

**AGROLANDSCAPE TRANSFORMATION OF AGRICULTURAL LAND
BAI-TAIGA DISTRICT OF THE TUVA REPUBLIC IN TERMS OF
ALTITUDINAL ZONATION**



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Khangaev Andrey Vasilyevich,

postgraduate student of the Department of real estate economics, state University of land management, Moscow

S u m m a r y: The article discusses the landscape structure and altitudinal zonality Bai-Taiga district of the Republic of Tyva. When the features of the local natural and geographical conditions. And in the General context, the analysis of land use in the study area.

Keywords: Bai-Taiga district, geography, farming, land management, land resources, altitudinal zonality.

The geographical position of Bai-Taiga district

The territory of municipal district «Bai-Taiga kozhuun of the Tuva Republic» is located on the periphery of Tuva in its western part and is bordered on the North

by the Republic of Khakassia in the East - the municipal district «Barun-Khemchikskoe district, Republic of Tuva», in the West - with the Republic of Altai and to the South by the municipal district «the Mongun-taiga kozhuun of the Tuva Republic» [1,2]. In geographic coordinates $50^{\circ}29'$ – $51^{\circ}39'$ latitude and $88^{\circ}47'$ – $90^{\circ}34'$ longitude. The position of the Republic of Tuva and the area under consideration in the structure of the subject (image 1).

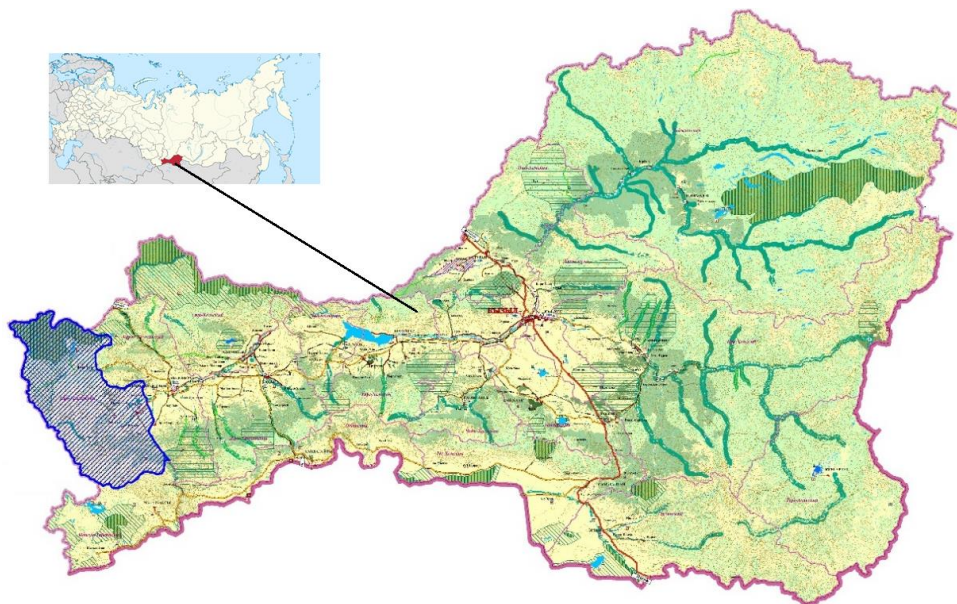


Image 1 - Location of the study area

The area of the Bai-Taiga district is 792282 hectares, which is 4,7% of the Republic's area and 9,12% of the area of the districts included in the Tuva basin (image 2).

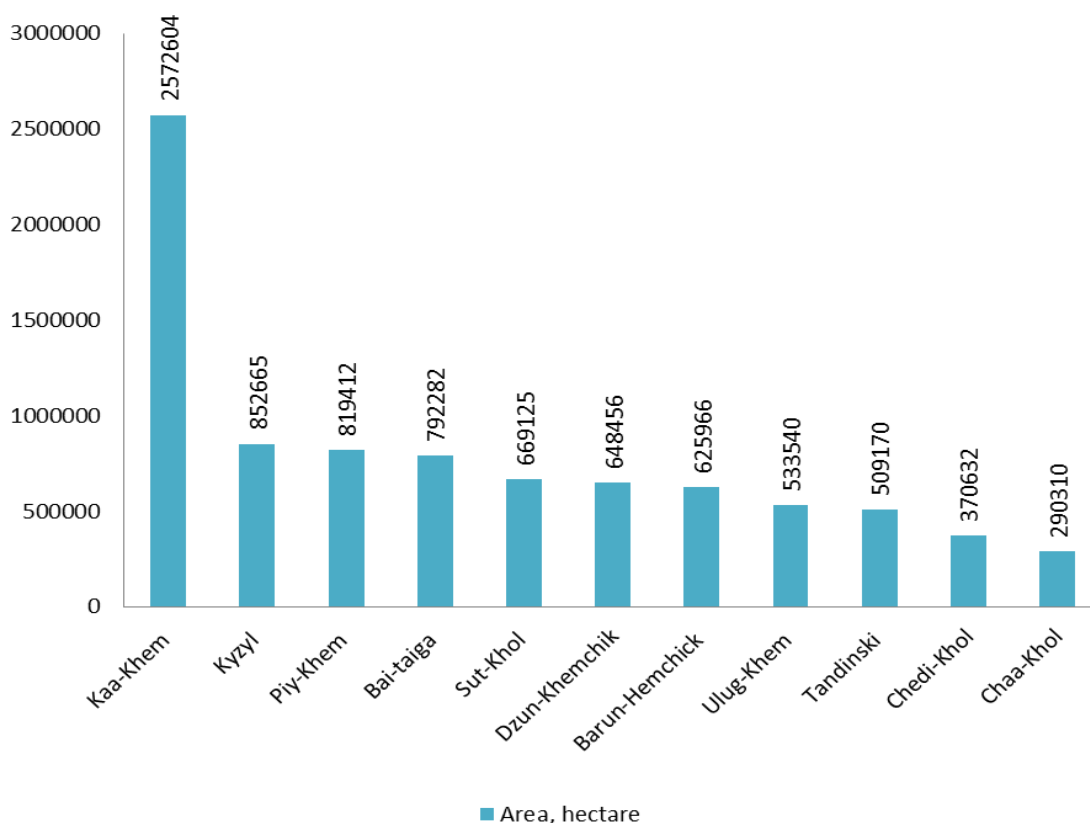


Image 2 - Comparison of the areas of the Republic of Tuva included in the Tuva basin

Geography of accommodation of the population in Bay-Tayginskiy district

To the peculiarities of economic and geographical situation of the district can be attributed to its remoteness from the Central regions (Kyzyl, Ulug-Khem), major economic areas, railway nodes. This is a significant factor that has a negative impact on the future development of the economy.

In comparison with other areas of The Tuva basin, Bai-Taiga is not the most densely populated in the Tuva basin. The change in the population of the district is due to both natural and mechanical movement of the population. It should be noted that the population density is 1,6 persons per 1 km² (Image 3).



Image 3 – Comparison of the size and population density on 01.01.2018 year, for the areas of incoming Tuvan hollow

In my opinion, the demographic situation in the region can be positively affected by the federal and republican programs for improving social support for motherhood and childhood, which can be aimed at providing additional material support.

Based on the information of the administration of the Bai-Taiga district, the population by 2018 amounted to 12707 people. The population in the area is unevenly distributed, more than 85% of the population lives in the Eastern part of the district of the Tuva basin below 1400 meters above sea level.

Natural and geographical conditions and distribution of land resources of the Bai-Taiga district

The climate of the area is continental with cold long winters and moderately warm short summers. The hollow nature of the relief of the territory with the General predominance of anticyclone regime in winter contributes to the

accumulation of cold air in the bottom of the basin and its additional emasculation. Data on average monthly air temperatures for the observed period are given in table 1.

Table 1-Minimum and maximum, average monthly air temperatures for 2016-2017, °C

Month Value	January	February	March	April	May	June	July	August	r	October	r	r
Minimum	-41,9	-37,3	-28,4	-7,2	-8,9	+6,8	+10,3	+3,2	-8,2	-15,2	-39,3	-33,8
Maximum	+16,0	-0,4	+14,1	+23,1	+31,0	+35,1	+30,8	+28,2	+27,1	+12,8	+6,0	-6,3
Monthly	-27,9	-21,6	-7,8	+6,8	+12,3	+19,3	+19,5	+15,3	+10,6	-1,6	-14,7	-21,7

The lowest observed temperature in winter-minus 41,9°C (31.01.2016). The winter period lasts about 178 days. Usually the snow cover does not exceed 25-30 cm and lies from mid-November to early April. The period with a stable snow cover does not exceed 148 days with a maximum thickness of 240 mm, which allows for winter grazing. There are cases of continuous heavy snowfall in the area, as in the first decade of November 2016, the thickness of the snow cover then ranged from 78 to 95 cm, (about 7-month precipitation rates). The maximum

height of snow was fixed in village Teeli November 4, 2016 – 53 cm, and 9 November 2016 – 43 see

Hot, dry summer comes at the end of may and lasts about 85 days. Maximum July temperatures of 30,8°C (19.07.2017). The duration of the warm (temperature above plus 10°C) period of about 120 days.

Based on the climatic features of the area, the period from April to October is a fire season. In this area, frequent foci of natural fires. According to the observations of 2016-2017, up to two wildfires may occur, with a total area of up to 180 hectares of forest area. The windy period is observed in the spring. The prevailing wind direction in this area is north-west, partly east, but at different times of the day the prevailing wind direction changes.

On the basis of the data issued by the office of the federal service for state registration, cadastre and cartography of the Republic of Tyva, the total area of the land Fund of the Bai-Taiga Republic of Tyva in 2017 amounted to 792282 hectares (Image 4) [3].

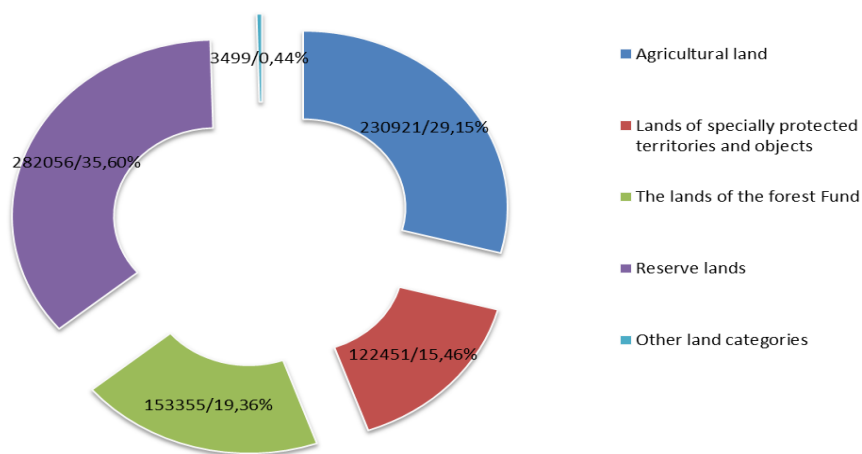


Image 4-Distribution of land resources of Bai-Taiga district, hectares/%

Landscape structure and high-altitude explanation of the Bai-Taiga district

The relief of the district is quite dissected. Narrow ridges are characterized by relatively smooth peaks and steep slopes. Intermountain valleys are the main lands that are used for the local population and economic activities. The height of the mountains inside the basin varies from 900 to 1800 meters. Almost the entire territory of the district should be considered as highly seismic, characterized by an increased level of seismic risk (Image 5).

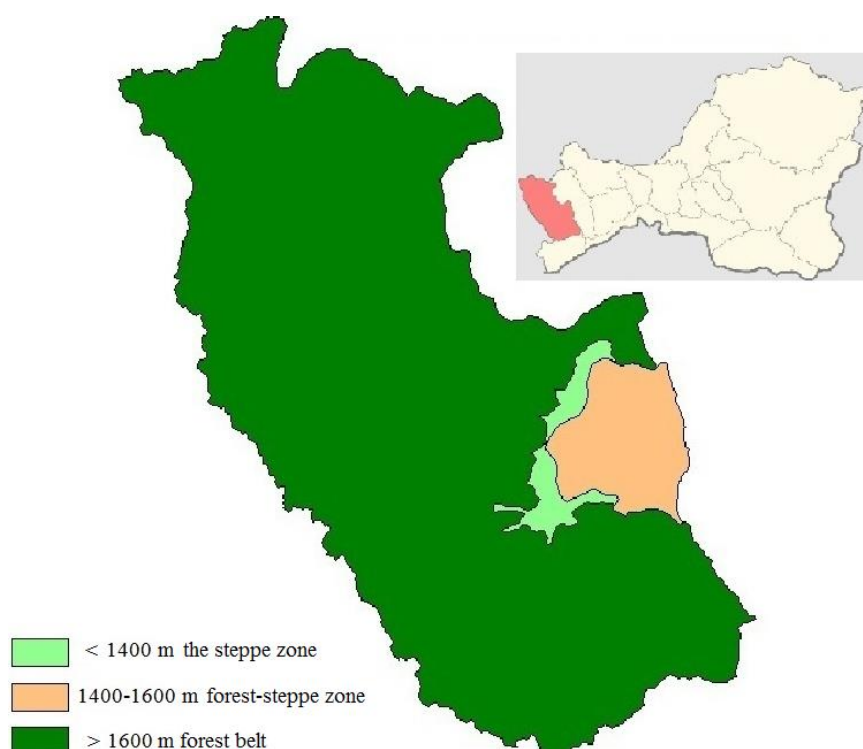


Image 5 - High-altitude zone of Bai-Taiga district

When applying the zones to the map in the MapInfo 9.5 program, it was found that most of the area is located in the forest belt of 724904 hectares (91,5%), the area of the area included in the steppe zone, 51624 hectares (6,52%), in the forest-steppe 15754 hectares (1,98%)

With the use of GIS technologies, a system-organized knowledge of the high-altitude zone of the study area and the adjacent territory is created. In fact, the most

favorable for economic activity of the steppe zone and it is home to most of the population of the area, carrying out economic activities.

In the forest zone there are areas with limited use (nature reserves, nature reserve, natural monuments).

Agriculture and land use in the Bai-Taiga region

The main production direction of the Bai-Taiga district-agriculture, with a predominance of sheep.

The complex landscape and severe natural and climatic conditions have caused a low ploughing of agricultural land. The district applies to areas dominated by grassland. The share of arable land in the structure of the land Fund is about 5% in the whole country, and in the region of 4,61%. The peculiarity of the Tuva pastures is the possibility to use a significant part of them during the whole year for grazing small and cattle. Hayfields and fallow lands on the area is a small area of the district.

Agricultural land in all categories occupy 248465,1 hectares, of which arable land-7827 hectares (3,15%), deposits – 1057 hectares (0,42%), hayfields - 1862 hectares (0,74%), pastures – 237719,1 hectares (95,67). The share of cultivated arable land in the total area of arable land is 40% [3].

Many traditional features are still preserved in the local population; horses play the main economic role from domestic animals, as the nomadism is unthinkable without these animals. In addition to horses, large and small cattle are bred in large numbers. Particular preference is given to breeding sheep-animals, the most adapted to winter grazing, which is able to be on the bottom feed. Keeping livestock on the pasture leads to the gradual knocking out of pastures and the need to move to new places, so historically, that in the traditional way of Tuvans, the priority belongs to such types of Pets that are capable of long transitions [4].

From the point of view of natural and geographical conditions assessment: short vegetation period and from the point of natural landscape assessment, which does not allow to carry out technical processing of crops and soils.

In these conditions, in my opinion, the development of animal husbandry, which is traditional for the local population, is more appropriate.

According to biche-ool T. N., one of the competitive advantages of the natural and climatic conditions of Tuva in the breeding of farm animals is the possibility of using a significant part of the pastures all year round, with which I agree. Biche-ool T. N. he also believes that the spread of pig and poultry farming depends on the cultivated area and the yield of fodder crops. On this point, I would note in General the whole animal husbandry of the Republic (including the Bai-Taiga district) and completely depending on the natural and climatic conditions [5].

The area is part of the area of traditional farming. In the area dominated by beef cattle, coarse wool sheep breeding, goat breeding, herd horse-breeding. According to the Department of agriculture of the Bai-Taiga district for the previous time in farms of all categories there is an increase in livestock (image 6). The number of cattle (as of 01.01.2017) – 13872 heads; including 5288 cows; horses - 2538 heads; sheep and goats – 147038; pigs – 190; birds - 132 heads [6].

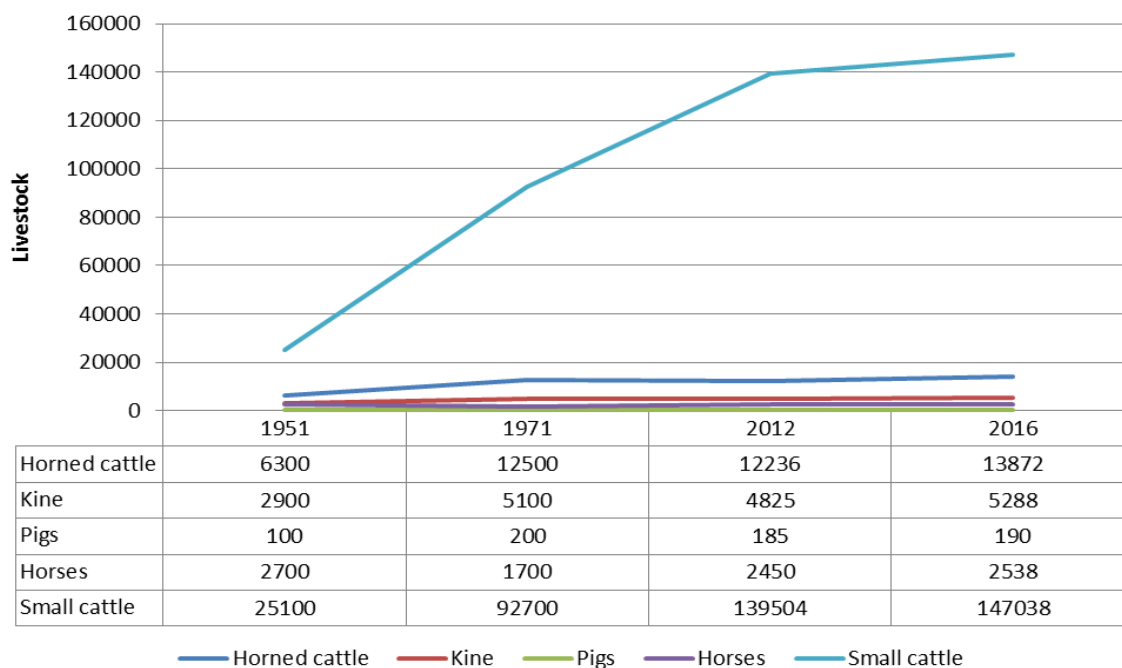


Image 6-Structure and dynamics of livestock in the Bai taiga district from 1951 to 2016

Based on the figure, we can note the weak increase in some types of livestock can be explained by socio-economic reasons: unemployment, lower living standards, the development of cattle stealing. The position of the administration of the Bai-Taiga district coincides with my assumption that the livestock has enough favorable conditions for the development and primarily for the breeding of sheep and cattle. However, the potential of its development is not fully used-the area of natural hayfields and pastures are not enough, there is no necessary transport and agricultural equipment, providing mechanization of work on hayfields, as well as equipment that allows to process the green mass of plants in the field of its harvesting.

One of the main factors determining the rational land use is the pasture load. It is expressed in the number of livestock per unit area of pasture. The grazing load depends on the number of livestock grazing on the territory. Calculations of

pasture load were carried out in two stages. To begin with, the number of conventional heads of cattle was produced. Then calculated the number of cattle grazed on 100 hectares of pasture area. After the calculations, the pasture load in the Bai-Taiga district amounted to 15 heads per 100 hectares. Based on the obtained calculations, the study area currently has a moderate level of pasture load with some reserve. I believe that it is possible to increase the current number of livestock, but with the mandatory preservation of unique objects of nature, natural environment, natural landscapes (image 7).

The area has a variety of natural landscape and tourist-recreational potential, has natural resources for recreation and treatment. Priority directions of tourism development: health, cultural and educational. Currently, tourism is one of the priority directions of economic development of the region and the region as a whole. Socio-economic consequences of the implementation of tourist destinations can have a positive impact on the development and other sectors of the economy of the region, will provide financial revenues to the budget by increasing income from recreational services and related economic activities.

Despite the fact that the area is considered to be advanced in the direction of agricultural development. Located natural landscapes, unique objects of nature are of considerable value. Therefore, I believe that the use of the territory for the current and future livestock leave in the same boundaries, subject to restrictions.

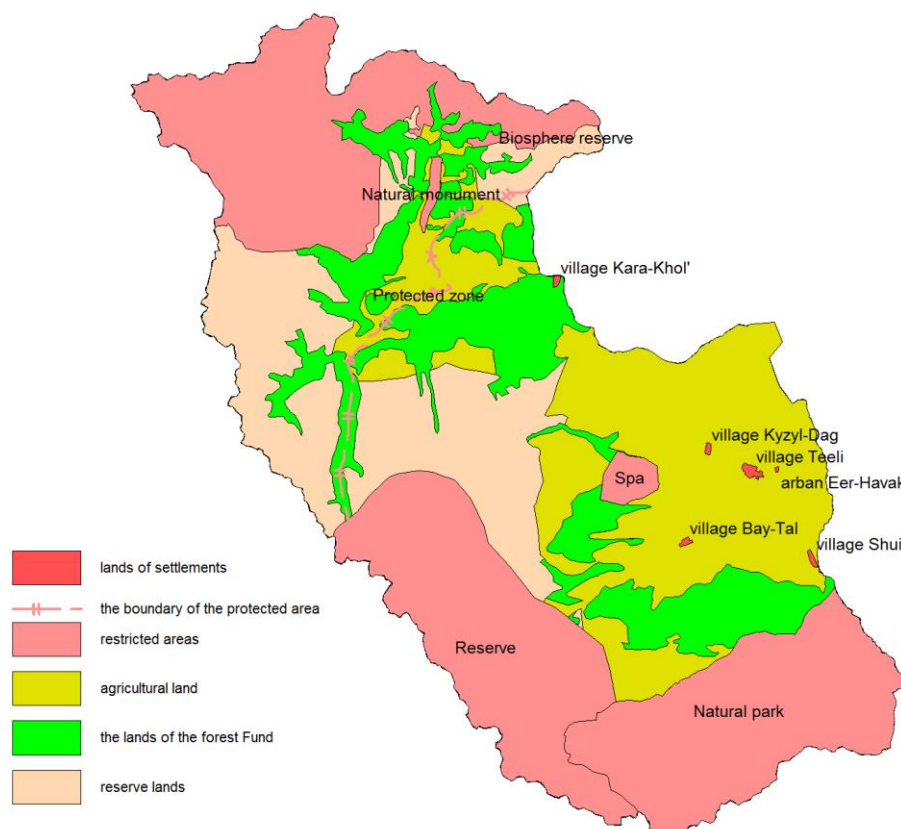


Image 7-Map of the development of the territory of economic activity

Conclusion

On the basis of the analysis, the following can be distinguished: the Bay-taiga district is characterized by the following unfavorable for human economic activity properties of the climate: significant daily and annual temperature changes, strong winds, abundant precipitation, snow avalanches. From the position of geographical location, the negative factor is the peripheral position of the district. From the point of view of the social situation is a high level of crime.

The strengths of the possible development is a huge tourist potential, combining a unique variety of natural and climatic conditions with picturesque landscapes, the wealth of fauna and flora, preserved national traditions, unique historical monuments. At the same time, there is an opportunity to create a special tourist and recreational zone, as there are free production facilities and labor

resources. In turn, this will lead to an increase in the number of jobs through development, reduction of mortality, crime rate, increase in the birth rate and other indicators of the quality of life of the population. Another strong point is the increase in the number of livestock over a long period of time, both in agricultural organizations and in the local population.

However, in these climatic and landscape conditions, the type of nomadic pastoralists has historically developed. This fact is confirmed by the fact that the indigenous people were engaged in the breeding of cattle, sheep and goats, horses. With the departure of collective farms, the possibility of pasture turnover has disappeared, as the basis of life support of the population - pasture animal husbandry. I consider the resumption of rational use of pasture resources, the regulation of cattle grazing taking into account the preservation of the natural environment. To prevent starvation, as a consequence of livestock mortality - to develop measures for the cultivation of annual and perennial sown grasses, using the features of the climate of the study area (heavy rainfall) in small intermountain basins.

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