the distance of mining site to the air quality, 2015



Here 1-strongly polluted, 2-polluted, 3-medium, 4-fresh, 5-strongly fresh

44.7 percent of the respondents, who considered that the mining sector is related to the air quality, considered the reason for bad air quality because of indirect transportation vehicles from the mining, 28.6 percent from direct mining activities, 17.1 directly from mining activities and indirectly from population centralization. Dust from indirect transportation vehicles caused by the coal transportation activities between Tavantolgoi and Gashuun Suhait route.

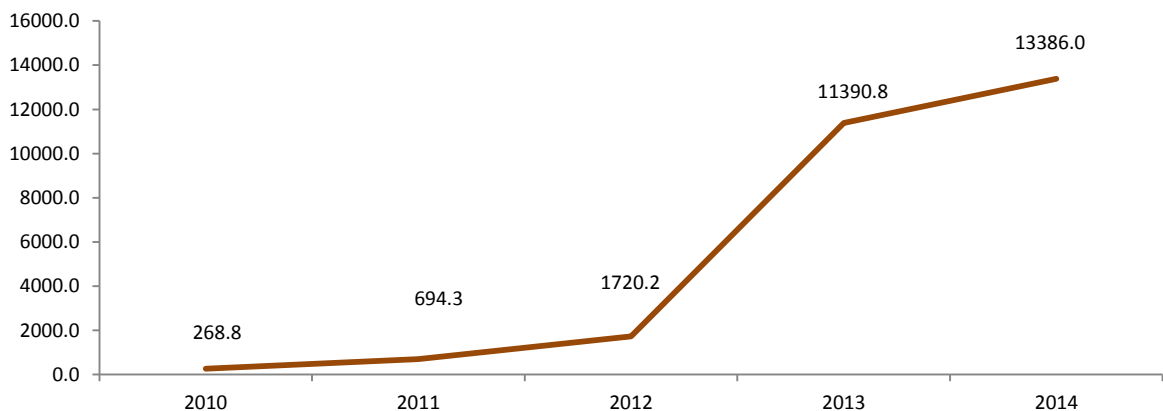
Consequences of air pollution: 60.3 percent of the survey respondents aid bad health impact, 35.7 percent bad impact to trees and plants and 4.0 percent bad impact to animal pasture.

6.3. Impact of the mining boom on water quality

34.5 percent of total households in Khanbogd soum use portable water, 27.4 use protected wells, 17.1 percent use unprotected manual wells, 12.2 percent use water kiosks, and 8.8 percent use other sources of drinking water. As for the quality of consumption water 11.3 percent considered it polluted.

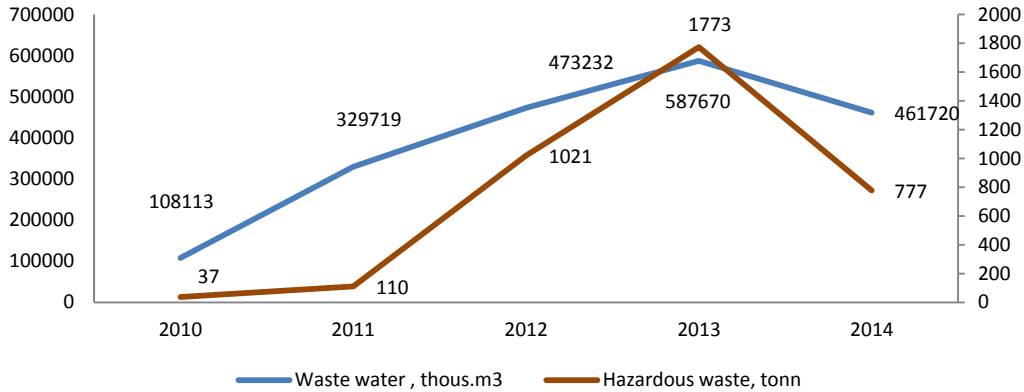
In 2014 the Oyu tolgoi project used 13386.0 thousand m³ of water in its mining activities. From which 96.4 percent was used for main industrial purposes (expressed by the difference of total water consumption and re-used water amount).

Figure 28: Water used for mining activities, thousand m³, by selected year



Between 2010-2014 the mining activities produced 1960.5 million m³ waste water and 3718 tons of hazardous waste.

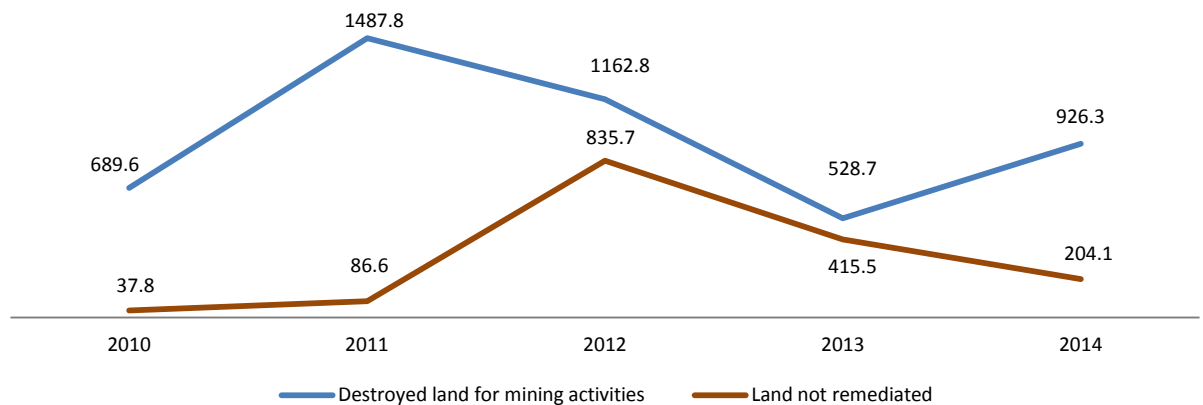
Figure 29: Waste from mining activities⁸ by selected year



6.4. Impact of the mining boom on land destruction

Between 2010-2014 the “Oyu Tolgoi” LLC mined totally 4795.1 hectares of field and during this period it didn’t make remediation to 33.0 percent of the used field or to 1579.8 hectares of field.

Figure 30: Field used for mining and not remediated, hectare⁸ by selected year



The size of the land, destroyed by the infrastructure along the mining activities, is 2585.5 hectares. In 2011 the biggest field or 1137.7 hectares of field was destroyed.

These include road, network, electrical lines, buildings and facilities, gas stations, flood dams and temporary dump sites.

Figure 31: Land destroyed by infrastructure along the mining, hectare, by selected year

