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## **ECOSYSTEM SERVICES IN THE FAR NORTH REGIONS (FROM THE EXPERIENCE OF "ETHNOEXPERT")**

**Abstract.** *The article is based on ecosystem service material research performed by "EthnoExpert". This analysis determines the benefits for the population and enterprises that the use of ecosystems provides. The research addresses the industrial development project implementation in the Murmansk oblast, the Nenets and the Yamalo-Nenets Autonomous Okrug. Ecosystem services were the focus in connection with preserving traditional nature management of indigenous small-numbered peoples of the North. There were attempts to solve the problem of the industrial project negative impact on ecosystem services by paying subsidies to the local population. Sadly, they only had a short-term effect. It is possible to reach a positive result by coming to terms with regional and municipal administrations and developing plans for sustainable territory development. "EthnoExpert's" experience showed that assessing ecosystem services and considering the obtained data while implementing an industrial project, minimizes the negative impact on the social and environmental spheres. At the same time, there is no significant damage to the economic efficiency of the project.*

**Keywords:** *ecosystem services, traditional nature management, sustainable development, industrial development, reindeer husbandry.*

The study of ecosystem services (i.e. benefits to the population and enterprises resulting from the use of ecosystems) is gradually becoming an increasingly important component in implementing the sustainable territory development concept. Considering ecosystem services while making project decisions gives plenty of rope for a comprehensive assessment of the proposed activity consequences, eliminating or minimizing the negative environmental impacts. Existing methods of calculating the natural system benefits facilitate integrating the ecosystem approach into the economic area [1].

Ecosystem services include material and nonmaterial benefits nature provides. Researchers use different ecosystem service classifications, the most widespread thereof based on a functional attribute. It subdivides into provisioning, regulating, cultural and supporting services. The first three groups of ecosystem services determine direct influence on human welfare. Provisioning services include, for example, products of marine and

freshwater ecosystems, wood production, hunting and cropping products. Services on climate, atmosphere, soil, water objects regulations, water cleaning, environment cleaning, etc. relate to regulating services. Cultural services include functions of natural systems, which satisfy aesthetic, spiritual, educational and scientific needs of people. Supporting services include soil-forming, circulation of water and nutrients, primary production creation etc. [2, p. VI].

"EthnoExpert" has been engaged in consulting and research activities in Russia for ten years, having implemented a number of projects in various regions of the Far North (Murmansk oblast, Arkhangelsk region, Nenets and Yamalo-Nenets Autonomous Okrug). The results of the company's activities help analyze various economic practices for accounting and ensuring the quantity and quality of ecosystem services.

There are industrial projects, which often go about without the necessary ecosystem service study, thereby ignoring their adequate assessment and significantly complicating the implementation of an integrated ecosystem approach. The concept of the ecosystem approach implies a strategy for integrated management of land, water and living resources, which stimulates their conservation and sustainable use on an equitable basis [3]. The fragile and vulnerable nature of the Arctic makes the ecosystem approach the most important condition for preserving the complex functions of natural and social systems during the implementation of industrial projects. The problem is also the lack of scientific research on the ecosystem services of the Arctic zone, although there are certainly a few examples of such works [4]. The lack of a scientific description of the different types of services of Arctic ecosystems tends decision making difficult and can have negative consequences for the region.

"EthnoExpert" commenced studying the problem of ecosystem services in 2008 as part of the Fedorovsky deposit development project in the Lovozero region of the Murmansk oblast. There are deposits of platinoids in the territory of Fedorova-Pana tundras, which a large mining company "Barrick Gold Corporation" was interested in. It initiated the search, evaluation and exploration work [5, p. 13]. "EthnoExpert" specialists assessed the project's impact on providing, regulating and cultural ecosystem services and proposed measures to reduce the negative impact on them.

The main providing ecosystem service for traditional nature management on this territory are reindeer pastures. The construction of industrial facilities and communication routes could lead to the annihilation of some deer pastures or a decrease in their capacity. An indirect negative consequence of industrial activity leading to the loss of ecosystems services is littering deer pastures. For example, broken glass scattered near roads and winter trails injures deer legs and provokes diseases leading to death.

Poaching significantly decreases the number of deer population: road construction improves access to hunters in the deer grazing territory.

In order to maintain proper quality of ecosystem services, project participants have to build a cut-off fence to prevent reindeer from going to the potentially dangerous territory. Prohibiting hunting throughout the territory did not meet the principle of the ecosystem approach and was not adopted. Since many locals live off hunting, this decision could have a negative impact on them. "Barrick Gold Corporation" also included cleaning of debris adjacent to pasture areas in the list of measures for reclamation.

"EthnoExpert" specialists took into account that background damage from the construction of industrial facilities can have an impact on regulating ecosystem services: natural regulation of water, air, soil water quality, etc. The appearance of new fishing bases and other recreational facilities on lakes and rivers creates an additional burden on the environment, and therefore negatively affects overall biological processes in the ecosystem.

There was no significant impact on regulatory services during the implementation of the EIA procedure due to the compact disposition of industrial facilities. Nevertheless, the Company planned to monitor the ecosystem and during the operation of the facility.

"EthnoExpert" specialists assessed possible changes in the ethno-cultural environment ambiguously. On the one hand, industrial activity entails the social and economic development of the district and the improvement of the population's quality of life. On the other hand, it radically changes the traditional way of life of the indigenous small peoples originally living in the Far North.

The impact on cultural ecosystem services of the territory is almost impossible to quantify. Therefore, it is usual practice among subsurface users to develop a plan for the sustainable development of certain territory's indigenous population. These were the following main points of the plan in the Fedorovskoye field case:

- Rational and effective use of land and mineral resources in the interests of industrial company and the indigenous population development;
- Creating conditions for sustainable development of traditional branches of economy, life and culture of indigenous peoples;
- Recognition and preservation of territories (areas) of traditional nature management, providing life support for indigenous people within the framework of the feeding landscape.

In 2009, "EthnoExpert" specialists took part in the development and implementation of a strategy and plan for integrated ecosystem management on Kolguev Island, Nenets Autonomous Okrug (NAO). They carried out a study within the framework of an integrated project supported

by the Global Environment Facility (GEF) and initiated by the Arctic Council's Arctic Flora and Fauna Working Group (CAFF), UNEP / GRID-Arendal and the Russian Federation. In addition to the Kolguev Island, the project worked at two more sites: in the lower reaches of Kolyma River in Sakha Republic/Yakutia and Beringovsky District in the Chukotka Autonomous Okrug (ChAO).

The territory of the island is characterized by a high density of nesting waterfowl in the Barents region and a unique population of reindeer (local reindeer meat is very high quality). At the same time, there was a slight excess of the permissible load on pastures (grazing around 8500 deer). The population of the island is only 450 people. Mostly these are Nenets, engaged in traditional activities - reindeer herding, hunting and fishing. The occupation of the local inhabitants by the hunting of birds - the greater white-fronted goose, the taiga bean goose, the barnacle goose, and the collection of eggs (although the collection of eggs of wild birds is prohibited in the Russian Federation) increased the burden on the ecosystem. The problem was the environmental disruption because of oil production, which could subsequently lead to the loss of wetlands and nesting places for waterfowl, the loss of deer pastures and traditional wildlife management by the local population. The survey showed the need for rational use of ecosystem services. To achieve this goal, the organizers of the project trained local people to smoke and dry-cure reindeer meat and process deerskins. Hereafter, they brought the trainees to the island and gave the community special equipment. [6, p. 5-6, 15-17] These events aimed at changing the marketing strategy. With successful organization of product processing and marketing, reindeer herders would receive more income from the available deer population, which would prevent further increase of the pasture load.

Another project, which took into account the role of ecosystem services, took place in 2012 during the social and environmental research in the zone of the East Tolotinsky licensed area (Nenets Autonomous Okrug). "EthnoExpert" specialists studied the probable damage to the economy and economic potential of the local population territory; social risks associated with changing living conditions of the licensed area people; risks associated with changing the ethno-cultural environment of the local community (Nenets, Komi). The company developed a compensation strategy, including procedures for payment evaluation and implementation to compensate for the damage to ecosystem services. Moreover, in order to interact with the local community most productively, it established a cooperation program (promoting socio-economic development of the indigenous community) consisting of program documents and multilateral agreements.

Studies of the processes that take place in the region proved industrial companies providing the indigenous population with charitable

assistance ineffective. Subsoil user companies are on the way to signing cooperation agreements with regional and municipal administrations, an integral part of which focuses on the issues of traditional nature management of indigenous peoples. These companies introduce coordinator positions or create structures that are obliged to organize interaction with the local population.

For example, "SK Rusvietpetro, Ltd." executed a cooperation agreement with the administration of the Nenets Autonomous Okrug in 2009, under which the total amount of the company's participation in the social and economic development of the region amounted to 185.6 million rubles. These funds were used to build socially important facilities in the villages (a hospital and a bath in the village of Khorey-Ver and a kindergarten in the village of Bugrino on Kolguev Island), to finance meat processing enterprise modernization in order to improve the efficiency of reindeer husbandry [7].

Later, the accumulated experience was used by "EthnoExpert" to create the "Development plan for the Yamal district of the Yamal Nenets Autonomous Okrug (2014-2018)". It was prepared and implemented in connection with the industrial development of the South Tambey gas condensate field on the Yamal peninsula. The Yamal LNG project unites the Russian gas company Novatek, French Total, the Chinese National Oil and Gas Corporation, and the Silk Road Fund. It provides for the extraction, liquefaction and supply of natural gas with a capacity of about 16.5 million tons per year. In connection with its implementation, project members agreed to build a transport infrastructure including the seaport and Sabetta airport.

According to the plan, in order to preserve and develop the ecosystem services provided, project stakeholders organized the process of revegetation for the lands that were temporarily in use during the construction phase, as well as the lands that were destroyed prior to the start of Yamal LNG activities. An important direction of work was the development of infrastructure and removal of obstacles on the reindeer herd migration routes. With the aim of facilitating transport accessibility for reindeer herders and thus minimizing the risks associated with traffic through the project area, every year the company constructs snowmobile and sledge trails through the territory of the South Tambey licensed area.

In accordance with the requirements, the winter road is equipped with special marks with strips of light-reflecting tape. The planning of winter track routes takes into account the opinion of reindeer herders and progresses in direct contact with the administration. In addition, eight new reindeer transition tracks operated by November 2016.

The following steps facilitated maintaining traditional nature management and ecosystem services of the territory: organizing air transportation and helicopter flights for the tundra population; providing of

reindeer herders with fuelwood; constructing facilities for processing traditional farm products; developing trading stations on the Yamal Peninsula.

Cultural ecosystem services were a subject of particular attention. Researchers identified four cemeteries, seven sacred and memorable places associated with the culture of the indigenous peoples of the North on the territory of the licensed area and the ten-kilometer security zone. The survey showed that all recorded places are functioning objects of the Nenets culture. The plan included measures to monitor the status of these facilities.

For industrial companies implementing projects in the regions of the Far North, attempts to solve the problem of the impact of industrial projects by paying subsidies to the local population are typical. However, subsidies do not always improve the situation in traditional nature management. On the contrary, sometimes they create new problems. The Yamal-Nenets Okrug budget directed subsidies to support reindeer husbandry depending on the livestock of the reindeer herd, the weight of sold meat, as well as subsidies for compensating transportation costs [8, p. 65]. The growth of the deer population on the Yamal peninsula has demonstrated inefficiency and even damage subsidies based on counting the number of reindeer bring. The spread of this type of subsidies led to an increase in the burden on pastures, the disturbance of vegetation cover and, consequently, the disruption of ecosystem services. Currently, the county administration is working to develop more effective venison processing and production, food industry development, market expansion. The authorities changed the procedure for turning in stag-deer to paying the money upon delivery, and not upon sale.

Industrial companies do not always take into account the hidden functions inherent to natural systems, as well as the various ecosystem services that the territory produces. As per example of the Arctic region, such functions are especially distinguished for tundra bogs located on permafrost soils: they are rich in carbon, maintain global biodiversity, regulate the climate, etc. Violating thereof may leave a huge impact on the climate of the planet because of carbon loss and natural gas emission. Describing this category of ecosystem services and considering it in project decision-making is important for the fragile ecosystem of the Arctic region and its sustainable development.

Assessing the environmental impact of the project does not always reflect the recreational or cultural functions of the Arctic ecosystems. Ecosystem approach implies obligatory interaction with all project stakeholders who may affect its implementation. With such activities, it is possible to take into account the cultural specificity of local residents and to develop optimal solutions that do not entail negative consequences.

Environmental policies carried out by the authorities and industrial companies often involve creating Special Protected Natural Areas for compensatory measures, in view of the inevitable disruption of the territory's ecosystems and ecosystem services. However, in the Arctic, such Protected Areas have a great impact on the social sphere: they limit the movement of indigenous peoples and disrupt the paths of grazing deer herds. Such situations arise because of the primarily incorrect assessment of the ecosystem services of the territory, and can subsequently lead to serious disruptions in the whole ecosystem.

Russia's legislation system does not regulate ecosystem service assessment, thus it is not a prerequisite for project implementation. However, such research contributes to making strategically correct management decisions. "EthnoExpert's" experience showed that assessing ecosystem services and considering the obtained data in industrial project implementation minimizes the negative impact on the social and environmental spheres without significant damage to the project's economic efficiency.

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