Problems of Industrial Development and Possible Risks for the Preservation of the Natural Environment of the Altai Republic

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Abstract. In this article are examined possible risks for the preservation of the natural environment of the Altai Republic in the process of industrial development of the region. It is demonstrated, that industry in the Soviet period, including mining, did not have a significant impact on the natural environment. In the 1990s, in the context of the socio-economic crisis, many enterprises ceased their activities. At present, few industrial enterprises, which in terms of production volumes are small and less often medium-sized enterprises, have a local impact on the environment of the region. In the post-Soviet period, in the conditions of democracy and transparency, some projects being implemented and proposed for implementation provoke protests from local residents, including indigenous people. The implementation of some large investment projects in the field of recreational and tourist activities may have an impact on the natural environment of the region and create conflict situations with the local population.

1. Introduction

The Altai Republic is located in the south of Western Siberia. With an area of 92,6 thousand km2, the population of the Republic at the beginning of 2021 is 221 thousand people. A specific feature of the region is a significant predominance of rural residents (71%) in the overall structure and a low population density (2,38 people / km2). The ethnic composition of the republic's population is dominated by Russians (60%), Altaians (31%), Kazakhs (6%). The share of other nationalities does not exceed 1%. The basis of the region's economy is currently agriculture and tourism, which has been booming in recent years. Other sectors of the economy such as mining, forestry, food, light and manufacturing sectors are of subordinate importance.

A similar structure of branches of the economy was formed in the Soviet period. This is primarily due to the physical and geographical features, natural resource potential and location of the region. The territory of the Altai Republic is completely located within the boundaries of the Altai mountainous region and includes 6 physical and geographical provinces [1]. High-altitude relief levels - low-mountain, mid-mountain and high-mountain - affect the climatic features of the region, play a significant role in the differentiation of landscapes, the formation of flora and fauna, and determine the development of many sectors of the national economy [2]. In addition, the strong dissection of the relief in the mountainous conditions of Altai, the presence of vast intermontane basins and plateaus determine a wide variety of climate. Exposure differences between slopes are of no less importance on the features of
micro- and mesoclimates. Temperature inversion is also widespread in the mountains. This leads to the fact that in winter it is warmer on the slopes than on the bottoms of hollows and ridges, where the heavier cold air flows and stagnates [3].

The aforementioned determines the specificity of the development of agriculture in the Altai Republic, in particular, for the mid-mountainous and high-mountainous territories of the Altai Republic, distant-pasture animal husbandry is widespread, and plant growing serves mainly as a fodder base for animal husbandry. Also, for the southern, higher-mountainous, areas, less forest cover is characteristic. For example, the forest cover of the northern regions of the republic is as follows: Mayminsky region – 53,7%; Choisky region – 70,0%; Turochaksky region – 84,2%; southern regions: Ust-Koksinsky – 33,5%; Kosh-Agachsky – 9,4% [4].

Agricultural production during the Soviet period was characterized by a low level of processing of livestock products. The cattle were handed over to the Biysk, Leninogorsk, Semipalatinsk and Ust-Kamenogorsk meat-packing plants, the main point of goat fuzz processing was Orenburg, maral antlers were sent for processing to Vladivostok, and wool to Omsk [5].

However, agricultural production is dominant in the region. It involves about 75% of the rural population [6].

2. Materials and methods

The variety of natural and climatic conditions of the Altai Republic determines a rich biological diversity, and the presence of significant reserves of certain types of plant and other natural resources (pine nuts, wild medicinal herbs, berries) is an important local business, especially in recent years in the context of a fairly high unemployment of the rural population of the region [4].

The Altai Republic as a whole has a variety of minerals. These are coal, iron, gold, silver, cobalt, bismuth, wollastonite, mercury, molybdenum, tungsten, lithium, tantalum, antimony, nickel, zinc, tin, as well as building materials [7-8]. But despite the significant variety of deposits of industrial importance, the main problem of the development of the mining industry in the Republic is its insufficient geological knowledge, complex geological structure, as well as harsh natural and climatic conditions, which limit the investment activity of the region in the interregional market of investment proposals. Further development of the mining complex of the Republic is associated with the development of polymetallic deposits, ore gold, building materials [9].

In the Soviet period, the leading place in the industry belonged to enterprises of light and food specialization. The main products of the light industry were intended for other regions of Russia, the raw material base was located outside the region, which significantly hindered the pace of economic development. For example, raw materials for light industry factories of the autonomous region were supplied from Kazakhstan, and from cities Minsk and Voronezh. The severance of traditional economic ties in the early 1990s with absence of any significant alternatives put enterprises in a difficult position [10-11].

Under conditions of the formation of market relations, the costs of production increased and profitability decreased to almost a negative value, which entailed a halving of industrial enterprises and a 145-fold decrease in industrial output in 2004 to the level of 1990. The light industry was particularly affected. For example, if in 1988 its share in the sectoral structure of industry was 52,4%, then in 2004 it was only 0,7% [12]. In general, the share of industrial production in the gross regional product did not exceed 18% in 1990, and by the end of the 90s of the twentieth century it was no more than 5% [5].

At present, the economy of the Altai Republic is characterized mainly by an agricultural and raw material orientation, and industry sector - mainly by processing industries. A few industrial enterprises in terms of production volumes belong to small and less often to medium-sized enterprises, and, as a rule, have a local and low-intensity impact on the environment of the region. The main factor of negative impact, including pollution, of industrial enterprises on the environment is not emissions and discharges, but the waste generated by them and the associated environmental problems of their placement, use and disposal [13].
Until recently, a big problem for the region was the low level of electrification of the national economy. Thus, in 1988, the electrical labor ratio in the industry of the Gorno-Altai Autonomous Region was 7 thousand kW-hour/person against 13,9 in the Altai Territory and 35,5 in the country [11]. This is due to the almost complete absence of its own electricity production in the region (only 0,6% in 2004) [12].

Until recently, the peculiarity of the power supply of the Altai Republic was that almost all the consumed energy was coming from the Altai Territory (mainly from Biysk). In order to solve this problem in the late Soviet period, it was planned to build a large hydropower complex on the river Katun - Katunskaya HPP (hydro-electric power station) with a design capacity of 1600 MW and a counter-regulating Chemal HPP with a capacity of 300 MW.

Since the beginning of the construction of the Katunskaya HPP coincided with the period of publicity and restructuring carried out in the Soviet Union, the implementation of the project immediately caused a public discussion about the need to build a HPP and the environmental consequences of its creation. At that time, environmental issues enjoyed great public support, which ultimately led to the formation in society of a stable negative attitude towards the construction of the Katunskaya HPP. In 1987-89 several examinations of the project were carried out, which underwent minor changes. As a result, in 1989, the project was rejected by the state ecological expertise, which indicated, among other things, that the construction of this hydroelectric power station would lead to significant disruptions to the natural complex of the river Katun, which is of unique value in natural, historical, archaeological and recreational terms [1-15].

It should be noted that the decision to halt the construction of the Katunskaya HPP was also associated with the deteriorating economic situation in the country. Supporters of the construction of the hydroelectric power station believe that the decision of the examination was not objective, since it was dictated by political motives and was taken under great public pressure.

A number of projects for the construction of hydroelectric power plants, for example, the Altai hydroelectric power station with a capacity of 140 MW on the river Katun, prepared in the mid-2000; Chibitskaya HPP with a capacity of 24 MW on the river Chuya, which reached the stage of the start of preparatory works in 2011, the construction of a cascade of small HPPs on the river Multa with a total capacity of 34,5 MW was also not implemented, including due to public protests [16].

In 2008, gasification of the Altai Republic began. For the period up to 2021, 9 settlements were supplied with gas in the region, the total length of gas networks is 630 km. 137 boiler houses were converted to natural gas. The level of gasification with natural gas (as of January 1, 2021) is estimated at 5,81%. This made it possible to significantly improve the ecological situation in the city of Gorno-Altaysk, especially in winter [13].

Solar energy has been developing in the Altai Republic since 2015. The first power plant connected to the unified power system was the Kosh-Agach SES. In 2016-2019, six more solar power plants were commissioned. Together with the hybrid power plant in the Yailu settlement (the territory of the Altai Biosphere Reserve), the total capacity of the SPP reached 120 MW. Two small hydroelectric power plants (HPP “Jazator” and HPP “Kairu”) have a total capacity of 1,3 MW. There are also 10 small diesel power plants in the region. A specific feature of the energy system of the Altai Republic is currently the sharp dominance of solar generation, which accounts for 92% of electricity generation in the region. The construction of solar power plants, unlike hydroelectric power plants, did not provoke protests from environmentalists and the local community.

3. Discussion
It should be noted that with the beginning of “perestroika” in conditions of openness, residents of Altai, as well as residents of other regions and the country as a whole, have an increased interest in the study and revival of religion, national traditions, beliefs, rituals, holidays, etc. This manifested itself in different forms, including in relation to nature, natural resources. For example, the Altai people are characterized by the veneration of all natural elements and certain objects of nature. All of this is closely related to the idea of the afterlife and the cult of ancestors. Each valley, mountain, river has its own spirit
of Eezi. The respectful attitude of indigenous people to these objects has been preserved to this day and is expressed in a system of restrictions and prohibitions, which is of great environmental importance in preserving natural landscapes, flora and fauna. Despite various factors (restrictive and prohibitive measures during the Soviet period, rapprochement of different cultures, globalization processes, religious influence in recent years, etc.), the indigenous people have largely preserved their national culture, pagan customs, traditional beliefs, etc. [17].

Back in the Soviet period (1988), the first national holiday "El-Oyin" was held near the village of Yelo, Ongudai region. In 1991, the revival of the zaisanat took place among the southern Altaians. In 1992, the "Association of Northern Altaians" was created, the purpose of which was to preserve the ethnic identity of the Northern Altaians (Tubalars, Chelkans, Kumandins) and to officially recognize their dialects [18]. An increase in interest in the culture of ancestors in the post-Soviet period was noted by more than 80% of respondents in the villages of Kulada, Inegen, Ongudai region and the village Mendur-Sokkon of the Ust-Kansk region [17].

An increase in interest in the culture of ancestors is directly related to the problem of preserving the natural environment in the places of residence of the indigenous people and the nature of Gorny Altai in general. For example, in the summer of 1993 on the Ukok plateau (Kosh-Agach district), in the permafrost layer of the mounds, mummified bodies of people with tattoos were found. Of particular interest was the discovery of the mummy of a young woman, soon named by journalists the Altai princess or the princess of Ukok. This created a conflict situation in the region, since many local residents demanded to bury the body of the "princess" back and generally prohibit such excavations in the future, not only in Ukok, but also in Gorny Altai in general. In addition, among the indigenous people, the opinion arose that the spirit of the disturbed princess Ukok could bring misfortune to the inhabitants of the region [19]. It should be noted that the earthquake of 2003, the epicenter of which was just in the Kosh-Agach region, only strengthened such sentiments among local residents.

The authorities of the Altai Republic could not ignore the opinion of local residents, especially in the new conditions for those times when local and regional authorities were elected. In August 1994, in order to preserve the natural environment on the Ukok Plateau, the Ukok Quiet Zone was established for a period of 10 years. With this decision, the regional government tried to reassure the local residents. In 2005, on the territory of the Ukok Quiet Zone, a natural park "Ukok Quiet Zone" was organized in accordance with federal legislation [19].

Among other examples, the project for the construction of the Altai gas pipeline to China through the territory of the Republic, including the Ukok high-mountain plateau, classified as a UNESCO World Natural Heritage Site, should be noted. This was opposed by both public environmental organizations, representatives of the scientific community and many indigenous residents [20]. The project has not been implemented to date for economic and geopolitical reasons. Note that in recent years, the option of building a gas pipeline across the Altai Republic through the territory of Mongolia, bypassing the Ukok plateau, is also being considered. In this case, most of the objections of environmentalists and local residents will be removed.

In the Altai Republic, since 1932, one of the most developed networks of specially protected natural areas in the Russian Federation has been formed, including 54 special protected areas. These include two biosphere reserves, one national park, four nature parks, two biological reserves, 44 natural monuments of regional importance and one botanical garden. The total area of these special protected areas is 2.36 million hectares, or 25.4% of the territory of the Republic. It should be noted that all natural parks and some natural monuments are organized at the initiative of local residents, and not the scientific community. Currently, local residents are seeking the organization of protection zones for all natural monuments.

In recent years, the Altai Republic has been positioned as one of the leading recreational regions of the Russian Federation. Mass tourism in the region has been developing since the early 1960s, the total number of tourists in the late Soviet period was more than 300 thousand people [21]. In the conditions of the socio-economic crisis, the number of tourists decreased (to 40 thousand in 1992-1993), but by the end of the 1990s it again reached the indicators of the Soviet era [22]. Since then, the number of tourists
has steadily increased, and since 2017, the Republic has been annually visited by more than 2 million tourists [13]. This is almost 10 times the population of the region. In recent years, more and more remote territories of Gorny Altai have been involved in the tourism sector.

Since 2009, large investment projects in the field of tourism have been implemented in the Altai Republic - the construction of a year-round ski resort "Manzherok", a closed special economic zone of a tourist and recreational type "Valley of Altai" (the project has not been implemented), Teletsky ski resort, etc. It can be mentioned here also the restoration in 2010 of the Gorno-Altai airport. After the reconstruction in 2011, the passenger traffic increased every year (from 41,9 thousand people in 2014 to 148,4 thousand people in 2020), this also contributed to an increase in the number of tourists in the region.

Until recently, the development of tourism has generally proceeded without conflicts with the local community, since villagers living near the most popular recreational facilities in Gorny Altai are quite actively involved in recreational and tourist activities. But the project for the creation of seven tourist and recreational clusters put forward for discussion in 2021, covering almost half of the Altai Republic in area, caused a sharp rejection of the population, including the indigenous, as well as a number of municipal authorities, deputies of municipal councils, local entrepreneurs. The project involved the creation of a network of apart-hotels, standard tourist information centers, modular food outlets, standard accommodation and catering facilities designed for wealthy clients. It is proposed to create a network of recreational facilities of a high level of service practically from scratch. The main complaints from the local community are that the implementation of this project is designed for wealthy investors; do not fully take into account the existing infrastructure of tourism and the interests of the local tourist business; it is planned to use agricultural land for the construction of recreational facilities, including share land, as well as land in specially protected natural areas; many natural objects sacred to the local population will lose their original appearance and, accordingly, their significance.

4. Results
Considering the impact of industry on the natural environment of the region, it should be noted that there are no large industries that have a significant negative impact on the natural environment of the region. At present, some water bodies are polluted, which are subject to the influence of mining (placer gold mining) and partially food (creamery) industries. The most polluted in the region is the river Maima in its lower reaches, this is due to the negative impact of the agglomeration of the republican center - the city of Gorno-Altaysk [13]. Agriculture and traditional crafts of the local population - hunting, fishing and gathering - have a more significant impact on certain types of natural resources.

There are no plans to develop large deposits in the coming years, the development of transport infrastructure is mainly associated with the reconstruction of the existing road network. Gasification of the region and the possible construction of the Altai gas pipeline, especially through the territory of Mongolia, bypassing the Ukok plateau, will not have a significant impact on the natural environment of the region. At the same time, the construction of new highways to popular recreational facilities will increase their accessibility and, accordingly, the number of visitors, which may affect their preservation in their natural state.

At the same time, when implementing large investment projects such as the above-mentioned project of creating seven tourist and recreational clusters, it is necessary to take into account the opinion of all interested parties, the need to preserve the landscapes, flora and fauna of the region.

5. References
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