

Informal use of linear road infrastructure of the extraction of natural resources in Eastern Siberia.

*Viktor Bogdanov¹

1. Institute of geography V.B. Sochava Siberian Branch of the Russian Academy of Sciences

A study on the use of linear road infrastructure as an informal road network has not been sufficiently studied. It is especially relevant in areas of intensive extraction of various natural resources.

The objectives of our study: to calculate the change in transport accessibility in connection with the construction of a new linear road infrastructure, to identify the positive and negative aspects of its use for informal transportation purposes, make an inventory, classification, and creation of a road network database including both formal and informal roads. We consider informal roads as roads outside of the existing network of public roads built, maintained and used by various organizations and individuals based on private, special goals and or informal rules.

The study area is located in the northern part of the Irkutsk region within the boundaries of the Ust-Kut and Katanga regions. It is characterized by difficult natural conditions: adverse winter temperatures, discontinuous permafrost, bogging, etc. The area had very low transport accessibility, but with the extractive industrial development the linear road infrastructure is growing rapidly.

Methods

For the project purposes, we used existing topographic materials, oil and gas field technological road maps, and remote sensing data. The calculation of the transport accessibility of this territory was made by the method of isochrons - lines of equal time spent on overcoming the space concerning the given points, using open GIS "GRASS GIS". To study the influence of roads on natural landscapes, we conducted several in-situ observations.

Results

The study area is a community of the Evenk indigenous population, which is mainly engaged in hunting and fishing. In the last 10 years, intensive logging, exploration and production of oil and gas has been carried out in the area. Accordingly, a linear road infrastructure is being built to service fields and transportation of resources.

There is a pronounced sequence in the construction of linear infrastructure.

The study area has significant forest and oil and gas resources, the company operators have long-term plans for their development. As new oil and gas fields are built and deforestation felled to the north, previously constructed technological roads become transit roads with relatively intense year-round traffic.

At the same time, there are no year-round public roads; the municipality organizes only winter roads that partially pass through abandoned geological profiles and forest roads.

We calculated transport accessibility using the linear road infrastructure of extractive companies. The

time spent on a way from the studied settlements to the transportation hubs of the region decreased to 50% in the winter period, while the transport assimilation of the entire studied territory significantly improved.

At the same time, there are other positive and negative effects of improving the transport development of the territory: the municipality's costs for maintaining winter roads are reduced, as well as the cost of delivering goods, hunters have the opportunity to get to new lands, while poaching by non-local people also increases. Field studies in key areas of Tokma and Khanda revealed landscape disturbances, replacement of the original forests with secondary birch forests, the development of thermal caste in swampy valley areas, soil heaving due to disturbance of soil cover and vegetation, and as a consequence of the development of high roads. The development of erosion processes on the slopes is intensifying.

Therefore, the studies of informal road network development have significant importance for studies of social and environmental impact of the extractive industrial development.

Keywords: road infrastructure, transport accessibility, indigenous population