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FACTORS INFLUENCING ON LAND USE CHANGE IN JAVKHLANT SOUM OF SELENGE AIMAG

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Хураангуй

Монгол орон нь бэлчээрийн мал аж ахуйг зонхилон хөгжүүлж ирсэн түүхтэй бөгөөд сүүлийн жилүүдэд газар ашиглалтын олон хэлбэр эрчимжиж байна. Байгаль цаг уур, нийгэм-эдийн засгийн олон хүчин зүйлээс шалтгаалж газар ашиглалтын өөрчлөлт, газрын бүрхэвчийн өөрчлөлт явагдаж байдаг.

Бидний судалгааны зорилго нь газар ашиглалтын өөрчлөлтөд нөлөөлж буй хүчин зүйлсийг илрүүлж, экосистемийг тэнцвэртэй хадгалан хамгаалахад ямар арга хэмжээ авах талаар судалж зөвлөмж өгөхөд оршино.

Сэлэнгэ аймгийн Жавхлантад нь манай орны эдийн засгийн төв бүс нутагт орших газар тариалан, мал аж ахуй харьцангуй сайн хөгжсөн сум юм. Судалгаанд бид нийгэм-эдийн засгийн зарим үзүүлэлт болон бусад холбогдох статистик мэдээллийг ашиглан газар ашиглалтын өөрчлөлтөд нөлөөлж буй хүчин зүйлсийг шугаман регрессийн аргаар тодорхойлсон. Тариалангийн талбайн өөрчлөлтөд хүн амын өсөлт эергээр нөлөөлж байгаа бол малын тоон өсөлт сөргөөр нөлөөлөх хүчин зүйлс болж байна.

Keyword: Cropland, land use, statistic, Javkhlant soum, land.

Introduction

Land is defined in economics as one of the primary factors of production. Land is a basis for everything physical, can be an investment target of businesses [6]. There are many definitions on the land-use changes. According to Meyer and Turner study, land use relates to land cover in various ways and affects it with various implications. The dominant rural land use by human activities, population dynamics, and agriculture policy leads to an expansion in agriculture areas or changes in crops [3]. According to Nzunda, et al. 2013, land cover changes have been influenced by social-economic factors which are population growth, livestock keeping, cash crop price, and level of education [4].

Mongolian lands are traditionally used for pasture and animal husbandry, but in recent decades multiple land uses have increased rapidly. Land administration and land management is going through the 6 main categories of land funds in Mongolia. One of the categories is an agricultural land use which occupies 73.76 percent of Mongolian territory. Therefore, agricultural sector plays the main role in the country's economy.

We need to do more researches for solving these issues. Our research objective is to determine influencing factors to land use and land cover changes; give some recommendations to policymakers for the sustaining ecosystem and economic development if the factors influencing the changes.

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The study area, Javkhlant soum, is located northern part of Mongolia which is both agricultural and traditional animal husbandry are developed well. Generally, due to the geographical situation and population size, most of the cropland area located in the northern part of Mongolia such as northern part of cropland area produces 52 percent of crop production of nation. Weather condition is very harsh and has four seasons. During 2005-2014, the average annual temperature was around -1.6°C and the average annual precipitation was 272.9 millimeters.

The soum has two administration units called “Bag”. According to statistics, total population was 2725, of which 48.8 percent were male and 51.2 percent were female in 2014. The economically active population was 1071, of which 96.8 percent were employed and 3.2 percent were unemployed. By the 2014, total investment was 31.84 million tugrug, of which 25.0 million tugrug was invested to agricultural sector. End of the 2014, 82.9 percent of job was announced to agricultural sector [2]. Here we can see land fond classification from figure 1.

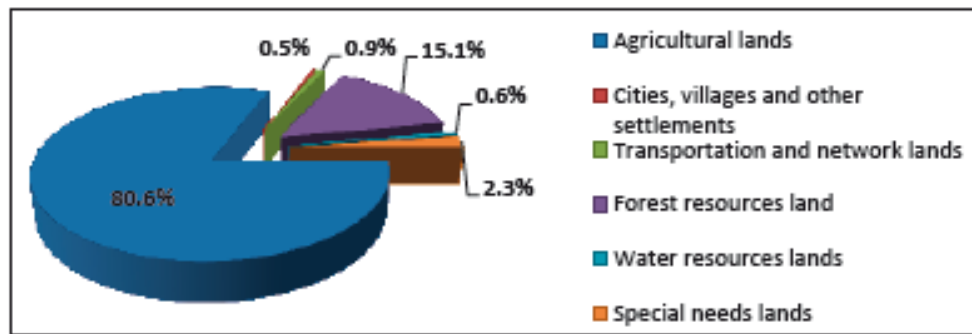


Figure 1. Land fond classification

Source: [1] Administration of land affairs, construction, geodesy and cartography, 2014

Total territory is 118970 ha, of which the 80.6% of the total territory is used for agriculture. The second biggest is forest resource land. The 0.5% of the total territory is used for cities, villages and other settlement. The 0.9% of the total territory is used for transportation and network lands.

Table 1. Land use and its changes

Land fond classification		2000	2014	Difference (ha)
Agricultural lands	Total	98680.3	95961.3	-2719.0
	Pastureland	73792.2	73573.41	-218.79
	Cropland	17474	17515.02	+41.02
	Uncultivated land	350	287.37	-62.63
	Herder's winter and spring camp	12.1	121.5	+109.4

Cities, villages and other settlement	Total	479	583.67	+104.67
	Building area	4.95	8.66	+3.71
	Common use land	459.23	396.35	-62.88
	Ger district area	14.8	178.64	+163.84
Transportation and network lands		1033.7	1060.03	+26.33
Forest resource lands		18028.0	18028.0	-
Water resources lands		749.0	749.0	-
Special needs lands	Hay land	-	2588	+2588.0
Total		118970.0	118970.0	-

The 0.6% of the total territory is used for water resources lands and the 2.3% of the total territory is used for special needs lands. End of the 2014, 164.5 thousand heads of sheep was numbered, which is 2.2 times higher than normal grazing capacity of soum rangeland area, which can contribute to land-use change. The total crop of cereal was 5837.0 ton, 297.0 ton of potato, and 1165.0 ton of vegetable in 2014 which are occupying 1.5%, 0.15%, and 1.14% of the national level.

From the table 1, we can see that during 14 years, pastureland is decreased by 218.79 ha and herder’s winter and spring camp is increased by 109.4 ha. According to Fallow III program, cropland is increased by 41.02 ha and uncultivated land is decreased by 62.63 ha. According to “Law on Allocation of Land to Mongolian Citizens for Ownership” Ger district area and building area are increased by 3.71 ha and 163.84 ha respectively, while common use land is decreased by 62.88 ha. Special needs land is increased by 2588.0 ha.

When we see cropland soil degradation level from the table 2, during the 25 years, soil degradation has been increased slightly which non degraded land is decreased by 1.6 %, [5].

Table 2. Cropland soil degradation level in Javkhlant soum

Year	Land size, ha	Non degraded land, %	Degraded land, %
1990	17770.0	38.7	61.3
2015	17515.5	37.1	62.9

Material and method

In this study we used statistic data of socia-economic including population, cultivated land, yield, livestock number, and climate indicators for determining factors affecting to the land-use and land cover changes using linear regression model. We assume that all this variables will influence land use-changes, especially cropland size.

Results

From the table 1, we can see that population ($R^2=0.7$) and yield ($R^2=0.6$) correlates to cultivated land. As we mention above, the government encourages agricultural industries for supplying domestic agricultural productions to needs, which is one of the driving force for increasing investment and also increasing population for people seek jobs. Besides, following up increase of investment, cultivation will be increase which may correspond to fallow land can be turned to cultivated land classification. Through the Fallow III program, the government subsidized the cop production sector in the period 2009-2013 such as 50 percent of the price of

new and advanced techniques, loans for seed and fuel fertilizer, final product purchase, tools and seeds for vegetable and potato (free from charge), and etc.

Table 3. Correlation

Variables	Cultivated land		N
	Pearson Correlation	Significance level (2-tailed)	
Population	0.718**	0.003	15
Yield	0.601*	0.018	15
Livestock number	0.371	0.173	15
Air temperature	-0.080	0.778	15
Precipitation	-0.062	0.825	15

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Population had a positive regression coefficient meaning that an increase in one unit of migrant to the area increased the odd ration of land use change by a factor of 10.373. According to statistics, during 2009 to 2014, totally 397 people came, of which 56.1 percent were from country side and 43.9 percent were from urban areas for seeking jobs. Flour price had a negative regression coefficient which means that if increase of one unit of cultivated land the flour price will decrease (See table 3).

Table 4. Regression analyze

Model	Unstandardized Coefficients		Standardized Coefficients	T value	Significance level
	B	Std. Error	Beta		
(Constant)	-12538.904	3608.901		-3.474	.005
Population	10.130	3.997	0.957	26.534	0.032
Livestock number	-0.035	.014	-.729	-2.558	.031

Notes: Dependent variable: cultivated land, observations 15, R 0.876, R Square 0.768, Adjusted R Square 0.639, Std. error of the estimate 1149.612, signify statistical significance at the 5% level.

Conclusion

- This paper attempts to determine influencing factors to land use and land cover changes.
- In this study, it is shown that population size, livestock number affect the cropland changes. Contrary to expectation, climate indicators, crop yield are not the significant determinant of the change.

Recommendation

However, we used only Javkhlant soum's cropland area change during last 15 years; it can be expanded to the study of long period and can be determined more factors to the changes.

Even though, during last 25 years, soil degradation is increased slightly in Javkhlant soum, but we have to implement advantage technologies for cultivation and protecting program for soil quality that can be reduced land degradation.

In this area, both of agricultural and traditional animal husbandary developed well. But recent decades due to economic situation, climate change, better access of jobs and public services, migration is increasing in this area. According to grazing capacity, livestock number is 2.2 times higher. And also the main cropland area is located central and northern part of Mongolia. From this point, herder and farmer have disputes from land use particularly; livestock herding which is livestock enter to cultivated land and eat crops. Not only, we have to make an agreement or contract between herder and farmer during the cultivation period, but also to match livestock number and grazing capacity in this area.

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