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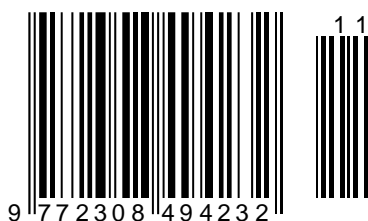
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Article



Vyacheslav Sergeevich Kreinin
 Don State Technical University
 graduate student

Pavel Serafimovich Obukhov
 Don State Technical University
 Ph.D., Associate Professor
 Rostov-on-Don, Russia

Artur Aleksandrovich Blagorodov
 Institute of Service Sector and Entrepreneurship (branch) DSTU
 master's degree

Vladimir Timofeevich Prokhorov
 Institute of Service Sector and Entrepreneurship (branch) DSTU
 Doctor of Technical Sciences, Professor
 Shakhty, Russia

Galina Yurievna Volkova
 LLC TsPOSN «Ortomoda»
 Doctor of Economics, Professor
 Moscow, Russia

EDUCATION OF THE INDIGENOUS POPULATION IS A GUARANTEE OF SUSTAINABLE SOCIAL AND ECONOMIC DEVELOPMENT OF THE REGIONS OF THE ARCTIC ZONE

Abstract: *The article analyzes the situation of the indigenous population in the Arctic zone of the Russian Federation, in which representatives of nineteen indigenous peoples live and their heritage sites are located, which are of historical and cultural value of global significance. Since the problems of developing the education of indigenous peoples of the Arctic today acquire a special meaning, an important aspect is the training of local residents. This article will consider such a way to reduce unemployment and personnel shortages in the Arctic as the creation of a competent and effective education system in the Russian Arctic with fully modernized technical equipment. Each of the Arctic peoples has its own unique experience, its own language and culture, and an important factor determining the specifics of the Arctic region is its "multinational character, the presence of a fairly significant numerically indigenous population, represented by several peoples belonging to different linguistic families, distinguished by cultural originality, different from each other social organization and social structure." Therefore, a special nature of the education of indigenous peoples of the Arctic is necessary for an integrated, multidimensional approach to the process of transmitting culture through the education system. Getting an education lays the foundation for improving the socio-economic conditions of people's lives and plays a key role in ensuring the sustainable development of a culture of peace. Thus, SDG No. 4 (Sustainable Development Goal is one of 17 interrelated goals developed in 2015 by the UN General Assembly) "Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all" has such objectives, the implementation of which will affect to increase the number of young people and adults, especially in least developed countries and small island developing states, with in-demand skills for employment, decent work and entrepreneurship, namely, "by 2035, ensure that all children complete free education, equitable and high-quality primary and secondary education that*

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achieves relevant and effective learning outcomes.” According to the authors, when developing an education system for indigenous minorities, it is impossible not to take into account the specific form of organization of the educational process itself, the frequency of vacations and diet. The problems of developing the education of indigenous peoples of the Arctic today acquire a special meaning and scale, going beyond the scope of local problems relating to the life and social well-being of a small part of the Russian population. Therefore, it is necessary to train local residents and then improve their skills, as this is one of the ways to reduce the level of unemployment and personnel shortages in the Russian Arctic. To do this, it is necessary to create a competent and effective personnel training system on the territory of the Russian Arctic, completely modernized and with modern technical equipment. However, there are several problems that hinder the development of educational services and their receipt by children in the Arctic. One of the central problems in the education of the indigenous population of the Arctic is the direction of education. It should be focused both on the traditional activities of peoples, and on adaptation and acquisition of modern professions. In addition, there are other problems that need to be solved in the Russian Arctic.

Key words: Arctic zone of Russia, youth, vocational education system, region, humanitarian development, population, education, personnel training, university graduates, economic needs, strategy, structural compliance, in-demand specialties.

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Introduction

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The shortage of qualified personnel, characteristic of Russia as a whole, will intensify during the forecast period. This means that for the sustainable development of the Arctic, there is no alternative to the need to train our own cadres of teachers, doctors, cultural workers, social workers, state and municipal employees, including representatives of indigenous peoples of the North (while maintaining strong ties with university centers in Russia).

There are fourteen single-profile cities located in the Arctic zone. According to the latest data, the socio-economic situation in them has deteriorated significantly. The most difficult situation has developed in the cities of Kirovsk, Onega, Kovdor and the village of Revda. The social, housing, communal and transport infrastructure here has deteriorated significantly. This area requires not only specialists in the development of urban areas with an “Arctic” bias, but also all specialists capable of ensuring a high social level: teachers, housing and communal services specialists, doctors and others. By the way, the healthcare sector faces special challenges: due to the higher incidence rate in the region, difficult living conditions, harsh climate, and difficult transport accessibility, it is necessary to build a new healthcare model in the Arctic. In particular, the key issues are the development of remote medicine, the development of air ambulance, the introduction of new approaches and medical technologies. For future medical workers, this may become especially interesting from the point of view of participation in “non-standard Arctic projects.”

Innovative technologies are the driver of socio-economic development of the polar macroregion. We need specialists who will create and implement innovative technologies from Russian developers for the needs of the Arctic, including in oil and gas projects. For example, several universities are training specialists in the bachelor’s program “Machinery and Equipment for Oil and Gas Fields.” A number of universities also offer an interesting bachelor’s program in Innovation Management in Industry. The introduction and active use of robotic technology is necessary due to harsh environmental conditions. Scientists are already working on samples of automated systems that can be used for underwater work on the Arctic shelf, environmental monitoring, and mineral exploration. The same applies to the development of unmanned technologies - they are necessary for scientists, the military, and representatives of mining companies.

Due to the active development of industry, the ancestral habitat of indigenous peoples in the Arctic is being negatively impacted, and this, in turn, leads to an aggravation of social problems and a crisis in traditional industries. In this regard, a special state policy is needed regarding their sustainable development and preservation of their original culture, crafts, language, and crafts. In-demand specialists include teachers of northern languages, translators of northern languages, philologists-researchers, animal engineers, livestock specialists, and reindeer herders. Among the interesting programs is the bachelor's program “Traditional Industries of the North.” During the training process, students gain competencies in the field of animal science in northern animal husbandry, breeding work, mechanization and automation in animal husbandry, skills and

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knowledge in the field of animal hygiene, the basics of veterinary medicine, and northern fisheries.

The education system of the Arctic territories will work for innovative development, effective modernization of the economy and social sphere of the Arctic zone. The priority directions of its development in the forecast period are increasing the innovativeness of the educational technologies used (creation of media libraries, introduction of multimedia computers, computer encyclopedias, e-books, reference books, etc. into the educational process), informatization of the educational process (including ensuring access of all educational institutions to global information resources, the development of distance education and other measures), improving the qualifications of teaching and management personnel, promoting the retraining of adults, integrating institutions of vocational education, science and business to maximize the compliance of the education system with the needs of the labor market for qualified personnel, the formation of effective economic relations in education. The catalyst for these processes in the entire educational system should be higher education (including the creation of federal state autonomous educational institutions of higher professional education “Northern (Arctic) Federal University” and “North-Eastern Federal University named after M.K. Ammosov”), new university scientific and educational complexes of modern technologies - search and exploration of mineral deposits; petrochemistry, coal chemistry; new building materials and technologies; for training certified specialists in information technology and network administration; biotechnology; biochemical-biophysical diagnostic, preventive and therapeutic medical technologies and other competencies. Vocational education in the Arctic will acquire the features of a flexible, open, developing system that can provide significant assistance to the socio-economic development of the region. A system for the production, promotion and commercialization of scientific knowledge will be created at Arctic universities.

There will be a connection between university programs and the needs of Arctic mega projects. New specialties will be developed that are adequate to the changing specialization of the Arctic economy - marine geology and geophysics, oil and gas business, marine biotechnology, biopharmaceuticals, information technology, tourism, land management, etc. The training of qualified personnel in technical specialties will be increased. The widespread dissemination of modular vocational training programs will facilitate the ability of students to build individual educational trajectories.

Access to high-quality higher and secondary vocational education for indigenous peoples of the North will improve. Local universities will contribute

to the active accumulation of new knowledge about natural resources and the characteristics of natural processes in the Arctic zone. They will be intensively involved in the process of forming the innovative infrastructure of the Arctic. The training of specialists - northern scientists with interdisciplinary competencies, scientific and traditional ecological knowledge of indigenous peoples will be revived, and state support will be provided to training programs for young polar researchers in Russia.

To an increasing extent, not only central and Arctic universities will solve the problems of retraining local personnel, preparing schoolchildren and youth for the requirements of employers (the majority of rural unemployed, as surveys show, are not ready to leave their villages and regions to improve their skills), but also local colleges, strengthened by a network of district and Russian partners from among universities and colleges. In the Arctic regions that do not have institutions of higher professional education, on the basis of co-financing from the federal and regional budgets, necessary and sufficient conditions must be created for the functioning of leading colleges of the Arctic subjects of the Russian Federation (resource centers), both as branches of institutions of higher professional education and as structures of applied bachelor's education. Institutions of primary and secondary vocational education will take on the format of a network structure, which, in addition to classical education, carries out dozens of types of economic activities and is present in many settlements of its region, is responsible not only for the vocational education of adolescents, but also for the training and retraining of residents of the region, both young and old. mature age. This format and functions of Arctic colleges are fully consistent with foreign practice, for example, the Arctic College in Nunavut, Canada, and Aurora College in the Northwest Territories of Canada.

New directions for training specialists in such colleges will include the profession of geological technician, mining engineer, ore-dresser - for the development of natural objects of the Polar Urals; municipal management specialists; There are few repairs for motor vehicles, motor boats and burans, and fishing equipment. Rural areas of the Arctic will require complex specialists who combine humanitarian, resource, and engineering competencies (from midwife to lawyer), without detailed specialization. In Arctic colleges, the training of such universal specialists (agricultural technicians) will be organized, who will combine a list of skills and abilities for a small rural economy. For the above-mentioned specialties, federal state educational standards for primary, secondary vocational education and higher vocational education, including applied bachelor's programs, should be developed. Each local rural community has its own unique training needs,

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and these will be correctly identified to tailor community college training and retraining programs to be as responsive as possible. This will bring the local education system more in line with rapid demographic and techno-economic changes. The role of the local community in the provision of educational services and management of the entire educational process and educational programs will increase significantly.

The forms and methods of delivering educational and other social services to villages will be much more diverse than today; and will draw more heavily on the cultural practices and traditions of local communities. It is through maximum adaptation of delivery forms and specific types of social services to the size and specific features of the local community (overall health status, level of education and competence); and a much more active influence of the local community on training and education programs, medical and cultural services than today, the availability of social services for the population of small and medium-sized villages in the Arctic will be ensured. The smaller the community, the greater the integration of various social facilities should be carried out (according to the type "school - kindergarten - rural community center - library - medical outpatient clinic").

A separate priority is the development of small schools in the Arctic. The "Rural Teacher" project will provide for the training and retraining of teachers in related specialties to work in small rural schools. Measures will be taken to retain university graduates in rural areas, using new methods and forms of advanced training for teachers in rural areas. To achieve the best standards, it is necessary to establish a review of best practices in primary and secondary education in the Arctic. In order to practically solve this problem, it is planned to make the necessary changes to the Standard Regulations on a General Educational Institution and the existing typology of general education institutions, aimed at legislative approval of these types and types of educational institutions. The existing sanitary, fire, technical, energy regulations, norms and rules will also be legally adapted to the existing realities of the Arctic zone. Along with new forms of education based on information and communication technologies, northern specific forms of delivering educational services to small remote villages should be preserved: school boarding schools for children whose parents are engaged in traditional crafts, small-class, nomadic, camp schools.

Nomadic kindergartens and schools will appear in at least five regions of Russia - these are the Yamalo-Nenets and Khanty-Mansi Autonomous Okrugs, the Komi and Sakha Republics, and the Arkhangelsk Region. At the Arctic Forum, which took place in Arkhangelsk, the authorities agreed to radically change the principle of teaching indigenous

children, so that teachers would move with chums along with reindeer herders across the endless tundra.

The "Children of the Arctic" project is the first in the field of education for children of indigenous peoples of the Arctic zone. In addition to the five Russian regions, Norway and Finland participate in it. It was decided that Yamal will become a pilot and will share with colleagues the experience of organizing nomadic education.

The "Nomadic School" project in the Yamal-Nenets Autonomous Okrug has been running for more than five years; currently, 22 educational organizations provide education in the tundra in the region: 17 "freaky" kindergartens and 5 schools. Over two hundred children study there. The teaching process is organized as follows: teachers either live with the reindeer herders in tents, constantly follow the herd across the tundra, or come several times a week on snowmobiles or all-terrain vehicles to the camp to conduct classes. Previously, children of reindeer herders and fishermen of indigenous minorities of the North (IMNS) had to leave their parents at the age of seven and were taken to boarding schools for nine months of the year.

Children of reindeer herders are taught basic subjects - Russian, mathematics, reading, fine arts, technology. The latter is the most unusual, but important item for the inhabitants of the tundra: kids learn how to dress skins, sew fur products, and learn the basics of fishing and hunting.

Only the primary grades were made nomads in Yamal, because it is difficult for children of this age to part with their parents. Every family has a choice: give their child a nomadic primary education or send them to a boarding school. The classrooms for classes are equipped with the latest technology.

For the first time, people started talking about nomadic education at the international level in May 2016. Then the presentation of schools with a national flavor took place at the UN. At the first stage, a network of national kindergartens was created in five regions, and only in 2019 "amazing" primary classes began to appear. The project is financed from regional education programs, but in the future it is planned to develop a federal program "Children of the Arctic" for additional education.

Interim results of the implementation of the "Nomadic School" project in Yamal show that this form of training significantly facilitates the adaptation of children when entering school and contributes to greater success of students. Children receive preschool education without losing communication skills in their native language, preserving the cultural and historical traditions and customs of the indigenous people. According to the Department of Education and Youth Policy of the Khanty-Mansi Autonomous Okrug-Yugra, since 2019, a pilot project "Language Nest" has been implemented in preschool educational organizations in the Berezovsky and Beloyarsky

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districts with the aim of early learning the native language for the indigenous peoples - Khanty and Mansi, but this is an additional education program. In Ugra, more than three thousand indigenous children attend different kindergartens; there are no specialized ones. Preschool education services cover 75% of the total number of indigenous children, and over three years the number of indigenous children attending kindergartens has increased by 18%.

There are no national schools or kindergartens in the Arkhangelsk region, but there are representatives of indigenous peoples. The Altai Republic is ready to share its experience in creating unusual national kindergartens. In the Kosh-Agach region, the “Nomad” project has been developed for preschool children and children of shepherds who are located in difficult-to-reach areas. According to the head of the private kindergarten, “Nomad” started in 2019, children are studying according to the Russian program “From birth to school.” The children will be given construction sets, pencils, paints and albums, workbooks - that is, those creative materials for development that are needed at that age. After the teachers leave, all materials will remain in the parking lot so that children can continue to study.

Nomadic teachers are professionals who not only know their native language, national customs and traditions, but also have the skills to drive snowmobiles, use satellite communication systems, and know the features of survival in extreme conditions. 32 teachers conduct training in the Yamal-Nenets Autonomous Okrug. Their preparation is approached responsibly: the Yamal Multidisciplinary College provides training in the specialty “Teaching in primary grades” with an additional specialization “Nomadic teacher”. As a rule, representatives of the local population – children of reindeer herders – go to tundra professions.

In the north of the Yamal Peninsula, family reindeer herding remains of paramount importance in the environmental management system, and is also a factor stabilizing ethnic identity and culture, influencing the preservation of tangible and intangible cultural heritage. Families of nomadic reindeer herders lead semi-subsistence farming, receiving cash income from the sale of venison, antlers and fish. In the conditions of the relatively closed way of life in the tundra, traditional beliefs and customs associated with the everyday side of life—the intrafamily division of labor—are preserved. Currently, there are about eighteen communities of indigenous peoples of the North in the Yamal district municipality. The largest of them are: “Kharp”, “Ilebts”, “Panaevskaya”, “Ya Erv”. Each family reindeer herding farm has its own permanent kaslani area. The direct impact of the Yamal LNG project on reindeer herding farms is expressed in the direct allocation of part of the pastures for the needs of the project with the subsequent cessation of access of reindeer herders to

their territory, as well as in the emergence of various unfavorable factors affecting food plants and the reindeer themselves: dusting of sand from the developed quarries causes diseases of deer and reduces their slaughter weight; industrial waste in the tundra leads to injury to deer and their disease with necrobacteriosis; An increased noise level disrupts the normal daily feeding and resting schedule of deer, leading to a decrease in slaughter weight, etc. The greatest impact from the implementation of the Yamal LNG project was felt by the reindeer herders of the Ilebts community, who grazed their herds in the immediate vicinity of the industrial site, within a radius of ten kilometers. To resolve the problems that arose for both parties, a meeting was held in Sabetta with the participation of representatives of Yamal LNG OJSC and the Ilebts community. As a result, a solution to the problem was found: a new trading post of the Ilebts community was organized 60 kilometers west of the previous location. The allocation of land for industrial needs and infrastructure development disrupts traditional reindeer migration routes and forces some reindeer herders to change their pastures, moving to new territories and pushing out other tundra dwellers, which leads to conflicts not only with companies, but also between communities.

The Yamal LNG company regularly informs the population about its current activities and upcoming work. Public hearings have become one of the tools for indigenous people to express their interests, including when defending their rights to protect their original habitat and economic activities. The participation of reindeer herders and fishermen in the discussion of future design work of industrial enterprises in nomadic areas helps to build a constructive dialogue to resolve the social and economic interests of the parties. It was at an offsite meeting, at a meeting of businessmen with reindeer herders, that it was decided to create reindeer crossings at the license area of the South Tambeyskoye field. The Yamal LNG company, together with representatives of communities, reindeer herding farms and the district administration, conducted a helicopter flight over the Yamal LNG license area and identified six places for reindeer crossings. Assistance was also provided in creating a winter road for personal transport of reindeer herders. During the consultations, the interests of 160 nomadic households were taken into account, including 95% of families actively managing natural resources in the area of direct impact of the Yamal LNG project (53 out of 56 families), as well as 107 nomadic families of northern Yamal. The management of the Yamal LNG company, together with the administrations of the Yamal-Nenets Autonomous Okrug and the Yamal region, are constantly looking for new ways to build partnerships with indigenous peoples living in the project area.

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Since 2017, nomadic teachers began to be trained to work with children of reindeer herders in St. Petersburg on the basis of the Russian State Pedagogical University named after A.I. Herzen (Institute of the Peoples of the North). The target group is selected during entrance examinations. It is planned that the number of nomadic teachers in Russia will increase sevenfold. Universities in Yakutia and Arkhangelsk expressed interest in creating departments at universities.

Wide diversification of sources of education financing, attraction of funds from sponsors and philanthropists will be ensured, the proportion of people receiving additional (postgraduate) education, participating in retraining and advanced training programs will be increased, and the institute of student teaching teams will be revived to retain young people in Arctic schools. Particular priority will be given to working with gifted children and talented youth. All educational institutions in the Arctic will have the opportunity to receive and receive information via high-speed channels.

Main part

The Arctic regions of the Russian Federation, with a small population, play a vital role in the development of the country. The 2.5 million people living in them (only 1.8% of the population of the Russian Federation) produce about 15% of GDP and provide 25% of the country's exports. In almost all regions of the Arctic zone of the Russian Federation, GRP production per capita is significantly higher than the national average. But paradoxically, the level and quality of life of the people living here do not correspond to the high efficiency of their work and do not compensate for the impact of harsh climatic conditions. Indicators of living standards and real incomes in most Arctic regions are either lower or correspond to the Russian average. For example, the Murmansk region, where 62.5% of the population (523.2 thousand people) lives in the Arctic zone, in terms of per capita GRP production from year to year is included in the national top ten leading regions, and in terms of living standards it is only in the middle group regions of the Russian Federation; The poverty level of the region's population for many years was above the average for the Russian Federation and only recently began to correspond to it (12.9%). The main factor in the development of the Arctic zone of the Russian Federation (AZRF), its greatest wealth is people. The development of resources, the implementation of Russia's geo-economic interests in the Arctic, and maintaining the population of the Arctic territories (the country's most important strategic resource) are impossible without preserving and developing its unique human potential - people adapted to living and working in extreme climatic conditions, possessing invaluable knowledge and special "Arctic competencies" ", concerning life and

work in the harsh conditions of the Arctic. Therefore, one of the main objectives of state policy in the Russian Arctic should be the development and enhancement of its human potential, increasing the level and quality of life of the indigenous and non-indigenous population, and increasing the number of employed people. Today, many adopted and upcoming government documents on the development of the Russian Arctic place the main emphasis on the development of natural resources in the Arctic, on the implementation of industrial and transport projects. Social issues are assigned a secondary role, derived from economic tasks. This is evidenced by both the main ideas and the structure of the documents, where sections on problems of the level and quality of life of people in the Arctic, as a rule, are last in the list of issues under consideration. It is necessary that the new era of Arctic development, which is opening in Russia today, becomes an example of how the state and socially responsible resource corporations begin development not with new industrial facilities, but with a radical solution to the long-standing problems of people who have long lived and worked on the Arctic lands, with ensuring a decent life for those who will lead their further development. Therefore, both in strategic documents and in practice, it is necessary to put the quality of human life in the Arctic at the forefront, to make the policy for the development of the Arctic zone of the Russian Federation as socially oriented as possible.

The social situation in the Russian Arctic today is a complex of problems. The state of human potential is under threat, as evidenced by the difficult demographic situation with high levels of migration and natural decline, low levels of public health, and the difficult situation of the indigenous peoples of the North. The standard of living of the population is characterized by high levels of poverty, in almost all regions of the Russian Arctic exceeding the average for the Russian Federation, levels of child poverty above the average in the Russian Federation (if in the Russian Federation the percentage of children whose level of provision is below the subsistence level in their total number is about 19%, then in in Arctic regions it reaches 30-40%). Wage levels do not compensate for the costs required to live in the Arctic. Thus, the excess of the average salary in the Murmansk region, its average value in the Russian Federation by 30% (28.9 thousand rubles and 21.2 thousand rubles, respectively, 2010) does not cover the gap in the cost of living, which is 1.5 times higher than in the middle zone. The gap in wages between the public sector and industrial sectors is high (for example, in the Murmansk region it is 2-3 times). The system of northern guarantees and compensation, which has experienced a noticeable "compression" in the last period, does not correspond to the high level of living costs in the Arctic, and in the extra-budgetary sphere and in private business northern guarantees are

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almost not implemented. Social protection, due to insufficient funding, which poorly takes into account the specifics of life in high latitudes, does not provide the necessary level of protection for socially vulnerable segments of the population - for example, in the Murmansk region, the monthly child allowance for low-income families (384.2 rubles in 2011) provided only 5% subsistence minimum for a child (RUB 8,245, Q2 2011).

The Arctic is one of the unpredictable territories in the modern world, which attracts with its rich raw material base and huge development potential. The Arctic is one of the main factors influencing the planetary processes of climate formation and living conditions on Earth. The Arctic peoples have created unique, deeply interconnected and mutually adapted life-support cultures with Arctic ecosystems, the preservation and study of which is of great importance for understanding the prospects for further and increasingly intensive development of the Arctic. The Russian Arctic is home to representatives of such indigenous peoples as the Nenets, Chukchi, Khanty, Evens, Evenks, Selkups, Sami, Eskimos, Dolgans, Chuvans, Kets, Nganasans, Yukaghirs, Enets, Mansi, Vepsians, Koryaks, Itelmens. Some of them lead a nomadic or semi-nomadic lifestyle associated with traditional types of environmental management - reindeer herding, fishing, sea hunting, hunting, gathering, and the majority are sedentary residents living in towns and cities.

The “Strategy for the Development of the Arctic Zone of the Russian Federation and Ensuring National Security until 2035,” approved in October 2020, provides for the creation of 182 thousand new jobs in the region. Of these, 140 thousand will be created through new investment projects. 65.5 thousand new jobs will be created for workers with higher education in the Arctic.

The personnel needs of the economy of the Arctic zone of the Russian Federation were compiled as a result of a study of 3.4 thousand regional employers and initiators of investment projects based on macroeconomic forecasting techniques. The study was conducted by the Far East and Arctic Development Corporation during 2020. Based on its results, meetings were held with heads of universities in the Russian Arctic and representatives of relevant regional executive authorities. The Corporation has prepared recommendations for the Russian Ministry of Education and Science on increasing the volume of admission targets for the 2021–2022 and 2022–2023 academic years at 5 key universities in the Russian Arctic. They became the Northern (Arctic) Federal University named after M.V. Lomonosov, Murmansk Arctic State University, Murmansk State Technical University, Norilsk State Industrial Institute, Northern State Medical University. “The development strategy of the Arctic zone provides for the launch of new economic projects in the territory and the creation of

new jobs,” commented Gasan Gasanbalayev, director of the labor resources department of the Far East and Arctic Development Corporation. “Therefore, today we must work to ensure that the Russian Arctic has a sufficient number of specialists to meet the personnel needs of investors. We continue to work on adapting admission targets to the needs of the Russian Arctic economy, updating the material and technical base of secondary vocational education institutions in the region, and implementing joint career-oriented projects with vocational education organizations in the Arctic. Starting in 2021, the Arctic will require several tens of thousands of additional specialists every year. Of these, a third are workers with higher education. Almost half are mid-level specialists, including skilled workers and employees. At the same time, a shortage of personnel can be traced in all 74 Arctic municipalities. The number of budget places at the only university located in the Arctic zone of the Russian Federation has increased. This year, the Northern (Arctic) Federal University named after M.V. Lomonosov expects 3,855 applicants for programs at all levels of education. This is 460 more people than last year. Documents for bachelor's and specialty programs for full-time study can be submitted as early as July 2021, and acceptance of consents for enrollment in the general competition for full-time study ended on August 11.

According to Vyacheslav Parshin, executive secretary of the NArFU selection committee, engineering personnel are needed in the Arctic zone of the Russian Federation and in the country as a whole. More than a thousand budget places have been allocated for these areas. Most of them are in the areas of “Construction” and “Oil and Gas Business” - 110 and 105.

Humanitarian majors are also in great demand among applicants. Thus, the number of budget places in the areas of training “History”, “Jurisprudence”, “Journalism”, “Advertising and Public Relations” has increased.

This year, NArFU has established a quota of 512 places for targeted training. The most in demand are pedagogical education and areas related to shipbuilding.

NArFU also works closely with enterprises in the region, for example, in the field of training personnel in the pulp and paper industry. Cooperation is also reflected in training programs: they are updated to ensure that university graduates are in demand in the labor market and meet the needs of companies. In 2019 and 2021, employees of the ILIM branch in Koryazhma defended their final qualification theses at the university. Two practice-oriented educational programs at the master's level were developed for the enterprise; students studied both directly at the ILIM production base and at the laboratories of Northern Federal University. Last year, a master's program was prepared in the area of training energy and resource-

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saving processes in chemical technology, petrochemistry and biotechnology for employees of the Arkhangelsk Pulp and Paper Mill. In 2023, it is planned to implement the program within the framework of the master's program "Chemical technology of pulp and paper production".

The branch of NArFU in the city of Severodvinsk has preserved the integrated training system "Plant-VTUZ", providing students with guaranteed employment, obtaining a working profession and valuable practical knowledge and skills. The Institute of Shipbuilding and Arctic Marine Technology (Sevmashvtuz) is a center for multi-level engineering education. It trains specialists in areas related to shipbuilding and ocean engineering, mechanical engineering and technological equipment for production, automation of production processes and systems, IT technologies, and ensuring radiation safety. During their studies, students are employed at enterprises of the United Shipbuilding Corporation (USC).

NArFU students have a unique opportunity to visit the Arctic. Since 2021, the Northern (Arctic) Federal University and the Northern Administration for Hydrometeorology and Environmental Monitoring have been conducting joint expeditions. The goal of the "Arctic Floating University" is not only to obtain new knowledge about the state of the Arctic islands and archipelagos, but also to train young specialists in Arctic specialties, as well as to develop international scientific and educational cooperation. The Arctic Floating University helps students and researchers gain new knowledge about the state of the ecosystem of the coastal areas of the Arctic archipelagos of Franz Josef Land and Novaya Zemlya. And students of hydrometeorologists, oceanologists, ecologists, chemists, geographers, geologists and biologists have the opportunity to conduct their research in places where not all scientists can go. Career guidance work at the university is carried out all year round: olympiads, competitions, excursions, master classes, and lectures are organized for schoolchildren. NArFU employees also perform at educational institutions in the region and beyond. Live broadcasts are held on social networks, where not only representatives of the university administration and the leadership of higher schools and structural divisions of NArFU speak, but also student activists.

The House of Scientific Collaboration operates on the basis of NArFU, where schoolchildren study both as part of general education programs and in additional education programs. For example, in the next academic year there will be courses on robotics, programming, unmanned aerial vehicles, genetic engineering, and microbiology. The Museum of Geology and the Museum of Entertaining Sciences of NArFU also host classes and excursions for children and schoolchildren from 5 years old. As support for applicants admitted to NArFU who pass the Unified

State Exam with high scores, they are paid a "Freshman 5.0" scholarship, which ranges from 5 to 10 thousand rubles, probably it could be higher.

Irina Shadrina, rector of the flagship Arctic university - Murmansk Arctic State University - says that today MASU is implementing 115 disciplines with Arctic specifics. Among them are specialists for the modernization of road networks in the Arctic region, specialists in the development of urban areas with an "Arctic" bias, engineers for automated process control systems, Arctic logistics specialists, and remote medicine doctors. Upon admission, the main interaction between the applicant and the university will take place remotely using the MASU Electronic Admissions Committee and Online University Admission service," says Irina Shadrina. - Personal reception of applicants is also possible, but by appointment. The main changes in the admission rules affected the number of areas of training and specialties that an MASU applicant can choose. Applicants after graduating from college who have the results of the Unified State Exam and internal exams can indicate a higher result in the application. In addition, this year our applicants make their informed choice only once - enrollment at the university on a budget during the main period is planned only in "one wave." In the decisive struggle for a budget place, not only Unified State Exam scores, but also the results of individual achievements can help. The maximum number remains unchanged - 10 points. Starting from 2021, the applicant's gold, silver or bronze TRP insignia will be taken into account.

Irina Shadrina added that today MASU provides 47.27% of the total training of personnel with higher education and 48% with secondary vocational education in the Murmansk region. Today, the leading universities in the Arctic zone are:

Northern (Arctic) Federal University named after. M.V. Lomonosov, Arkhangelsk

NArFU is the only federal university located in the Russian Arctic. More than 24 thousand people study at NArFU in 649 basic and additional educational programs. The university operates 136 Arctic programs, 73% of graduates are employed by Arctic enterprises. The draft NArFU development program for 2021-2035 has received approval from the Government of the Russian Federation. It provides for the modernization of the university's educational program portfolio in accordance with the Arctic's long-term need for personnel, expanding access to vocational education in remote areas (currently the share of those receiving online education is 3%), creating a career guidance system for schoolchildren and a system of continuing education. In 2020, a scientific and educational center (REC) "Russian Arctic: new materials, technologies and research methods" was created on the basis of NArFU. The REC includes 33 organizations from the Arkhangelsk region, Murmansk region, the Republic of Karelia, the

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Komi Republic, and the Nenets Autonomous Okrug. The network structure of the REC “Russian Arctic” can become a model solution for new scientific centers created in the Arctic.

Murmansk Arctic State University, Murmansk

MAGU is a university of the second all-Russian group of flagship universities, has more than 4,200 students and has 2 branches - in Kirovsk and in Apatity. Provides training in 86 basic educational programs. This is a classic flagship university, providing, among other things, training in economics, natural sciences, engineering and technology. MAGU takes a leading position in training personnel for the main sectors of the Russian Arctic economy, with the exception of maritime specialties. In November 2020, MASU held a strategic session with the involvement of key customers of the personnel training system in the region. As a result of the session, the directions of development of the university and strategic documents for the development of the Arctic until 2035 were synchronized. The university should become a key partner in training and conducting research and development work in the interests of employers in the region.

Murmansk Technical State University, Murmansk

Educational programs at MSTU are conducted in 32 areas of training and specialties; more than 2,200 students study at the university. The draft University Development Program for 2020–2028 is focused on three main areas. The first is the formation of an engineering and technical elite for the implementation of Arctic infrastructure projects. The second is the creation of a scientific center engaged in advanced research in the field of priority areas for the development of the Murmansk region and the Russian Arctic, and an innovation ecosystem that ensures the transfer of knowledge and technology. Third, the creation of a modern university complex, including the campus and university infrastructure. As a result of the implementation of the program, MASU should become an engineering and technical scientific and educational cluster, a center of Arctic competencies for training scientific, technical and engineering personnel for the implementation of projects related to the development of the Arctic.

Norilsk State Industrial Institute, Norilsk

NGII trains civil engineers, specialists in the field of metallurgy, mining, applied computer science, electrical power engineering, and other technical specialties. More than 4,500 students study at the university in 11 main educational programs. The development of a university development strategy is being implemented on the joint initiative of NGII, the Norilsk Development Agency and the Norilsk Nickel company. Two-thirds of graduates are employed by Norilsk Nickel – this covers 25% of the company’s personnel needs.

Experts agree that training personnel to work in the Arctic territories deviates from the general principles of education, since it requires a special approach, and also that specialists working in the Arctic must have a number of universal – above professional – skills. As the rector of the Northern Arctic Federal University named after M.V. Lomonosov (NAFU, Arkhangelsk) Elena Kudryashova pointed out in an interview with a TASS correspondent, we are talking about such competencies as project management, systems thinking, intersectoral communication.

For this reason, TASS was told at the Murmansk Arctic State University (MASU) - the only Arctic university located directly beyond the Arctic Circle - the demand for employees with a set of universal competencies is growing. In the mining industry, these are engineers for technological support of the oil and gas field; in the transport sector, these are specialists in modernizing road networks in the Arctic region.

Director of the international center for the development of promising competencies Future Skills: NEFU of the North-Eastern Federal University (NEFU), Roman Gogolev, notes that the specifics of training specialists for the Arctic territories are also determined by the need to work in extreme weather conditions and the lack of convenient logistics. “Therefore, here they teach how to adapt spare parts from an old Soviet tractor to the newest Caterpillar <...> Low-skilled personnel are not needed in the Arctic; migrants with shovels will not solve the problem there,” Gogolev emphasizes.

He noted that the list of required professions appeared in the draft strategy for the development of the Arctic zone of the Russian Federation until 2035, which was developed by the end of 2019. According to the expert, specialists in the mining industry, ice-class marine shipbuilding, port and shipping infrastructure took a significant place in it. In the future, according to Gogolev, the strategy for the development of the Arctic zone will involve the Canadian version, where mining companies are equipped with high technologies, comply with environmental requirements and where not many people work, since production is significantly automated.

Experts are confident that, given the specifics of training personnel for the Arctic, the development of specialized departments in universities and centers of additional education focused on practical disciplines should be effective. Many universities are already implementing such mechanisms. NARFU, at the request of partner enterprises, develops and implements educational standards. MASU, in turn, forms a sustainable system of personnel training capable of self-development in accordance with the concept of LifeLongLearning (lifelong learning).

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According to the director of the Engineering School of the Far Eastern Federal University (FEFU), Alexander Bekker, specialists ready to work in the Arctic zone can be trained outside it. They are usually characterized by high social mobility, and graduates can simply leave for the Arctic after training. “Now I already have 10 graduates of the school with a degree in Hydraulic Engineering working in the Arctic latitudes. The Arctic, of course, needs all the specialists, but now the prevailing technology of development is exactly what these guys are doing. Although we can say that any engineering specialties in the development of the Arctic will be in demand, including electricians, builders, geologists and others,” Becker told TASS.

Specialists of the North-Western State Medical University named after Mechnikov (Northwestern State Medical University, St. Petersburg) at the end of March announced the development of a special state educational standard for training medical specialists specifically for work in the Arctic zone. The emphasis in medical training is on the prevention of cold injuries and early prevention of viral diseases. An important part of the modern system of training personnel for the Arctic is their focus on practice. Therefore, interaction between universities and enterprises where graduates will work is being strengthened. According to Kudryashova, NArFU has concluded more than 120 agreements on such cooperation. Among the partners are companies such as Gazprom, Rosneft, Lukoil, United Shipbuilding Corporation, and GLONASS Corporation. MASU, together with Russian Venture Company JSC, plans to introduce the discipline “Innovative Economics and Technological Entrepreneurship” into the curriculum.

As one of the key mechanisms for modernizing the secondary vocational education (SVE) system, the centers are intended to become a platform for training young personnel and retraining teachers. On their basis, it is expected to obtain specialties, including blue-collar jobs, that meet the needs of the national and regional economy and the directions of investment policy. It is expected to improve qualifications and acquire additional skills. Help is provided to schoolchildren in choosing a profession - the direction of the centers’ work, according to which young people become familiar with new professions in practice, which contributes to an informed choice of a future profession.

The key principles of the work of advanced training centers are: compliance of secondary vocational education programs with personnel needs and the geography of the region, focus on the investment strategy, ensuring collective access to advanced production technologies, creating conditions for the formation of a comprehensively developed personality and ensuring objectivity in assessing the competencies of graduates of the secondary specialized education system, namely,

compliance of vocational education programs with personnel needs.

The centers ensure that VET programs meet staffing needs, including the content and number of students. Based on the national economic development strategy, which is closely related to the strategy of regional development and attracting investors, the personnel needs of enterprises determine the requirements for vocational education organizations, training programs and the results of the activities of colleges and technical schools, which correspond to the goals and objectives of the geography of the regions

The system of working with personnel in the centers is focused on personnel demand, which is formed by the economy of a particular region. The development of center programs and their material and technical base for training, taking into account the economic, investment and industry specifics of specific regions, makes it possible to train in-demand specialists whose level of knowledge and skills meets the current needs of enterprises, focusing on the investment strategy of consumer development.

Modernization of open source software takes into account the strategy of regional development, the specifics of investment projects and the strategy of economic development of the state as a whole. In this system, centers are an effective platform for communication between enterprises, investors and businesses. Systemic cooperation makes it possible to provide personnel training that meets the needs of enterprises, investors and the region, due to their provision of students with collective access to advanced production technologies.

An important function of advanced training centers is to provide specialists with access to advanced technologies, equipment and a modern production base. The sites are designed to concentrate the latest equipment for collective use, creating conditions for the formation of a comprehensively developed personality.

“We must forever abandon the stereotype: finished school, got a profession - and that’s it. (...) it is necessary that colleges and technical schools (...) provide a strong, comprehensive education, including in natural sciences and humanities, programming, and a foreign language. And of course, the so-called soft skills - the ability to work in a team, solve creative, non-standard problems,” noted President Vladimir Putin in Yekaterinburg in March 2022 at a meeting on the development of the free software system. The centers are designed to provide the opportunity to receive continuous professional education, to assist specialists who have a secondary vocational education and have decided to change their specialty, to grow professionally and in practice to master new flexible skills for comfortable communication in a team and effective work, providing an objective assessment of

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the competencies of graduates of the secondary vocational education system.

It is planned to conduct demonstration exams at the centers. Graduates of technical schools and colleges will be able to demonstrate their skills in practice and receive an objective assessment using a transparent system.

Centers of advanced prof. training - the concept of an extensive network of open areas in the regions for advanced training, training and retraining of citizens on advanced equipment. The centers are designed to promote systematic interaction between enterprises, businesses and investors, and an objective assessment of existing and acquired competencies. Obtaining up-to-date knowledge and skills in in-demand professions in the context of regional development economics and investment strategy is the cornerstone of the concept.

Conclusion

Thus, the education of indigenous sparsely populated peoples of the North (SIPN) is one of the most important conditions for the development of the Russian Arctic. It is necessary to create new educational organizations for representatives of the indigenous peoples, taking into account the ethnic characteristics of the indigenous peoples in the educational space of Russia to improve the standard of living of the population. Such organizations should be located as close as possible to the places where indigenous minorities live, but ensure that they receive high-quality education. Issues of development of all levels of the education system for indigenous peoples continue to remain important topics, which is associated with the need to adapt these peoples to modern conditions while maintaining their cultural identity, therefore, conducting traditional types of economic activities for indigenous peoples in modern conditions requires new knowledge, which is designed to facilitate work and make it more efficient. In the labor markets of the Russian Arctic, there are high levels of unemployment, usually exceeding the national average (for example, in the Murmansk region in 2018, the overall unemployment rate was 8.9%, while the Russian average was 7.5%). The situation is especially difficult in rural remote settlements, where unemployment is 2-3 times higher than the regional average. In single-industry towns, the state of labor markets is unstable and extremely dependent on the situation in resource markets, the policies of industrial groups and corporations. The processes of diversification of economic activity, including the development of small businesses, are proceeding slowly, which is associated, among other things, with the "northern rise in prices", i.e. increased level of costs for the development of new types of activities. There is an outflow of the most qualified and enterprising personnel; new incentives are needed to attract young qualified workers to the Arctic.

A problem that needs to be solved immediately is the state of the social infrastructure of Arctic cities and towns. In most of them, the level of its development not only lags behind the Russian average, it most often does not meet even minimum social standards, and, according to foreign experts, we are 40-50 years behind the foreign Arctic in this area. Healthcare and housing and communal services require priority attention. If in regional centers the provision of infrastructure and personnel is comparable to the levels achieved in the populated regions of the Russian Federation, then in remote settlements, ZATOs, and places where indigenous peoples live, the situation is many times worse. Thus, in the Lovozero district of the Murmansk region, where the Kola Sami live, the provision of paramedical personnel is 1.5 times lower, and the supply of doctors is almost 3 times lower than the regional average (21.2 doctors per 10,000 inhabitants, compared to 54.6 on average for the region, 2019).

We are convinced that in Arctic regions, especially remote ones, general approaches to optimizing healthcare are unacceptable. They do not have enough hospitals, first aid stations, and outpatient clinics, the material and technical base of which meets modern sanitary standards. With poor transport accessibility, isolated villages, a reduction in the number of rural district hospitals, paramedic stations, the elimination or lack of mobile forms of service make medical care inaccessible to local residents. The development of air ambulance is a necessary measure, but not sufficient to radically improve the situation. Moreover, as experience shows, given the high cost of this type of transport, the decision to use it is made only in extreme cases, when it is often difficult to help the patient. In relation to Arctic settlements, the criteria for sectoral efficiency (closing of rural schools and hospitals due to the high costs of their maintenance) should give way to criteria for spatial efficiency. This means we must remember that the opportunity to receive the most important social services at the place of residence is the most important condition for maintaining the viability of local communities, maintaining the level of population in the Russian Arctic - the most important factor in Russia's success on the global Arctic stage.

Today we should not be talking about "reaching" the social infrastructure of the Arctic to the average Russian level. The increased costs of people's health must be compensated by higher social and infrastructural standards. At the highest latitudes, where it is impossible to create a full range of services, the approach may be to minimize the presence of people based on innovative technologies (remote, mobile services, etc.). But inhabited areas (like, for example, the Murmansk region) or those in need of settlement in the Arctic should become an area of increased social and infrastructural security, the highest possible comfort of living, at the level of the

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best standards. Only this approach will allow us to talk about truly sustainable development of the Russian Arctic, the possibility of realizing the national interests of the Russian Federation here.

Another problem is the mobility of the population of the Arctic zone. It has two components - the problem of emigration of persons wishing to leave the Arctic regions, and the issue of creating conditions for attracting and retaining qualified personnel. It is well known that the implementation of the resettlement program is hampered by insufficient government funding. Measures are needed to develop multilateral partnership mechanisms for the implementation of resettlement programs (the government of a constituent entity of the Russian Federation, the Ministry of Regional Development, city administrations, management of industrial companies), which are effectively used today, for example, in Norilsk.

It is also known that the level of return migration to the North of people who left it at retirement age is growing from year to year, and the main motive is the desire to live with relatives in a multi-generational family where most of their lives are lived - in the North. Other examples show that when the older generation receives an apartment in another region, the younger generation of the family also leaves. All these examples indicate that it is necessary to pay attention not only to improving state and non-state financing of programs for relocating disabled people from the Arctic regions, but also to creating better conditions for labor spatial mobility of Arctic residents in young and middle ages. Life in the North, in the Arctic, should be the result of a person's conscious choice of the best life for himself, and not a forced decision of a hostage to circumstances.

The basic reason for the current situation in the social sphere of the Russian Arctic is the lack of fair tax and non-tax mechanisms for the distribution of income generated during the development of Arctic resources. Economic activity in the Arctic today benefits regions outside the Arctic more than the Arctic itself. The Arctic regions, while producing a significant share of GDP, in the process of redistribution are deprived of a vital part of the income generated, which could be used to improve the level and quality of life of their population. Taking into account the above, we propose to the Government of the Russian Federation, namely:

1. Adopt a package of documents and laws of the Russian Federation that provide the basis for state policy in the Arctic zone of the Russian Federation:

strategy for the socio-economic development of the Far North and Arctic regions for the period until 2035;

strategy for the development of the Arctic zone of the Russian Federation for the period until 2025, laws "On the fundamentals of state socio-economic policy in the regions of the North and the Arctic", "On

the zoning of the North of the Russian Federation", "On guarantees and compensation for persons working and living in the regions of the North of the Russian Federation";

legally establish boundaries and a clear list of territories of the Russian Arctic.

2. Complete the development of the state program "Economic and social development of the Arctic zone of the Russian Federation for 2018-2035", ensuring a socially oriented approach to its formation. Include in it as priority programs for the development of human potential, increasing the level and quality of life of the population, the formation and modernization of social infrastructure in the Russian Arctic.

3. Develop measures aimed at transforming the Arctic zone of the Russian Federation into an area of high living comfort and increased social and infrastructural security. Strengthen government protectionism measures for the development of Arctic social infrastructure. Ensure the development and implementation of targeted programs for the rapid modernization of social infrastructure in the Arctic zone, aimed at maximizing the quality and accessibility of social services (health care, housing and communal services, etc.).

4. Develop and implement measures of state subsidy support that ensure a qualitatively new state of the social infrastructure of remote Arctic settlements. When developing standard indicators of personnel and infrastructure provision, especially in healthcare, take into account the need to apply increased standards due to the low transport accessibility of these settlements.

5. Ensure clear regulatory regulation of the process of developing public-private partnerships in the social sphere, creating new mechanisms for interaction between resource corporations and local communities to resolve social issues. Stimulate the development of a network of social services provided by non-profit organizations.

6. Bring the system of northern guarantees and compensations into line with the high level of costs of living in the Arctic; implement the return of unreasonably curtailed northern guarantees; eliminate the referential nature of certain articles of the Law of the Russian Federation No. 4520-1 of February 19, 1993 "On state guarantees and compensation for persons working and living in the regions of the Far North and equivalent areas", Ch. 50 Labor Code of the Russian Federation No. 197-FZ.

7. Together with the constituent entities of the Russian Federation, develop measures to ensure the provision of northern guarantees and compensation in the same amount to all those working in the Arctic, regardless of their affiliation with the public sector or private business. Strengthen the responsibility of employers in private business for establishing minimum wages and implementing northern

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guarantees; stimulate the development of a social partnership system to ensure the full scope of northern guarantees for employees of the extra-budgetary sector. Establish a minimum official salary in the public sector equal to the subsistence level.

8. Improve government funding for resettlement programs for the disabled population, create incentives for the participation of industrial corporations operating in the Arctic in regional and local resettlement programs; expand the use of insurance mechanisms for these purposes. Develop measures to improve conditions for labor spatial mobility of Arctic residents in young and middle ages.

9. In order to attract young personnel, ensure that natives of the North receive all “polar” percentage bonuses from the first day of work in the Arctic zone, provide a system of incentives for businesses that attract young people from other Russian regions to work in the Arctic, and for employers implementing

training programs and retraining of personnel to work in the Russian Arctic. Establish additional measures to support young families - benefits for maintaining a child in preschool institutions and paying for housing and communal services. Develop programs for financial support for youth education in universities with the condition of subsequent work for at least three years in the Russian Arctic.

10. Take measures to create more equitable tax and non-tax mechanisms for the distribution of income generated during the development of the resources of the Russian Arctic, to improve interbudgetary relations between the federal center and the regional and local levels of government in the Russian Arctic in order to increase the amount of funds remaining at the regional and local level for improving the level and quality of life of the population of the Arctic zone of the Russian Federation.

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Article



Maria Srgeevna Eliseeva

Institute of Service Sector and Entrepreneurship (branch) DSTU
bachelor

Artur Aleksandrovich Blagorodov

Institute of Service Sector and Entrepreneurship (branch) DSTU
master's degree

Victoria Sergeevna Belysheva

Institute of Service Sector and Entrepreneurship (branch) DSTU
Ph.D., Associate Professor

Vladimir Timofeevich Prokhorov

Institute of Service Sector and Entrepreneurship (branch) DSTU
Doctor of Technical Sciences, Professor
Shakhty, Russia

Galina Yurievna Volkova

LLC TsPOSN «Ortomoda»
Doctor of Economics, Professor
Moscow, Russia

RAIPON IS AN ASSOCIATION OF INDIGENOUS PEOPLES OF THE NORTH, SIBERIA AND THE FAR EAST, PROVIDING THEM WITH LEGAL PROTECTION

Abstract: *In the article, the authors performed relevant research related to what is happening in the Arctic region to protect the rights of indigenous peoples. This is primarily due to rapid climate change, melting ice and potential greater opportunities for economic activity in the Arctic, primarily related to resource extraction. However, the living of an increasing number of people in extreme geophysical conditions will require paying more attention not only to the health of people as individuals, which is what medicine has traditionally focused on, but also to the social health of the population of the Arctic region, which will require joint efforts of specialists from different industries, as well as creating a coherent long-term mechanism for interaction between the state, local authorities, business and the population. In this regard, this article is aimed at identifying the characteristics of the social health of the population of the Arctic region, focusing on the most pressing social problems of the population living in the Arctic region, the adaptation of migrants to the conditions of the Arctic, as well as on positive examples of their solution. The leading approach to the study of this problem is a generalization of the primary analysis of research in various fields of science, which made it possible to comprehensively consider the features and identify problematic areas of the social status of indigenous peoples of the North, Siberia and the Far East. The research materials are of practical value for government bodies and local self-government when making management decisions, for educational institutions not only in terms of reflecting this topic in the educational process, but also in borrowing new educational practices to increase the level of education of the population of the Arctic region, for business in order to understand the peculiarities of doing business in the Arctic region, taking into account the influence of extreme geophysical factors on the status of indigenous peoples and their psycho-emotional state.*

Key words: *social health, Arctic region, healthcare, ecology, housing conditions and sanitation, drinking water supply, climate change.*

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Introduction

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The preservation of cultural traditions and their transmission through rituals, rites and customs, traditional economic activities and language form and support the sense of belonging to one's people. In the modern world, in the context of globalization, it is especially valuable and at the same time difficult to preserve this for small indigenous peoples who are experiencing strong pressure from civilization. The younger generation cannot resist the temptation to abandon the traditional way of life and move to large populated areas. They stop participating in traditional rituals, wearing national costumes, and speaking their native language. The awareness of one's national identity is under threat, understanding the importance of preserving not only biodiversity, but also the diversity of national cultures and ethnic groups, the United Nations enshrined in its Declaration on the Rights of Indigenous Peoples (adopted [resolution 61/295](#) General Assembly of 13 September 2007) that "indigenous peoples have the right to respect and revitalize their cultural traditions and customs. This includes the right to preserve, protect and develop the past, present and future expressions of their culture, such as archaeological and historical sites, monuments of material culture, designs, rituals, technologies, visual and performing arts and literature" (Article 11). However, the experience of recent decades has shown that government intervention in the system of managing traditional forms of economic management has become a "double-edged sword" for the northern small peoples. On the one hand, the Arctic territories received a powerful incentive for development. In the post-war period, new resources were required to restore the destroyed economy of the USSR. The primary task of the country's leadership was the development of unexplored northern territories to use mineral resources for the needs of the country. The industrial development of the Russian Arctic has become not only a threat to the environment, but also to small nationalities leading a nomadic lifestyle. Moreover, the All-Union literacy programs extended to the Far North. "In order to improve the study of the Russian language in Nenets schools, the executive committee of the district Council of Workers' Deputies decided to organize preparatory courses in Nenets and Komi schools in the district in the 1946–1947 academic year." In 1946, a boarding school was organized. On September 18, 1947, the Nenets executive committee

decided to reorganize the basic elementary school into the Naryan-Mar seven-year school. On September 18, 1957, after the closure of the seven-year school, the Nenets boarding school was opened on its basis. Living in a boarding school contributed to the loss of connections between the children of reindeer herders and the traditional way of life. School graduates who had lost the skills of tundra dwellers did not return to the habitat familiar to their ancestors. The introduction of a state program for shifting reindeer grazing in the early 60s further widened the gap with the usual environment. The institution of the nomadic family was practically destroyed. Shepherds grazed herds of deer in the tundra, while women and children remained in the villages. The separation from his family greatly complicated the life of the reindeer herder. In addition to herding reindeer, everyday issues were also added: cooking, drying and repairing clothes - the traditional occupation of women in the tundra - became completely the responsibility of men. The transition to a sedentary lifestyle and changes in the traditional economic way of life served as the impetus for the loss of the native language in the families of reindeer herders. And, as a consequence, the disappearance of ethnographic and folklore diversity. Increasingly, the older generation, native speakers of the Nenets language, communicate in Russian with their children and grandchildren, because the native language is no longer relevant. Moreover, the intensive development of the northern territories contributed to the influx of highly educated specialists of other nationalities, bearers of other cultural values. Communication and friendship among young people of indigenous nationality and other ethnic groups created conditions for the formation of new families. In such families, Russian became the main language. In the early 2000s, as a result of prevailing circumstances, the number of native language speakers sharply decreased. In this connection, at the Pedagogical College named after A.P. Pyrers in Naryan-Mar were unable to recruit applicants for the training of Nenets language teachers in national schools in the district. As a result, the department for training teachers of the Nenets language for national schools was closed. The last hope for the natural spread and preservation of the Nenets language on the territory of the Nenets Autonomous Okrug was irretrievably lost. Since 2012, educational activities in the pedagogical college have been carried out only in Russian (according to Article 14 of the Federal Law No. 273 "On Education in the Russian Federation" dated December 29, 2012).

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Currently, in the Nenets Autonomous Okrug, attempts are being made to artificially revive traditions and rituals on the basis of an ethnocultural center throughout the district. The local press, namely the newspaper “Naryana Vender” (“Red Tundra Man”), maintains a page where material is published in the Nenets language. However, these attempts are not enough to preserve culture. We believe that government support measures, which will not only be formalized in program documents, but can become an effective tool for supporting and preserving the ethnocultural diversity of indigenous peoples of the North, Siberia and the Far East. It is necessary to support the entrepreneurial activities of indigenous peoples, who not only engage in traditional activities, but also develop Arctic tourism; introduction of electives for the study of the Nenets language and culture in educational institutions of the district; revival of national holidays, including in close collaboration with other territories of ancestral residence of the indigenous population.

Main part

From 2009 to 2017, the project of complex expeditions “Heritage of Russian America” was carried out in Alaska under the leadership of the hero of Russia, honorary polar explorer M.G. Malakhova. The geography of expeditionary research included both the interior regions of the state of Alaska - the basins of the Yukon, Kuskokwim, Nushagak rivers, the Nushagak lakes system, as well as the Aleutian ridge and Kodiak Island. The first hikes repeated part of the historical route along the river. Yukon Alaska explorer Lavrentiy Alekseevich Zagoskin, a Russian officer who, for two years in the forties of the 19th century, walked more than 5,000 miles on foot, by boat and on dog sleds, explored and mapped the middle and lower reaches of the largest rivers Yukon and Kuskokwim. Subsequently, the expedition members repeated the route not only of L.A. Zagoskin, but also another explorer of the interior of Alaska - naval navigators Ensign Ivan Yakovlevich Vasiliev, who in 1829–30. kayaked up the Nushagak, crossed the Nushagak ridge and crossed into the Kuskokwim basin, and in another period reached the Kuskokwim River basin through the Nushagak lakes system. Expeditions on the islands repeated the routes of Russian navigators who discovered these lands in the middle - second half of the 18th century. The expedition members conducted ethnographic research in the villages of the Athabaskans, Aleuts and Yupik Eskimos, made presentations for local residents about Russian researchers, and studied the implementation of the rights of indigenous peoples. During the expedition, Russian traditions were recorded that have been preserved in the life of Indians to this day since the times of Russian America. The results of the study showed that, despite the fact that the Russian stage on Nushagak and Kuskokwim was very short in duration

(20–60s of the 19th century), many influences of Russian culture have survived to this day, and play an active role in the life of the indigenous people. peoples In turn, the Aleutian Islands experienced the longest influence from the Russian people - more than a century and a half, with a level of borrowing comparable to the interior of Alaska. As part of the expedition, the areas of borrowing were only identified and require additional close attention, and may well become topics for independent research. Empirical data show that among modern representatives of the indigenous population, only middle-aged and older people are native speakers of the Indian and Eskimo languages. The younger generation (under 30 years of age) speaks only the official language of the United States, and there is no desire to speak and learn their native language, primarily because it is unnecessary. At the same time, the languages of the Eskimo group showed a greater degree of resistance to the expansion of the English language in comparison with the Indian languages. As the American researcher M. Krauss noted: “Russian influence on the languages of the indigenous population can be accurately measured by the number of borrowed Russian words that are still used today; most of them are nouns, defining new objects of material culture.” According to him, the Aleuts currently use about 400 Russian words, the Pacific Eskimos - more than 300, the Eskimos of Bristol Bay - about 190, the Tanaina Indians - more than 300, and, finally, the Tlingit only nine words. During the expedition, a small dictionary of Russian words found in folk culture was collected. These words became part of the languages of the Alaska Natives. Such a dictionary has not yet been created. There is reason to talk about the existence of a special Alaskan dialect of the Russian language. Wide distribution of Russian surnames and names. Currently, most of the indigenous population of Alaska have only Russian and American names and surnames, and they consider the former as part of their traditional culture (Kozhevnikov, Ivanov, Vaska, Pitka, Ismalka, Nikolai, Isakov, Petrushka, Kuzma, Agripina, Andreyanov and etc.). Borrowings in spiritual culture. The widespread spread of Orthodoxy, which began to actively spread after the sale of Alaska as a way of resisting segregation and forced Americanization (knowledge of Church Slavonic texts of prayers, icons, red corner, holidays, Orthodox chants in Russian, Christmas carols, etc.). Borrowing in housing and commercial buildings - log buildings, huts, storage sheds. At the end of the last century, Russian influence could easily be seen in the shape of the dwellings of the indigenous population of Alaska. On Kodiak and the Aleutian Islands, the form of housing was completely borrowed from the Russians. Here houses were built made of small logs, with windows and doorways, and a gable roof. Before entering the house, a canopy was always built, which

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is still called “collidor” among the Aleuts. A porch appeared in front of the entrance to the house, and instead of the animal skin that had previously been used to cover the entrance, they began to use a wooden door on hinges. The form of furniture borrowed from the Russians was widely used: bunks, benches, chests, tables. Some types of clothing also appeared under Russian influence. Villages and their layout are another subject of borrowing (initially, indigenous peoples were nomadic and the idea of permanent settlement was first introduced by Russian colonists, who, in fact, shaped the appearance of modern indigenous settlements). Borrowings in everyday culture (in particular, baths). Physical monuments of the Russian period have not been used in everyday life for a long time, and if they are preserved, they are preserved as family heirlooms and souvenirs. Many have icons, in most cases these are modern paper images of saints, but there are also ancient ones, preserved from the century before and last. These are, perhaps, the only monuments of material culture preserved from the Russian period in the history of Alaska. In the vast majority of houses, as in Russian villages, photographs of the owners and their relatives take pride of place. Orthodox icons are placed either opposite the entrance or next to a window (location in the corner is not typical). S. Fedorova, assessing the contribution of the Russians to the development and exploration of Alaska, she wrote: “The Russian period, although it ended abruptly and suddenly in 1867, was of great importance for the subsequent development of Alaska and its indigenous population. The Russians laid the foundation for the diversified development of Alaska’s economy. The Russians introduced the indigenous population to their culture, created a written language for non-literate peoples, and published books in their native languages.” Thus, some elements of Russian culture, having undergone certain changes, became an integral part of the traditional culture of the indigenous population of Alaska and are preserved to this day and were explored by participants in the Heritage of Russian America expeditions. The Constitution of the Russian Federation guarantees the rights of indigenous peoples in accordance with generally accepted principles and norms of international law and international treaties. At the same time, land and other natural resources are used and protected as the basis for the life and activities of the peoples living in the relevant territory, and in Art. 72 issues of joint jurisdiction of the Russian Federation and its constituent entities include the protection of the original habitat and traditional way of life of small ethnic communities. These constitutional norms are disclosed in more detail and concretization in federal laws (for example, the Federal Law “On guarantees of the rights of indigenous peoples of the Russian Federation” dated April 30, 1999 No. 82-FZ (hereinafter referred to as Law No. 82-FZ) and the laws of the constituent

entities. At the same time, the procedure for the implementation by indigenous peoples of the north of their rights in the field of protecting their ancestral habitat at the regional level is not sufficiently regulated: not all subjects have the appropriate regional laws. The list of places of traditional residence and economic activity of indigenous peoples of the Russian Federation is approved by the Government of the Russian Federation on the proposal of state authorities of the subjects, in whose territories these peoples live. In Law No. 82-FZ, the concept of ancestral habitat is revealed as a historically established area within which small peoples carry out cultural and everyday life activities and which influences their self-identification and way of life. According to A.I. Kazannik, this definition does not fully reveal the essence of this concept and draws attention to the definition given by ethnographers: “the natural and historical-cultural environment that has developed in the territories of historical settlement of indigenous small ethnic communities and is the basis of their traditional way of life.” The objects that make up the concept of “original habitat” include: lands of settlements of indigenous peoples of the north, lands on which burials are located, natural objects that are part of the cult of indigenous peoples, as well as hunting and fishing grounds, reindeer pastures, gathering areas. At the same time, there are no specific rules aimed at realizing the rights of indigenous peoples to their original habitat in the law. In particular, the procedure for assessing the impact on the natural environment in places where indigenous peoples live and mechanisms for compensation for damage caused are not prescribed. Law No. 82-FZ contains the concept of ethnological expertise - “a scientific study of the impact of changes in the ancestral habitat of small peoples and the socio-cultural situation on the development of an ethnic group.” However, there is no federal regulation on the issue of ethnological examination and the use of its results without legislative regulation is difficult. It should also be noted that there is also no mechanism for the participation of indigenous peoples in conducting environmental assessments. The Law of November 23, 1995 No. 174-FZ “On Environmental Expertise” does not provide for the obligation to conduct an expert assessment when developing territories where indigenous peoples live. Accordingly, the creation of an appropriate regulatory framework can become a real guarantee of respect for the rights and interests of indigenous peoples. In the Russian Federation, the protection of the rights of indigenous peoples is ensured, in particular, through judicial protection. Law No. 82-FZ contains a provision on the right of indigenous peoples to judicial protection of their original habitat, which can be exercised, including through an authorized representative, in order to more effectively protect their rights. Judicial protection is provided in the

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process of considering civil, criminal, and administrative cases related to violations of norms on the protection of natural objects located within the ancestral habitat of indigenous peoples. Similar norms are established, in particular, in the Town Planning Code of the Russian Federation. As an example of the successful implementation of the right to judicial protection, A.A. Tranin points to the decision of the Arbitration Court of the Komi Republic dated May 5, 2010 on compensation for material damage caused to reindeer pastures. Based on the case materials, it was established that the soil cover with moss growing on it (the main food source for reindeer) was destroyed by tracked vehicles. The court, taking into account the expert's opinion, satisfied the claim in full. One of the important forms of protecting the habitat of small peoples is also the formation of territories of traditional environmental management. They are specially protected areas necessary for the traditional way of life, conservation and development of indigenous peoples. The procedure for the formation of such territories is defined in Law No. 49-FZ of 05/07/2021 "On the territories of traditional environmental management of indigenous peoples of the North, Siberia and the Far East of the Russian Federation." Currently, there are more than 400 such territories, but the number of refusals has reached a huge number, which, according to A.A. Tranina, is an absolute violation of the constitutional right of indigenous peoples to their original habitat. Thus, the ancestral habitat for the indigenous peoples of the north is the basis for their normal development, including the development of traditional farming. Currently, the Russian Federation has enshrined the right of indigenous peoples to their original habitat, but the implementation of this right requires additional legislative elaboration. In accordance with the fundamentals of the state policy of the Russian Federation in the Arctic for the period until 2035, approved by the President of the Russian Federation on September 18, 2020, the Arctic zone of the Russian Federation should become the leading strategic resource base, solving the problems of the country's socio-economic development, as well as maintaining the role of a leading Arctic power. However, achieving the potential development opportunities of the Russian Arctic zone is hampered by a whole range of problems. An important problem is the lack of complete official information on the Arctic zone of the Russian Federation as a whole and on territories partially classified as part of the Russian Arctic zone. Using this information, it would be possible to make a multifactor analysis on the feasibility of developing, preserving and studying these territories, but the authors of works on Arctic issues may overestimate or underestimate statistical indicators characterizing the level of socio-economic development of the Arctic zone of the Russian Federation. In addition, at present, no special federal law "On the Arctic Zone of the

Russian Federation" has been introduced, which would regulate fundamental issues related to the functioning of the Arctic zone of the Russian Federation as a special region of the Russian Federation. It cannot be said that the Arctic territories are outside of legal regulation: this function is performed by many different legal acts. However, for the development of the territory, a unified law is needed that can ensure the multi-purpose development of this territory and the preservation of the geopolitical interests of the country. An analysis of the development of the Arctic zone of the Russian Federation and an assessment of the experience of developing the Arctic territories of the member countries of the Arctic Council identified negative demographic processes in most subjects of the Arctic zone of the Russian Federation and the outflow of highly qualified labor resources to the southern regions of Russia and abroad. Thus, in recent years, the population of the Arctic zone of the Russian Federation has decreased by 2.4%. The main reasons for the outflow of population from the Arctic regions are not problems with fertility and mortality, but the problem of migration outflow associated with an insufficiently high level and quality of life in these territories, including the closure of production enterprises and the lack of places of work, low work motivation, which determined by the size of individual income (the amount of wages and compensation payments). According to the authors, it is the growing economic activity of states that causes the problem of environmental pollution. Environmental problems are especially acute in the territories of the Arctic zone of the Russian Federation, in the Arkhangelsk and Murmansk regions, territories adjacent to Norilsk, and oil and gas production areas in Western Siberia. These areas are distinguished by a profound transformation of the natural environment. The Arctic nature is especially vulnerable in comparison with other regions; currently there is an acute shortage and even the absence of new environmentally friendly and competitive industrial technologies that can ensure the preservation of the environment of the Arctic zone of the Russian Federation. Along with other problems, the regions of the Arctic zone of the Russian Federation are characterized by "high energy intensity and low efficiency of natural resource extraction." The lack of accurate data on hydrocarbon reserves and other resources increases risks when developing policies for modernizing the infrastructure of the Russian Arctic zone.

Competition for Arctic resources is impossible without maintaining the population of Arctic territories and maintaining human potential. To stimulate the demographic development of the Arctic zone, it is now necessary to develop and adopt a set of measures, which should include both social and economic, cultural and other measures. Thus, in order

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to attract the population to the Arctic zone, it is necessary to create, among other things, a material interest in working in the Arctic. In modern realities, the primary goal of state policy in the Arctic zone of the Russian Federation is the transfer of Arctic territories to innovative development. The main indicator characterizing the level of innovative development is the volume of innovative goods, works and services. Due to the current structure of the economy, maintaining the innovative development of all industries is impossible, and the creation of new industries at the initial stage will not be as effective as the introduction of innovations into existing traditional industries. The mining and manufacturing industries, which predominate in the regions of the Arctic zone of the Russian Federation, are one of the drivers of innovative development. This is due to the concentration in these industries of more technologically complex and knowledge-intensive products with high added value. These industries are both sources of innovative products, works and services, and the main consumers of innovative developments. All this necessitates the formation of a system aimed at creating conditions for increasing and developing financial and human resources potential, taking into account the level of involvement of enterprises in the mining and manufacturing industries in the process of creating and implementing innovations. Thus, the main objectives of supporting the innovative development of the Arctic zone of the Russian Federation should be, namely:

- creating conditions to ensure financing of innovation activities;
- provision of qualified personnel.

To provide financial support for innovative activities in the Arctic zone of the Russian Federation, the following are needed: tax incentives, stimulation of private businesses to invest in innovative projects, as well as the use of targeted programs. In addition, stability of legislation is extremely important for business. One of the main tools that contribute to financial support for the development of Arctic territories in foreign countries are regional programs. Private capital is not able to provide long-term investments in the economy of the Arctic zone of the Russian Federation, therefore the state must take the initiative into its own hands and create conditions for the participation of private capital in the socio-economic development programs of the Russian Arctic. These programs should be aimed at:

- updating infrastructure, communication systems and communications (primarily transport);
- attracting labor reserves;
- solving the problems of the small indigenous population of the Arctic;
- targeted subsidies.

When developing and implementing measures to increase the efficiency of Arctic development, it is necessary, among other things, to use foreign

experience. The main goal of the socio-economic development of the Arctic zone should be the comprehensive development of the territory, and only the extraction and transportation of energy resources to other countries. At the present stage, increased competitiveness, sustainable economic growth and the well-being of the population are determined mainly by the innovative type of reproduction. The importance of innovative development is especially great for the recovery of the agricultural sector of the Arctic zone of the Russian Federation (AZRF) from the crisis, sustainable development of agricultural production, and provision of the population with biologically complete local food products. Our own agricultural production is aimed at providing the population of the Arctic zone with meat, milk, sea, river and lake fish, eggs, greenhouse vegetables, and wild plants. Local food products directly provide livelihoods and determine the level of food security for more than 2.5 million people living in the Russian Arctic. The formation of an innovative agricultural economy in Russia is currently being built on the basis of the Federal Law “On the Development of Agriculture”, the State Program for the Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials and Food for 2018–2035, the Strategy for the Sustainable Development of Rural Territories of the Russian Federation on the period until 2035, Strategies for innovative development of the Russian Federation for the period until 2035, Strategies for innovative development of the agro-industrial complex of the Russian Federation for the period until 2035. These documents are aimed at creating conditions for increasing employment, ensuring a stable increase in the level and quality of life of the rural population based on the modernization of agricultural production. Innovation activity is carried out on the continuous interaction of the creation and dissemination of innovations into production within the framework of the state policy in the field of development of the innovation system. Currently, not all subjects of innovation activity, both in the country as a whole and at the regional level, have been created and united into an integral innovative agricultural system. The formation of an innovation infrastructure, in which the agricultural consulting system plays a key role, is of particular relevance. The activities of specialist consultants at the Institute of Agricultural Consulting are aimed not only at providing a variety of services needed by agricultural producers and the rural population, but also at the development and transfer of innovations into agricultural production. With the help of the information and consulting service, the innovation process is managed at the stage of innovation development. In the Concept for the development of agricultural science and scientific support of the agro-industrial complex of the Russian Federation for the period until 2035. Among the priority areas for the development of agricultural

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science and scientific support for the agro-industrial complex of Russia, the development of innovation and consulting activities in the agro-industrial complex has been identified. Currently, agricultural consulting centers at the regional and district levels have been established in most constituent entities of the Russian Federation. Currently, agricultural producers and the population can receive consulting services in 60 constituent entities of the Federation, where 73 regional and more than 0.5 thousand district agricultural consulting organizations operate. Consulting services are least developed in the northern and Arctic territories with extreme conditions for agricultural production and agrarian characteristics. In the European North, out of six regions, agricultural consulting centers have been created only in Karelia and the Komi Republic. Existing consulting does not always take into account the specific features of the agricultural sector of various regions of the country associated with natural, economic-geographical, socio-economic conditions and factors. The system of agricultural consulting cannot be the same for all subjects of the Federation. A mechanical transfer of the practice of organizing agricultural advisory services from regions with developed agriculture to the regions of the North and the Arctic will not yield positive results. Here, due to the peculiarities of the functioning of agriculture, the formation and development of an agricultural consulting system will differ significantly. In this regard, developing ways to form and develop an agricultural consulting system for the northern and Arctic territories with difficult conditions for agricultural production is an urgent task. Agricultural consulting is a type of activity of consultants to provide services necessary for agricultural producers and the rural population to master new knowledge, new technologies, selection and genetic, marketing, organizational and managerial, economic and socio-ecological innovations in order to obtain economic, social and environmental benefits. Consulting, unlike information, is aimed at a specific object of agricultural activity. The counseling process represents the interaction between the consultant and

the client to solve problems. Users of consulting services are agricultural and agri-food organizations, peasant (farm) farms, rural population (owners of personal plots, gardeners), government bodies of the agro-industrial complex and local government. Each subject is interested in obtaining economic, social and environmental benefits through the services provided to him. The consulting process represents the interaction between the consultant and the client to solve problems and implement changes that bring benefits to agricultural producers. In modern conditions, the agricultural consulting system is the main tool for the transfer of innovations from producers of innovations to agricultural consumers. With the help of the consulting service, information about innovations is disseminated through the publication of specialized literature, information via the Internet, radio and television, and training events. Specialist consultants demonstrate new knowledge, new technologies on experimental fields and farms, and implement innovative projects in agricultural production. The need to create an agricultural consulting system at the federal, regional and district (interdistrict) levels is due to: the shortage and outflow of qualified specialists from the agricultural sector; degradation of resource potential and the need for innovative modernization of agriculture; uncertainty and constantly changing external and internal environment; the weakening of the management bodies of the agro-industrial complex in the dissemination of scientific knowledge and the development of innovations; difficulties experienced by rural producers in obtaining information about innovations, as well as about best production practices; underdevelopment of agricultural innovation infrastructure. Agricultural consulting is an essential element of the agroinnovation system (Figure 1). The consulting service closely interacts with other subjects of the innovation process and serves as an effective tool for transferring innovations to the agricultural sector. Foreign experience shows that about 60-80% of agricultural producers are able to master innovations with the help of an agricultural consulting service.

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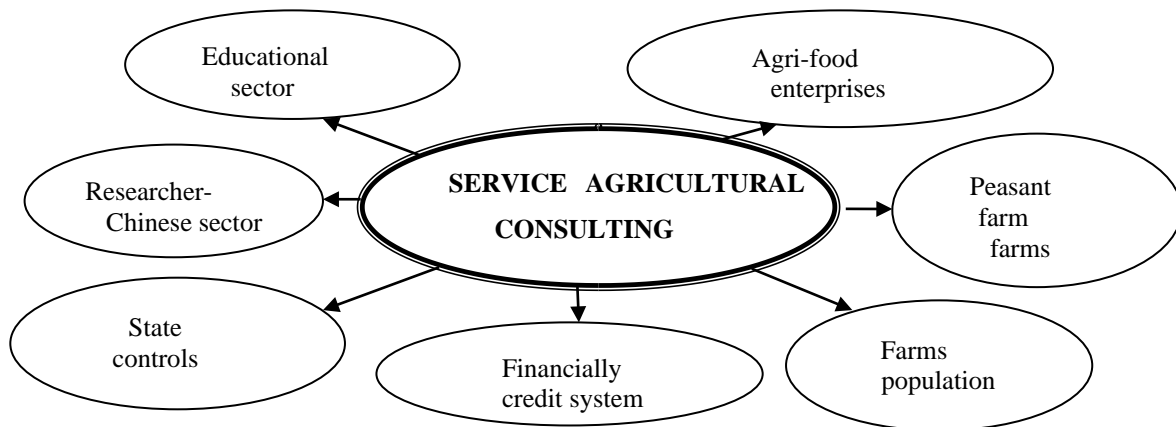


Figure 1. The place of agricultural consulting in the innovation system of the agricultural sector

A key role in the innovation infrastructure belongs to the agricultural consulting system. The agricultural consulting system, which closely interacts with scientific and educational institutions, implementation organizations, and agricultural

producers, is an effective tool for mastering innovations in production. The consulting service is designed to perform the following main functions (Figure 2).

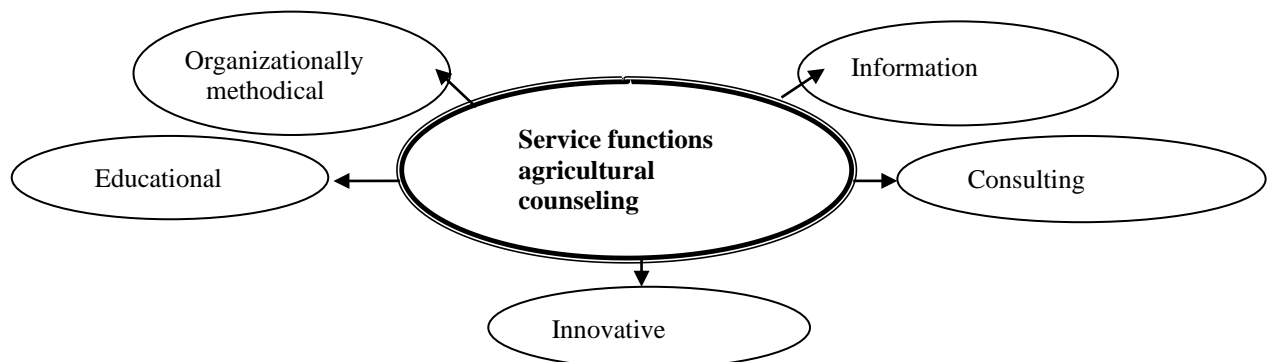


Figure 2. Functions of the regional agricultural advisory service

1. The organizational and methodological function is designed to organize the coordination of interaction between the subjects of the consulting service, organizational and methodological support for the work of consultants, holding seminars and conferences, and create conditions for expanding access for agri-food subjects and the rural population to consulting services.

2. The information function solves the problems of generating information resources, providing subjects of innovation with scientific and technical achievements and advanced production experience in the agricultural sector, and disseminating information.

3. The consulting function is aimed at providing advice to agricultural producers and the rural population.

4. Innovation function is the main function of the agricultural advisory system. It is aimed at

disseminating and introducing innovations in agricultural production. With the help of the innovation function, the organization and implementation of events for the dissemination and implementation of innovations in production is carried out.

5. The educational function is aimed at holding seminars, round tables, conferences in close cooperation with regional educational and scientific institutions.

The most important function of consulting services is to provide innovative support to agricultural producers. Using the innovative function, the following tasks are solved, namely:

- improving mechanisms for mastering innovations in agricultural production;
- development of recommendations for the introduction of innovations for specific consumers, preparation of innovative projects;

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- organization of demonstration facilities on an industry basis, including alternative employment for the rural population;
- organizing and conducting mass and collective events to disseminate information about innovations, training seminars, schools, presentations, demonstrations, field days and information days;
- dissemination of best practices;
- participation in the formation of plans and programs for scientific research and production testing;
- collecting and summarizing information about completed scientific developments in research and

educational organizations, forming a regional information bank on its basis.

The agricultural consulting system is a link between producers of innovations and their users. To develop innovative activities, the advisory service will have to strengthen ties with the scientific and educational sector, management and service bodies in the agricultural sector, and information institutions. A diagram of possible interaction between the agricultural consulting service at the level of the Komi Republic and subjects of innovation activity is shown in Figure 3.

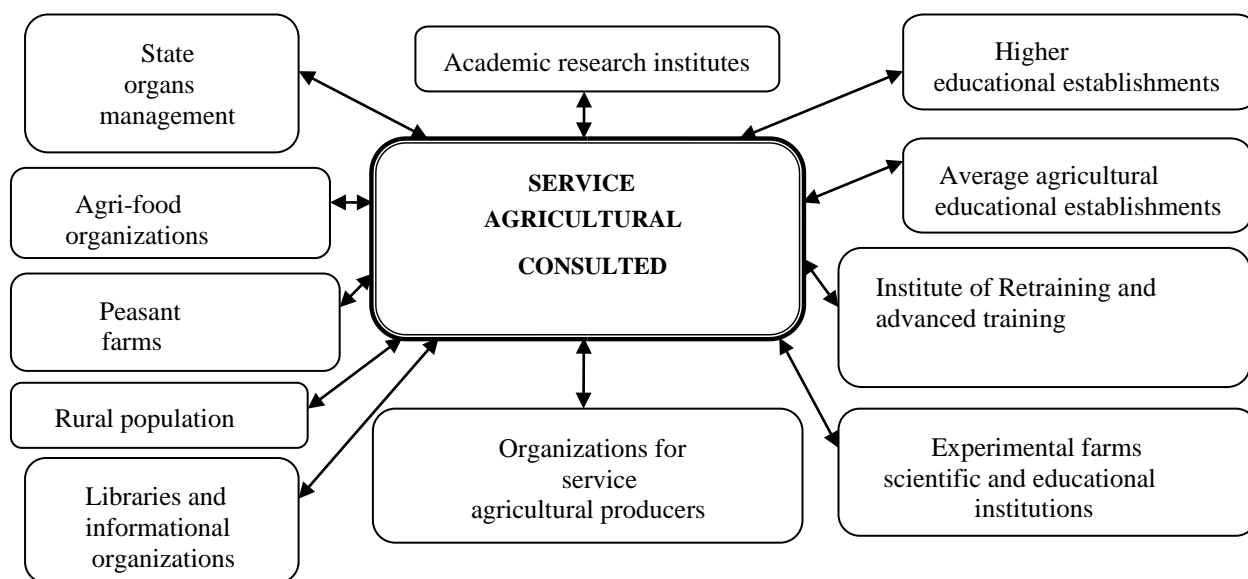


Figure 3. Interaction of the regional agricultural consulting service with subjects of innovation activity

The service can prepare proposals for applied scientific research in demand by agricultural producers for scientific organizations, create a data bank on innovative projects, inform potential consumers about them - agri-food enterprises and peasant farms, help resolve issues of forming innovative projects, and recommend investors for their implementation. Employees of the consulting service, together with scientists and university workers, can conduct applied research on current problems of the agro-industrial complex, and engage

in publishing and advertising activities. Interaction of the information and consulting service with institutions of secondary vocational agricultural education is possible by using their educational and production base to organize experimental and demonstration activities of the regional consulting service. The priority areas for the participation of the agricultural consulting service in the development and transfer of innovations into agricultural production are shown in Figure 4.

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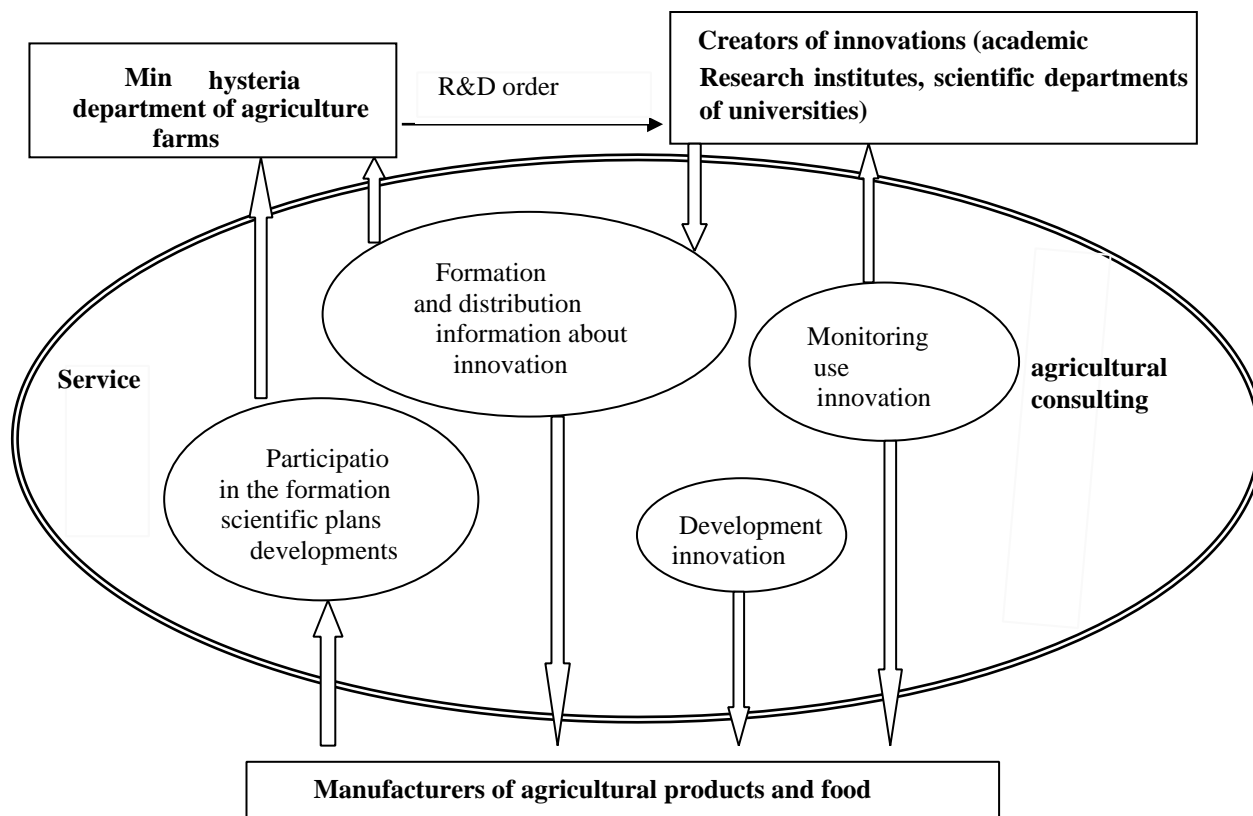


Figure 4. Scheme of participation of the regional agricultural consulting service in the development of innovations

Scientific organizations can disseminate information about innovations through the agricultural consulting system using printed and video products, demonstration events, consult service specialists in the development of innovations, develop, examine and evaluate the effectiveness of innovative projects, and, together with consulting organizations, introduce innovative developments into production. Universities must provide training for modern specialist consultants who will be able to solve practical problems of innovative development of the agricultural sector. Close interaction between the republic’s advisory service and scientific and university institutions is possible by involving employees of research institutes and university teaching staff in training employees of advisory services. In turn, highly qualified service consultants should be recruited to train specialists for the agricultural sector and the regional agricultural consulting service. Not only agricultural producers, but also the management bodies of the regional agro-industrial complex are interested in the effective functioning of the integrated information and consulting service. This interest is related to the implementation of an agricultural consulting system for agri-food policy, a strategy for sustainable agricultural and rural development through the dissemination and implementation of innovations, best practices and management methods, and market

information. Regional authorities and governing bodies, together with the participation of the federal budget, provide financial support for the information and consulting service.

To expand access to information and advisory services to agricultural producers and the rural population, the involvement of rural administrations will be required. Heads of rural administrations can help organize information corners in libraries, premises of rural administrations, provide premises for meeting rural residents with visiting consultants from agricultural consulting centers, ensure connections between owners of personal subsidiary plots and family farms with consulting centers, identify and equip basic farms in which best practices can be demonstrated. The heads of basic farms will provide consultations to agricultural producers and personal subsidiary plots of the population. A study of organizational forms of agricultural consulting abroad and in our country shows that different service models are used. For the subjects of the Arctic zone, during the period of establishment of the agricultural consulting service, it should be retained in the agro-industrial complex management system. This organizational form of agricultural consulting, as already noted, is used in the Republic of Belarus. Its main advantages are as follows:

- an effective federal link in the system, which ensures the development of the legislative, scientific

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and methodological base, training and advanced training of personnel;

- close interaction with regional and local administrations, good production contacts with agricultural producers;

- great opportunities for the service to influence the formation of state agricultural policy;

- the use of existing qualified and experienced personnel of government agencies, which allows the formation and development of the service at minimal cost.

At the same time, this model is not without its drawbacks: the service can be used as a tool for implementing public service policy; the client does not have much confidence in government officials and does not want to move into open trusting relationships. In Komi, the agricultural consulting service is represented by the information and consulting department of the Ministry of Agriculture of the republic. There is no agricultural advisory service at the municipal level, which hinders the access of rural residents, especially remote areas, to information and advisory services. Agricultural consulting in the region is at an early stage of development. The main activities of the service are related to consulting, conducting training events and publishing information materials. The consulting service is not involved in the promotion and implementation of innovative technologies, and does not participate in the formation of plans for applied scientific development. Close ties between the advisory service and the management and service bodies of the regional agro-industrial complex, scientific and educational sectors have not been established. As the agricultural consulting system develops, it is advisable to create an autonomous institution. The status of an autonomous institution will ensure the efficiency of the service, improve the quality of services provided, and minimize taxation. The autonomous institution will receive guaranteed budget funding in accordance with the developed state task and will increase the flow of funds from the provision of commercial services. The formation and functioning of agricultural consulting in the subjects of the Arctic zone has its own specifics, determined by natural, socio-economic factors, established types of agricultural structures, scientific, educational, personnel, production and financial potential, innovative activity of agricultural organizations and peasant farms. We have developed a scheme for organizing agricultural consulting for the Pechora-Ural Arctic, represented by the urban district of Vorkuta (located in the Arctic zone), as well as the urban districts of Inta and Usinsk and the municipal districts of Ust-Tsilemsky, Izhemsky, Pechora (located in the Arctic and subarctic zones). For the urban districts of Vorkuta, Inta and Usinsk and the municipal district of Pechora, it is proposed to create an intermunicipal consultation center in the city of Pechora. For the Arctic rural areas of Izhemsky and

Ust-Tsilemsky, a similar center should be located in the village of Izhma. There is a need to speed up counseling centers with highly qualified specialist consultants. Each intermunicipal consultation center will include a livestock specialist, an accountant-economist and a lawyer on a temporary basis. The formation of appropriate agricultural consulting centers will increase the coverage of agricultural producers and the rural population with information and consulting services, dissemination of innovations for medium and small forms of agricultural structures, increase the level of coordination and integration of services with agricultural science and education. Taking into account the specific features of the functioning of agricultural production, it is inappropriate to create municipal (district) consultation centers in each subject of the Arctic zone. For example, in the Nenets Autonomous Okrug, a regional agricultural consulting center should be organized in the city of Naryan-Mar in the district's agro-industrial complex management system. The formation and development of agricultural consulting related to strengthening the staff of consultants, providing consulting and innovative assistance to agricultural producers and the population, conducting training and practical activities, developing the infrastructure and material and technical base of consulting services will require significant financial resources. In the current difficult socio-economic conditions that have developed in the agricultural sector of the Arctic zone, increasing financial support for advisory services is associated with budget formation. As the system of agricultural consulting strengthens and develops, and the sustainability of agriculture, there will be a gradual transition from fully budgetary financing of consulting services to their partial reimbursement through payments from agricultural producers and borrowed funds. A questionnaire survey conducted by the authors (2020–2022) of managers and specialists of agricultural organizations and farms showed that agricultural producers in the Komi Republic agree to pay for the development of business plans, farm development strategies, assessment of investment projects, introduction of modern technologies, and search for channels for selling products. Activating paid consulting will require subsidizing part of the costs of agricultural producers using consulting services. With the completion of the formation and strengthening of the personnel and technical potential of the agricultural consulting service in the Arctic zone, it will in the future become the main instrument for the transfer of innovations from the subjects of the agroinnovation system that produce innovations to agricultural consumers. In accordance with the Charter of the Murmansk Region and Decree of the Government of the Russian Federation dated April 17, 2006 No. 536-r "On the Unified List of Indigenous Minorities of the Russian Federation," the indigenous

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people of the Murmansk Region are the Sami. According to the 2010 All-Russian Population Census, 1,599 Sami people live in the Murmansk region (about 0.2% of the total population of the region), 226 people belong to other small peoples of the North (Nenets, Evenki, Mansi, etc.). The majority of representatives of the indigenous people of the North (hereinafter referred to as IMN) live in rural areas (66.3%). Places of traditional residence and traditional economic activity of indigenous peoples of the Russian Federation in the Murmansk region in accordance with the order of the Government of the Russian Federation dated 05.08. 2009 No. 631-r "On approval of the list of places of traditional residence and traditional economic activities of indigenous peoples of the Russian Federation and the list of types of traditional economic activities of indigenous peoples of the Russian Federation" are the municipalities of Kovdorsky district, Kola district, Lovozersky district, Tersky district. In the Murmansk region, active government measures are being taken to support traditional economic sectors and way of life, as well as communities of indigenous peoples of the North.

In the agricultural production cooperatives of the Lovozero region: Agricultural production cooperative "Tundra" and Agricultural production cooperative Olenevod MNS, the main activity of which is reindeer husbandry, the share of indigenous peoples of the North is 27.6% of the total number of employees. Every year, the Ministry of Fisheries and Agriculture of the Murmansk Region and the Barents-White Sea Territorial Administration of the Federal Agency for Fisheries distribute quotas for the extraction (catch) of aquatic biological resources for representatives of indigenous peoples and their communities in order to ensure the traditional way of life and carry out traditional economic activities based on submitted applications. One of the common forms of self-organization of people from among indigenous peoples, the main goal of the creation and activities of which is to protect the ancestral habitat, traditional way of life, rights and legitimate interests of representatives of indigenous peoples, is a community. In the Murmansk region, 37 communities of indigenous peoples of the North are currently registered. Detailed information can be found on the official website of the Government of the Murmansk Region at the link: http://gov-murman.ru/region/saami/short_info/. The main activities of the tribal and territorially neighboring communities of the Sami people are: fishing and extraction of aquatic biological resources in the Barents Sea and in inland waters of the region; reindeer husbandry; fishing of marine animals; hunting; collection of wild plants; processing of products of these types of management; production of household and cultural items of the Sami people; provision of tourist and excursion services. 9

communities have leased forest areas for reindeer grazing. All sites contain water bodies where communities carry out traditional fishing. 2 communities have fishing grounds on the White Sea. On the lands of the forest fund, communities of indigenous peoples of the North were provided with 9 forest plots for use, 2 plots were provided to an individual from among the indigenous peoples of the North (Sami) for reindeer herding. 2 Sami communities received fishing grounds on the White Sea for use. In order to support and develop community forms of economic management and self-employment of the indigenous people of the Murmansk region, preserve their cultural heritage, traditions and customs, within the framework of one of the tasks of the state program "Public Administration and Civil Society", the subprogram "Strengthening ethnocultural diversity, civic consciousness and patriotism" in the Murmansk region" the following government support measures are being implemented in the Murmansk region. Every year, funds are allocated from the regional and federal budgets to improve the material and technical base of communities. From 2019 to 2022, 31 communities received support in the form of subsidies for a total amount of about 35 million rubles. Using allocated funds, communities purchased wooden houses, snowmobiles, ATVs, cars, motor boats, electric generators and other equipment necessary for traditional economic activities. Every year, representatives of the indigenous people working in reindeer herding farms and communities are provided with vouchers to sanatorium and resort institutions. During the period from 2019 to 2022, 43 people underwent health improvement in sanatoriums. In order to preserve the Sami language in the Murmansk region, fiction, educational and methodological materials on Sami topics are published, cycles of television and radio programs are produced in the Sami and Russian languages, and CDs are produced. Activities are being implemented aimed at preserving the traditions and customs of the indigenous peoples of the North and popularizing the original national culture. National holidays, festivals, exhibitions, round tables, seminars, and conferences are held annually. The main cultural events are the celebration of the National Sami Day - annually on February 6 in the territories of traditional residence of indigenous peoples and the annual festival of Sami music and the festival of children's and youth theatrical performances in the Sami language "Moainas Lanni - Fairytale City", which take place in the city of Olenegorsk. Also, representatives of the indigenous people, according to established tradition, take an active part in organizing the regional holiday of national cultures "Festival of Friendship", the Day of the Sami Word, the Day of the World's Indigenous Peoples - August 9, the Murmansk city local history festival of children's creativity "Chakhkli", the

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regional Holiday of the North and the Day of the Reindeer Herder, traditional summer and autumn Sami games. Every year, as part of the Program, a delegation of the indigenous Sami people takes part in the International Exhibition Fair “Treasures of the North”, which takes place in Moscow. Activities in the field of improving the quality of life and preserving the original culture of the indigenous peoples of the North are also being implemented within the framework of comprehensive regional plans. According to the Law of the Murmansk Region dated June 28, 2018 No. 1649ZMO “On Education in the Murmansk Region,” the creation of conditions to meet the needs of indigenous peoples of the North in studying their native language and literature falls within the powers of the Ministry of Education and Science of the Murmansk Region, which manages the field of education within the limits of possibilities provided by the education system of the Murmansk region. The learning of the Sami language is carried out in accordance with the needs of students and their families. Currently, the study of the Sami language in general education organizations in the Lovozero region is organized in accordance with the wishes of parents in the form of club classes. Groups of the first year of study are formed at the beginning of the school year on the basis of applications from parents (legal representatives) of students, mainly representatives of the Sami population, as well as non-Sami nationalities (Komi-Izhemtsy, Russians). All statements from parents (legal representatives) of students, those expressing a desire to learn the Sami language are satisfied. The Ministry of Health of the Murmansk Region is implementing measures aimed at improving the quality and standard of living of indigenous peoples of the North in the field of healthcare. In order to increase the accessibility of medical care to residents of remote settlements of the Murmansk region, medical organizations use on-site and remote forms of providing consultative and diagnostic assistance. In accordance with the order of the Ministry of Health of the Murmansk Region, the work of the “Health Train” was organized using vehicles and mobile medical equipment. Within the structure of the Government of the Murmansk Region, the coordination of the activities of the executive bodies of state power of the Murmansk Region on issues of the original historical, cultural, socio-economic, linguistic development of indigenous peoples of the North, the protection of their ancestral habitat, traditional way of life and economic management is carried out by the Ministry of Internal Policy and Mass Communications Murmansk region. Subordinate to the Ministry, the state regional budgetary institution "Murmansk Regional Center of Indigenous Peoples of the North" develops and implements programs, projects and activities aimed at improving the living standards of indigenous peoples of the North of the Murmansk region, protecting their rights to unique

historical, cultural, socio-economic development , protection of their original habitat, traditional way of life and traditional economic activities. The activities of the Government of the Murmansk Region are aimed at implementing the Concept of sustainable development of indigenous peoples of the North, Siberia and the Far East of the Russian Federation, the Strategy of the state national policy of the Russian Federation and the Development Strategy of the Arctic zone of the Russian Federation in order to improve the quality of life, create conditions for employment and improve demographic indicators indigenous peoples of the Russian Federation, preservation of their cultural development. In November 2022, with the support of the Government of the Murmansk Region, the III Congress of the indigenous people of the Kola North - the Sami - was held. The congress was attended by 65 delegates from all districts and settlements of the Murmansk region, representatives of Sami organizations, associations, enterprises, Sami public leaders, and leaders of communities of indigenous peoples of the North. Following the results of the III Congress of the Indigenous People of the Kola North, a representative collegial body, the Sami Assembly Sam Sobbar, was created. Also, in order to implement a set of organizational, economic and legal measures aimed at protecting the original habitat, traditional way of life, economics and crafts of the indigenous small people of the Murmansk region - the Sami, on the basis of the resolution of the Government of the Murmansk region dated 11.02. 2019 No. 57-PP there is a Council of Representatives of Indigenous Peoples of the North under the Government of the Murmansk Region, which includes nine representatives of the Sami communities, a representative of the Government of the Murmansk Region and a representative of the Public Chamber of the Murmansk Region from among the indigenous peoples of the North. Five of the nine members of the Council are members of the Sami Sobbar Sámi Assembly. The Council is a collegial advisory body. At Council meetings, issues on the most important areas for the Sami people are considered. Proposals are made to improve the regulatory legal framework. The Council exercises public control over compliance with federal laws and the laws of the Murmansk region on the protection of the natural environment in the places of traditional residence and traditional economic activities of the Sami. There is also a working group on fisheries under the Council. In addition, representatives of the indigenous people of the Murmansk region are included in:

- Public Chamber of the Murmansk Region;
- subcommittee of the Public Chamber of the Murmansk Region on Interethnic Relations, created in accordance with the Law of the Murmansk Region dated July 11, 2018 No. 996-01-ZMO;

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– Council for Nationalities and Religious Denominations under the Public Chamber of the Murmansk Region;

– thematic working group on ensuring interethnic harmony, the activities of which are aimed at implementing by the Government of the Murmansk Region Decrees of the President of the Russian Federation dated 05/07/2022 No. 602 “On ensuring interethnic harmony”, dated 08/21/2022 No. 1199 “On assessing the effectiveness of the activities of executive authorities of the constituent entities of the Russian Federation ” Also, representatives of the indigenous small Sami people are included in the Public Councils under the government authorities of the Murmansk region (Ministry of Internal Policy and Mass Communications of the Murmansk Region, Committee on Culture and Arts of the Murmansk Region, Committee on Physical Culture and Sports of the Murmansk Region, Ministry of Natural Resources and Ecology of the Murmansk Region region). There are 7 public associations of indigenous peoples in the Murmansk region, one of the many regional associations of indigenous peoples is the Public Organization of the Murmansk Region “Association of the Kola Sami” (hereinafter referred to as the Association). The activities of the Association are aimed at solving problems of creating the necessary conditions for the preservation and development of the cultural heritage, traditions and customs of the indigenous peoples, medical and social services, the preservation of traditional lifestyles, traditional types of economic activities and crafts of the indigenous peoples. The Association is the founder and member of the Association of Indigenous Peoples of the North, Siberia and the Far East of the Russian Federation, and is a member of its Coordination Council. Representatives of the Association are members of the Sam Sobbar Sami Assembly, the Council of Representatives of the Indigenous People of the North under the Government of the Murmansk Region, and the working group on the creation of the Khibiny National Park. Currently, special attention is paid to regional development, which depends on a number of

objective and subjective factors that influence economic growth. Among the objective factors influencing the economic development of a territory are: production potential, human capital, resource provision; researchers are increasingly talking about the influence of the geographical factor. The geographical factor in the research of scientists is presented differently: on the one hand, it is the location of the region, its foreign economic relations, on the other hand, it is the climatic conditions that determine the structure of the economy. Within the framework of modern conditions, special interest arises in the territories of the Arctic zone of the Russian Federation, which is natural; it is in these territories that climate changes are formed. The regions of the Arctic zone of the Russian Federation are in harsh climatic conditions and the level of their development depends on a large number of factors, which include the influence of the climatic factor. The Arctic zone includes: 1) completely or partially northern territories 8-mi operating entities: the Republic of Sakha (Yakutia); Krasnoyarsk Territory; Murmansk region; Arkhangelsk region; Nenets Autonomous Okrug; Yamal Nenets Autonomous Okrug; Taimyr (Dolgano-Nenets) Autonomous Okrug; Chukotka Autonomous Okrug; 2) lands and islands specified in the Resolution of the Presidium of the Central Executive Committee of the USSR dated April 15, 1926 “On declaring lands and islands located in the Arctic Ocean as the territory of the USSR”; 3) internal sea waters, territorial sea, exclusive economic zone and continental shelf. As part of the proposed study, the level of development of the regions of the Arctic zone of the Russian Federation will be considered, and socio-economic development will be analyzed. The subject of the study is the process of regional development of the regions of the Arctic zone; the object of the study is the Arctic regions wholly or partially included in the Arctic zone (Table 1). Based on a draft federal law published in 2018, the Arctic zone was defined as a part of the Arctic that is subject to the jurisdiction of the Russian Federation.

Table 1. Composition of the Russian Arctic

Regions	Territories included in the entire Arctic	Territories that are partly part of the Arctic
Murmansk region	+	
Nenets Autonomous Okrug	+	
Yamalo-Nenets Autonomous Okrug	+	
Chukotka Autonomous Okrug		
Republic of Karelia		+ Loukhsky, Kemsy, Belomorsky district
Komi Republic		Vorkuta urban district

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Arhangelsk region		+ Onezhsky, Primorsky, Mezensky districts, Arkhangelsk, Severodvinsk, Novodvinsk, as well as the Arctic islands administratively belonging to it (Novaya Zemlya, the ZF-I archipelago, etc.).
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One of the main indicators characterizing the level of regional development is the GRP indicator. Based on the values of this indicator, one can judge

the dynamics and level of development of the territory (Table 2).

Table 2. GRP per capita of the regions of the Arctic zone, million rubles

	2016	2017	2018	2019	2020	2021
GRP of the Russian Federation	317,515.3	348,641.5	377,006.0	405 147.7	449,097.9	472 161.9
Republic of Karelia	241688.0	251981.4	281021.6	301818.1	335944.5	371452.0
Komi Republic	487363.5	541155.3	550386.2	557641.3	613975.0	640622.9
Arhangelsk region	360165.9	391146.2	417776.4	456985.8	532533.7	584111.3
Murmansk region	333511.6	361968.4	395213.7	427090.7	525475.7	560380.2
Krasnoyarsk region	413172.4	416272.7	441084.9	493985.7	582345.8	615803.9
The Republic of Sakha (Yakutia)	508674.4	566387.0	597037.4	688540.1	780139.8	903611.1
Chukotka Autonomous Okrug	883368.7	896822.1	877612.8	1142504.1	1226152.0	1323201.3
Nenets Autonomous Okrug	3913588.7	3685897.1	4035943.2	4329031.1	5210143.9	5821559.8
Yamalo-Nenets Aut. district	1820301.3	2209803.4	2544898.0	3025745.6	3336453.4	3670257.6

The results of the study of GRP per capita showed that the regions of the Arctic zone are characterized by high GRP indicators. The obtained result allows us to talk about the development of these territories; a possible reason for the obtained results is the significant resource potential that provides the Arctic territory with potential for development.

The Arctic territories, due to difficult climatic conditions, vast territory, relatively small number of inhabitants, remoteness - and therefore, it would seem, the economic inexpediency of their development - pose a special challenge for the countries of the Arctic region in terms of the development of transport infrastructure. Researchers note that the key difference between the northern regions and the southern ones is desolation. Thus, the population density in the Tyumen region, Krasnoyarsk and Khabarovsk territories is 1–2 people per 1 sq. km, in the Magadan region - 0.3–0.4 people per 1 sq. km. The northern territories contain 80% of all the country's mineral resources - hydrocarbons, diamonds, rare, non-ferrous and precious metals; 93% of natural gas, 75% of oil, including gas condensate, 98% of diamonds, almost 100% of cobalt, platinum group metals, apatite concentrate, 90% of copper, nickel, 90% of gold are produced here, half of the forestry and

fisheries products are produced. “A resident of the Russian North is hundreds of times richer in natural territorial resources and living space than the average inhabitant of the planet.” At the same time, in his article Gogolev P.V. emphasizes that the concept of “north” in legislation is used as a legal category that “comprehensively takes into account the physical (geographical, climatic) and socio-economic (presence or absence of infrastructure) features of the territory of human residence, spatially encircling a significant part of Russia parallel to the Arctic Circle.” The gradual development of the unique natural resources of the Arctic North and the protection of territories are slowly but surely ensuring an influx of workers, military personnel, and increasing the population. However, if you look at a map showing road density per 100 square kilometers, the northern part of the continents contains many times fewer roads than the south. According to experts from the National Research University Higher School of Economics, the cost of building roads in the Far North due to the inclusion of additional design solutions that increase the stability of the roadbed exceeds the average by 10–30%, and due to the low development of infrastructure, transporting the necessary materials becomes completely difficult task. Maintaining the

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road network in satisfactory condition due to frequent fluctuations between positive and negative ambient temperatures is also a negative factor. How to develop the Arctic territories, whose riches are talked about so much? One of the solutions to reduce the financial burden is small aviation - and in this work we will focus on the possible result of actively attracting entrepreneurs to carry out this activity. According to the general definition contained in Article 2 of the Civil Code of the Russian Federation, entrepreneurial activity is an independent activity carried out at one's own risk, aimed at systematically generating profit from the use of property, the sale of goods, the performance of work or the provision of services.

*increase cargo and passenger traffic, including by attracting tourists to previously inaccessible points. The example of the United States of America, namely the state of Alaska, can serve as proof of our point of view. As of January 2022, Alaska had 9,346 registered aircraft, 7,933 pilots, 400 public airports, 282 land bases, 114 sea-based bases, approximately 747 registered landing points—and that doesn't include unimproved lakes or gravel sites. According to statistics provided by the McDowell Group, 1,857,500 people visited Alaska during the summer of 2022, and of those, 747,100 (40%) used air travel. This led to the fact that air tourists alone spent up to 1,494,200,000 (1.4942 billion rubles) dollars. However, three-quarters of visitors who used air travel reported wildlife viewing as their top travel activity, with shopping being the next most popular activity. Thus, we can say that the development of tourism will indirectly affect the growth of traditional cultural crafts, which will have a beneficial effect on the preservation of the culture of indigenous peoples of the North and the development of small businesses. In addition to tourists, this category also includes scientists, for example, historians, ethnographers, anthropologists and linguists, who will have the opportunity to conduct their field research at lower costs;

*increase the transportation of vital or urgent cargo. Decent livelihoods, including meeting the demand for goods of all those living in the northern regions, are considered by some researchers as the most important condition for the successful implementation of programs for the development of the Arctic. Of course, air transportation will increase the prices of goods, but with the formation of a permanent market, the development of technology and increased competition, this type can become a significant source of goods. Let us note that in 2022, the centralized supply (only) of “fuel to remote areas of the Khabarovsk Territory will cost 3.6 billion rubles,” 2.07 billion rubles were allocated from the budget of the Arkhangelsk region to co-finance issues of local importance, and directly to support 3,990,000 rubles were allocated for the delivery of flour and medicines to areas with limited delivery times. Yes,

for the most part, cargo is delivered by water transport, however, we consider it correct to point out that the involvement of small aviation from private companies when creating a state order will be a good lever for the development of entrepreneurship and small aviation in the Arctic regions. However, for the sake of honesty, we note that in order to enter the market for cargo transportation services in the regions of the Far North, there are significant barriers to entry for new participants, such as “a significant amount of initial capital for entering the markets; high cost of transportation associated with small cargo flows in the opposite direction; high risks; imperfect state regulation of tariffs for northern deliveries; untimely financing of northern supplies from budgets of various levels;

* connect populated areas and create infrastructure that can be used not only by civil, but also by state aviation. This infrastructure will need to be maintained, repaired and refilled, which will allow the service to be transferred to private hands. Infrastructure can be understood, in accordance with Art. 1 of the Federal Law of 01/08/1998 No. 10-FZ “On state regulation of aviation development” not only airfields, airports, but also objects of a unified air traffic management system, centers and flight control points for aircraft, storage facilities for aviation equipment, and others used for in the implementation of aviation activities, structures and equipment - and all this can also be used, including by the military or the Ministry of Emergency Situations. With the development of the Northern Sea Route, the risk of emergency events inevitably increases - and the presence of a prepared air transportation infrastructure will significantly reduce damages and losses due to rapid deployment on site;

* more efficiently carry out cartographic, geodetic, and other land management work; reforestation, environmental protection work and monitoring of the state of the environment in places of traditional residence and traditional economic activity - that is, to more successfully implement, among other things, those tasks that are spelled out in program documents - for example, the Concept of sustainable development of indigenous peoples of the North and the Far East Russian Federation. Improving technologies (including global positioning and orientation), modernizing public relations and regulations in these areas makes it possible to transfer increasingly greater powers from the public sphere to private companies;

*to facilitate agriculture in terms of pollination, the distribution of chemicals, as well as to monitor traditional sectors of the economy, such as reindeer husbandry, hunting, fishing, fur farming, and cattle breeding. It is not without reason, as researchers note, that the version of modernization carried out during the USSR period - with the widespread involvement of aviation - was a softened version of the

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development of traditional economic sectors, “which for many years made it possible to preserve the material basis of the national cultures of small peoples”; hunting and fishing have received serious development potential for decades, the “development of indigenous peoples has accelerated with the formation of autonomous okrugs, national regions, hereditary (village) self-government bodies and the organization of state medical, trade, consumer and transport services for reindeer herders, hunters, fishermen, leading nomadic and semi-nomadic Lifestyle”.

Let us note that, despite great prospects, at the moment, to implement the above ideas, a huge amount of work is required - and this industry needs very close and comprehensive attention from the state and society. Of course, plans for the development of aviation, including small aviation, for example, are mentioned a lot in various program documents: in the Fundamentals of State Policy of the Russian Federation in the Arctic for the period until 2020 and beyond, and in the Strategy for the Development of the Arctic Zone of the Russian Federation and ensuring national security for the period until 2035; Order of the Ministry of Natural Resources of Russia dated April 22, 2020 No. 342 “On approval of the main directions for the development of the system of state natural reserves and national parks in the Russian Federation for the period until 2035”, and in the “Strategy for the socio-economic development of the Northwestern Federal District for the period until 2035”; indirect references to this are also found in such a program document as the “Strategy for the development of tourism in the Russian Federation for the period until 2035”, approved by Order of the Government of the Russian Federation dated May 31, 2020 No. 941-r. However, the researchers note only a general interest in fulfilling the assigned tasks - “the current documents do not contain a general list of all activities of interrelated programs, elaboration of the issues of financial support for each activity, assessment of the degree of participation in the financing of budgets of different levels, or definition of special rules of tax policy. “...” contains activities that cannot be regulated programmatically, since they relate to the permanent functions of state authorities and local governments to provide a range of state and municipal services.” ETC. Alushin, as well as Bratanovsky S.N. and Shustova M.V. express the opinion that currently state support for entrepreneurship using civil aviation is in the nature of short-term and targeted, minimal assistance. At the same time, the current transport legislation, both federal and regional, in most cases does not take into account the specifics of private activity in this area - including the functioning of small, ultra-light aviation. Currently, we have to admit that this area does not have a clear legal basis, and its development is carried out spontaneously. Thus, at present, many features of

the organization of insurance, maintenance and parking of small aircraft, the establishment of transport tariffs and fees, taxation and incentive systems are not reflected in legislative acts. “We note that the Civil Code of the Russian Federation and the Air Code allow the transportation of passengers and cargo by small aircraft on an ongoing basis. However, the corresponding rules and conditions have not yet been adopted at the federal level.” In fairness, we still point out that the Government is slow, but is taking steps to increase support for small aviation - thus, criticized for lack of efficiency (since it concerned a small number of airports, and the amount of accrued subsidies did not keep up with inflationary processes in the economy) Resolution of the Government of the Russian Federation of December 20, 2007 No. 907 - was replaced by Resolution of the Government of the Russian Federation dated 02/09/2018 No. 135, where the list of airports that can qualify for subsidies from the federal budget was significantly expanded; in 2016, the Government of the Russian Federation issued Decree No. 570 dated June 22, 2016 on providing subsidies to manufacturers of aircraft with a passenger capacity of up to 19 people - however, there is no data on the recipients of these subsidies. To summarize a brief excursion into this difficult but extremely fascinating topic, we emphasize that the Russian Federation, at least in its program documents, is interested in the development of small aviation, including in the polar regions, since small aviation can significantly increase the chances of successful development of the northern territories, including by attracting and developing business activities. Saving of the population seems to be one of the general directions of modern policy of the Russian Federation. Demographic tasks are identified among the priority tasks in the latest Decree of the President of the Russian Federation V.V. Putin: ensuring sustainable natural population growth; increasing life expectancy to 80 years by 2035. It is emphasized that the implementation of breakthrough scientific, technological and socio-economic development and an increase in the country’s population depend on their solution. This task is especially relevant for the Arctic regions of Russia, where population reproduction is accompanied by certain risks caused by the natural, climatic and socio-economic specifics of the Arctic zone. In the Republic of Sakha (Yakutia), the main threats to demographic security include the lack of significant population growth, which is due to changes in the ratio of sources of population formation. The migration outflow of the population is not compensated by natural growth; Until 2013, the negative migration balance exceeded natural growth. Although in recent years there has been some improvement in the migration situation, nevertheless, in the republic the migration balance coefficient remains almost 2 times higher than in the Far Eastern Federal District. Modern trends in natural growth have

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again returned to their previous vector of decline. Although for 2018–2020 the natural increase rate increased 1.9 times, but the results for 2022 showed a reduction in the natural increase rate by 17%. The total fertility rate, which had previously been increasing, has acquired negative dynamics since 2018 (2019 – 2.09, 2020 – 1.93). Only in the rural population this indicator exceeds the level of simple reproduction (2.59 – 2021). The ratio in the distribution of births by birth order changes. Although the share of children third or more in birth order in 2021 increased slightly compared to 2018 (from 30% to 31.7%), the absolute numbers of those born decreased slightly (2021 – 4899 children, 2022 – already 4866 children). In the area of population mortality, there are much more serious problems that make it possible to position them as the main threats to the demographic security of the region. This is a high proportion of deaths in working age, excess mortality among men, high population losses as a result of external causes of death. The latter acts as one of the significant points in the characteristics of mortality in the region. The excess mortality of men, which is generally characteristic of mortality processes, in the case of external causes of death manifests itself even more clearly. As a result of problems in mortality, life expectancy did not reach 70 years until 2021. The excess mortality of men also determines their lag in life expectancy. Changes in the processes of fertility, mortality and migration directly affect the age structure of the population; The population is aging. The share of the elderly population has more than doubled since 1990: from 6.7% to 16.4% in 2022. The aging of the population occurs simultaneously with a reduction in the proportion of children, which is typical for almost all regions of Russia. In a certain sense, the risks of demographic security include the presence of significant territorial differentiation in the reproduction of the population of the republic, which necessitates the development of special measures to save the population separately for groups of territories or population groups. This applies primarily to the northern and Arctic municipal regions of Yakutia. Thus, the main threats to demographic security in the republic include a negative migration balance, a reduction in the birth rate, the presence of high losses of the working-age population, the persistence of excess male mortality and a low level of life expectancy, which ultimately affects the lack of significant demographic growth. A survey of 879 indigenous women (Nenets) of the Arctic zone of Western Siberia was conducted. Reproductive health indicators were analyzed depending on age, area of residence, nomadic or sedentary lifestyle, social factors and education, the presence of genital and extragenital pathology for the period 2018–2021. The reproductive health of women in the Tazovsky and Yamal regions is characterized by a higher birth rate and a low level of artificial termination of pregnancy,

but, due to the extreme living conditions in the tundra, a high level of spontaneous termination of pregnancy. On the contrary, in the Nadym region, the level of induced abortion is higher, and the level of birth rate and spontaneous abortion is low. Among the indigenous inhabitants of the tundra, Despite the extreme living conditions in the plague and the generally low level of education, we note a significantly higher number of pregnancies and births, as well as spontaneous abortion, but less frequent artificial termination of pregnancy and the lowest level of gynecological pathology. They also have an earlier onset of menopause; From extra genital pathology, they often suffer from chronic bronchitis. Among the indigenous residents of national villages, despite more comfortable living conditions in the village and, generally, an average level of education, we note a higher level of gynecological diseases with an inflammatory component and from extra genital pathology - a high incidence of excess body weight. Noteworthy is the lower number of registered marriages and the high level of widowhood and living alone compared to residents of the tundra. Living in the Far North is accompanied by contact with a number of negative natural factors; for women, the target of the negative impact of these factors is a woman's ability to conceive, bear and give birth to healthy offspring. The health of indigenous women living in the tundra requires close attention. The nomadic lifestyle creates significant difficulties in providing quality medical care, especially during pregnancy. The study of the reproductive function of indigenous women living in the Arctic zone of Western Siberia is especially relevant not only from a medical and social perspective, but also important in terms of preserving the people. 879 people were examined, of which 627 were indigenous residents (Nenets) of the Yamal, Nadym and Tazovsky districts of the Yamalo-Nenets Autonomous Okrug. An analysis of reproductive losses and mortality of children was carried out depending on ethnicity, area of residence, nomadic or sedentary lifestyle for the period 2018–2021 by analyzing scientific medical literature and our own research conducted in the form of a survey of the female population. When surveying respondents, information on the course of 1650 pregnancies was summarized. To assess the significance of differences between groups, the χ^2 criterion was used. The significance of the differences was considered established at $p < 0.05$. Among respondents, such a pregnancy outcome as the birth of children was almost twice as common among people living in the Tazovsky (51.0%) and Yamalsky (44.9%) districts of the Yamal-Nenets Autonomous Okrug compared to residents permanently residing in the Nadymsky district of the Yamal-Nenets Autonomous Okrug (29.7%) ($\chi^2 = 28.8$; $p < 0.001$ and $\chi^2 = 11.8$; $p < 0.001$). Such a serious complication of reproduction as the threat of termination of pregnancy,

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on the contrary, was twice as common among residents of the Nadymsky district (31.3%) compared to respondents from the Tazovsky district (9.4%) ($\chi^2=50.5$; $p<0.001$) and Yamal (12.9%) ($\chi^2=23.5$; $p<0.001$) districts of the Yamal-Nenets Autonomous Okrug. Among respondents, the birth of children was 60.0% more among indigenous people living in the tundra (66.7%) compared to newcomers (41.4%) ($\chi^2=29.0$; $p<0.001$). Artificial termination of pregnancy was almost twice as often among non-resident respondents (50.0%) compared with native village residents (28.0%) ($\chi^2=73.7$; $p<0.001$) and five times more often when compared with indigenous tundra inhabitants (7.8%) ($\chi^2=82.3$; $p<0.001$). Spontaneous miscarriage, on the contrary, was three times more common among indigenous tundra residents (25.5%) compared to migrant respondents (8.6%) ($\chi^2=30.8$; $p<0.001$) and twice as often compared to indigenous village residents (12.9%) ($\chi^2=17.3$; $p<0.001$). The death of children under 18 years of age among indigenous tundra residents (24.4%) is three and a half times more common ($\chi^2=36.8$; $p<0.001$) compared to indigenous village residents (6.8%) and eight times more common among compared with the newcomer (2.9%) female population ($\chi^2=41.7$; $p<0.001$). Residents of the Northern Territories, in comparison with residents of temperate latitudes, are characterized by: early aging, the development of dystrophic changes in the reproductive system, reproductive pathologies, and early onset of menopause. The state of reproductive health is heterogeneous among different groups of women: local Caucasian, aboriginal nomadic and sedentary populations, which is associated with the characteristics of life, health care and length of residence in extreme conditions. Positive socio-economic changes have led to an increase in life expectancy, and as a result, a lengthening of the menopause period in women. Early studies showed differences in endocrine profiles between Aboriginal and Caucasian populations in the

North, primarily before menopause. We examined 188 postmenopausal women living in the European North: Arkhangelsk region, Mezen district, Soyana village (65°46' N), Sovpolye village (65°17' N), Dolgoshchelye village (66°05'N); Nenets Autonomous Okrug, village Nelmin Nos (67°58'N); Yamalo-Nenets Autonomous Okrug: s. Se-Yakha (70°10' N), village. Tazovsky (67°27' N), village. Gyda (70°53'N). Of these, 76 people are the local Caucasian population, living here for three or more generations, 26 people are the nomadic aboriginal population, 86 people are the settled aboriginal population. Health status and socioeconomic living conditions were determined by questionnaire. Blood collection, preparation and storage of serum and plasma were carried out in accordance with GOST R 52623.4-2015, clause 9 and GOST R 53079.4-2008. Hormone levels were determined using an ELISYS Uno plate ELISA analyzer (Human, Germany), kits produced by DRG and Labor Diagnostika Nord (Germany), Hema-Medica and Alkor Bio (RF). The norms of these sets are taken as normative values. Statistical processing was carried out using Statistica 10.0. Based on the results of the Shapiro-Wilk test, nonparametric analysis methods were selected. The results are displayed as Median, 10th and 90th percentiles, then Me (10%; 90%). The significance of differences between indicators was identified using the Mann-Whitney U test. Differences were considered statistically significant if the probability of incorrectly accepting the null hypothesis of equality of medians was $p \leq 0.05$. P values from 0.05 to 0.1 were considered as a trend (t). The greatest number of differences between the levels of endocrine indicators of the reproductive system in postmenopausal women was identified in the group of the local Caucasian population compared to the aboriginal population; the differences in the groups of nomadic and sedentary women are minimal (Table 3).

Table 3. Levels of sex hormones, androgen binding globulin, antisperm antibodies and dopamine in postmenopausal Northern women.

Hormone name - (normal values)	Local Caucasian population	Nomadic aborigines	Sedentary Aborigines	p values
	1	2	3	
	Meh (10%; 90%)	Meh (10%; 90%)	Meh (10%; 90%)	
N	76	26	86	
Age	57.00 (48.00; 69.00)	55.50 (48.00; 65.00)	56.00 (50.00; 67.00)	

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Luteinizing hormone (5.0-57.0 IU/l)	24.71 (6.48; 46.90)	21.46 (7.78; 34.55)	20.09 (5.52; 34.15)	1-3 = 0.034
Follicle-stimulating hormone (10-150 IU/l)	46.42 (25.82; 95.93)	57.51 (8.40; 87.90)	62.22 (5.02; 92.03)	
Prolactin (1.9-26.4 ng/ml)	9.28 (5.08; 19.20)	12.77 (7.24; 22.28)	11.30 (7.38; 25.79)	1-2 = 0.030 1-3 = 0.021
Progesterone (0-2.3 nmol/l)	5.45 (0.40; 11.40)	2.83 (0.72; 7.98)	3.95 (1.77; 8.59)	1-2 = 0.065 (t) 1-3 = 0.072 (t)
Estradiol (0.07-0.23 nmol/l)	0.160 (0.090; 0.360)	0.178 (0.089; 0.82)	0.148 (0.088; 0.258)	
Total testosterone (0.5-4.3 nmol/l)	1.82 (0.88; 2.79)	1.34 (0.43; 2.40)	0.92 (0.51; 2.51)	1-2 = 0.055 (t) 1-3 = < 0.001
Testosterone free (<55 years - 0.0-2.9, > 55 years - 0.0-1.6 pg/ml)	1.23 (0.30; 3.35)	0.66 (0.07; 1.65)	0.72 (0.18; 2.25)	1-2 = 0.020 1-3 = 0.031
Dehydroepiandrosterone sulfate (DHEA-S) - (0.27-6.75 µmol/l)	3.00 (1.20; 5.97)	2.52 (1.75; 6.62)	5.44 (1.48; 8.81)	1-3 = 0.040 2-3 = 0.064 (t)
Androgen binding globulin (15-120 nmol/l)	53.42 (25.90; 142.35)	86.55 (45.42; 334.71)	100.85 (45.77; 294.90)	1-2 = 0.010 1-3 = < 0.001
Antisperm antibodies (0-60 IU/l)	20.41 (5.87; 29.47)	40.55 (29.96; 47.30)	38.90 (27.97; 52.00)	1-2 = < 0.001 1-3 = < 0.001
Dopamine (<0.653 nmol/l)	0.402 (0.000; 0.573)	0.412 (0.000; 3.079)	0.263 (0.000; 0.686)	1-3 = 0.061 (t)

Living in similar climatic conditions, but different degrees of adaptation to them and way of life are the main reasons for such significant differences in the endocrine status of the local Caucasoid in relation to the aboriginal population. The latter showed significantly higher levels of prolactin, DHEA-S, androgen binding globulin and antisperm antibodies, as well as significantly lower or trending levels of total and free testosterone, progesterone, luteinizing hormone, in relation to the local Caucasian population. The savings of the population in the northern regions largely depends on the mortality rate of the population, which is associated with losses of demographic potential along with migration outflow.

The specific age structure of the population of the Republic of Sakha (Yakutia) ensures a relatively low overall mortality rate. However, there is a high proportion of deaths in working age, and this figure for men during 2010–2021. 2 or more times higher than the same figure for women. The male population has the greatest problems in preserving demographic potential. Excessive male mortality as a serious problem of demographic security has been observed for a long period of time, and in working age it is much higher than the index for the population as a whole. The indices in excess of male mortality from external causes of death are very high (Table 4).

Table 4. Male excess mortality index in the Republic of Sakha (Yakutia) for 2016-2021.

	2016	2017	2018	2019	2020	2016/2021
From all reasons	1.66	1.75	1.69	1.55	1.48	0.89
From external causes of death	4.51	4.77	4.08	4.57	4.47	0.99
From all types of transport injuries	3.38	3.72	3.80	3.67	2.96	0.88
From suicide	5.54	6.04	4.25	4.63	6.26	1.13

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From murders	5.36	5.95	5.25	10.46	4.45	0.83
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The most serious threat in terms of mortality in the region is high mortality due to external causes, which until 2022 were in 2nd place in the structure of causes of death. In 2021, they accounted for 16.2% of the total number of deaths (compared to 24.6% in 1990). In men, this class of causes of death retained its second position in the structure of causes of death. The external mortality rate is especially characteristic for the northern and Arctic regions of the republic. During

2000–2018 the mortality rate from external causes of death decreased from 164.4 to 135.4 (for both sexes). Decrease in the absolute number of deaths from external causes for 2000–2018. is accompanied by positive dynamics in reducing the share of these causes of death in the total number of deaths (Table 5).

Table 5. Dynamics of deaths from external causes for 2000-2018, people.

	2000	2003	2006	2010	2013	2014	2015	2016	2017	2018
Deaths, total, people.	7470	9325	9696	9402	8992	8918	8351	8239	8165	8053
Died from external causes, people.	1836	2341	2186	1872	1740	1637	1533	1482	1392	1302
Share in the total number of deaths, %	24.58	25.10	22.55	19.91	19.35	18.36	18.36	17.99	17.05	16.21

The predominant causes of external mortality are suicides and murders. In total, in 2018 they accounted for 37.1% of the total number of deaths from external causes (47% in 2017). An increase in the mortality rate was typical for suicides (1.4 times). For other reasons, a decrease was noted: from murders (1.2 times), from accidental alcohol poisoning (1.5 times). The most favorable dynamics of deaths due to road accidents (for 2000–2018 by 38.9%). A specific characteristic of mortality from external causes is the high proportion of deaths of working age. The predominant causes of external mortality are suicides and murders. In total, in 2018 they accounted for 37.1% of the total number of deaths from external causes (47% in 2017). Thus, problems in the field of mortality pose one of the main threats to the demographic security of the northern region. Among measures to reduce mortality, priority should be given to measures to reduce external mortality, mortality of the working-age population and excess mortality of men. In measures to reduce external mortality, paramount importance should be given not so much to medical prevention, but mainly to social prevention measures, which will be more effective in reducing the scale of mortality from external causes. Solving problems in the field of protecting health and increasing the efficiency of the health care system for indigenous peoples of the North is justified by the general direction of state policy and is one of the most important conditions for the socio-economic development of the region. In the Yamalo-Nenets Autonomous Okrug, a state policy is being pursued, which includes various measures regarding the

indigenous peoples of the North, aimed at improving the quality and standards of life of the indigenous peoples of the North, creating favorable conditions for a long, safe, healthy and prosperous life. Despite the success of the ongoing activities, there are problems in the healthcare sector regarding the difficulty of providing medical care in remote and hard-to-reach areas, especially in cases of pregnancy and childbirth, as well as diseases of infants under one year old. Infant mortality deserves special attention, since its level largely characterizes not only the general health of newborns, but also affects the life expectancy rate. In recent years, there has been a downward trend in infant mortality rates overall in the Yamalo-Nenets Autonomous Okrug, but at the same time they remain quite high in rural areas. In 2017, the infant mortality rate in places of traditional residence and traditional economic activities of indigenous peoples was 14.75 %. In 2018, the largest number of deaths was registered in the Yamal (6 infants) and Tazovsky regions, the main cause of which is acute pneumonia. The reduction in indicators was achieved through measures aimed at improving medical care for pregnant women and children, among which can be identified, namely:

- *advanced training of obstetricians and gynecologists (including through remote webinars);
- *providing the population with means of communication in order to ensure life safety and preserve health;
- *the work of the Commission to analyze the causes of maternal, perinatal, infant and child

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mortality (supervised by the Governor of the Autonomous Okrug);

–*developed methodological recommendations and memos for parents (concerning the most dangerous conditions in children, the most common symptoms and syndromes of diseases in which first aid is important in preventing the development of complications);

–*the work of sanitary assistants (allows first aid to be brought closer directly to the tundra camp);

–*organization of re-evacuation (this solution allows patients to be delivered to their place of permanent stay after discharge from hospitals).

These and other activities are reflected in documents such as: “Strategy for the development of healthcare of the Yamalo-Nenets Autonomous Okrug for the period until 2035”, “Information on the results of the activities of the Department for the Affairs of Indigenous Minorities of the North of the Yamalo-Nenets Autonomous Okrug in 2021”, “Resolution of the Governor of the Yamalo-Nenets Autonomous Okrug dated December 28, 2021 No. 132-PG “On approval of the People’s Program of Indigenous Minorities of the North in the Yamalo-Nenets Autonomous Okrug.” Despite the in-depth study of this problem, several areas can be identified that will improve the efficiency of providing assistance to pregnant women and children, namely:

*implementation of a satellite tracking system for the movements of families of tundra dwellers (will allow rescue services to track the location of nomads in the event of an emergency, which is especially important if a pregnant woman refuses prenatal hospitalization);

*providing hospitals with all-terrain vehicles (allows to increase the availability of medical care);

*maintaining information databases for complete records of pregnant women and children who may need medical care and who live in hard-to-reach areas (this measure will make it possible to have information about families in which there is a possibility of infant death);

*introduction of remote telecommunication technologies for the provision of medical care (allows you to identify and diagnose diseases without leaving your place of permanent residence, and increases the possibility of contacting when the first symptoms of disease appear).

The main problem is related to the accessibility of care and these measures are aimed specifically at increasing the efficiency of providing medical care and introducing specialized and high-tech assistance to the indigenous peoples of the North of the Yamalo-Nenets Autonomous Okrug, paying special attention to improving medical care for the nomadic population, families of reindeer herders who have children under one year of age or pregnant women. The territory of the Yamal Peninsula has the most severe climatic and geographical conditions, manifested in the influence

of extreme values of average monthly temperatures and air humidity, and wind speed. The population uses an open hearth to heat their homes most of the year. In total, cold and exposure to pollutants from an open lesion leads to a high prevalence of chronic non-obstructive bronchitis. The anthropogenic and technogenic impact of oil and gas infrastructure on the health of Arctic aborigines is one of the most important. We investigated the question of whether the increase in the prevalence of chronic non-obstructive bronchitis occurs due to the proximity of oil and gas production facilities and settlements among the indigenous inhabitants of the tundra. The object of the study was the inhabitants of the tundra of the Tazovsky region (which does not yet have a long history of developing oil and gas fields). A total of 242 indigenous people of the tundra were examined. The diagnosis of chronic non-obstructive bronchitis was established according to the WHO definition with normal indicators of external respiratory function. According to the results of the study, the prevalence of the disease among residents of the tundra was: Yeseyakhinskaya - 40.0%, Tanamskaya - 40.0%, Tazovskaya - 11.1%, Yuribeyskaya - 33.3%, Gydanskaya - 31.1%, Mesoyakhinskaya - 40.9 %, Antipayutinskaya and Nakhodkinskaya - 50.0%. Consequently, the prevalence of this disease (chronic bronchitis) is not affected by oil and gas production facilities, since there are no production facilities in the areas of maximum prevalence of chronic non-obstructive bronchitis. Gas and oil production facilities are located in the south of the Tazovsky Peninsula, and not in the north and central part of the Tazovsky region, where the most unfavorable situation is in terms of the prevalence of chronic non-obstructive bronchitis. Industrial transformation in the Arctic regions of the Yamal-Nenets Autonomous Okrug over the past decades has subjected the “lifestyle” of indigenous residents to serious changes. The development of the gas and oil industries leads to a significant reduction in pastures and the number of deer. Increasingly, there is a transition to a sedentary lifestyle. Psychological and social adaptation of indigenous people to new conditions inevitably leads to the formation of a new behavioral stereotype. The level of mental health, violation of mental adaptation, of the population becomes the main subject of study, since complete mental health is regarded as optimal adaptation, in which the interaction of a person with his biological and psychological aspects determines not only the level of psychological health, but even when diseases occur, it affects the clinical manifestations, course and further prognosis. Purpose of the study: to conduct a level assessment of the state of neuropsychic adaptation among indigenous residents, in conditions of lifestyle transformation, living in the Arctic region of the Yamal-Nenets Autonomous Okrug. The study included 232 practically healthy people, from among the

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indigenous small population of the Yamal-Nenets Autonomous Okrug (Nenets), living in the village. Nori, Kutopyugan, Nadym district, village. Antipayuta, Tazovsky village, Tazovsky district.

Significantly more women took part in the study compared to men at $p < 0.01$.

Table 6. Prevalence of “current complaints-symptoms” among respondents with different levels of neuropsychic adaptation %

Symptoms	Second group Psychoadaptive states	Third group Psycho maladaptive states
1. Feeling of general weakness and lethargy	72.5	67.0
2. Fatigue, feeling tired	59.6	52.4
3. Concern about the possibility of serious illness	59.6	50.0
4. Decreased, bad depressed mood	50.0	59.7
5. Increased heart rate	-	52.4
6. Headaches	48.3	45.1
7. Insomnia, sleep disorder	40.2	45.1
8. Changes in mood for no apparent reason	-	43.9
9. Lack of self-confidence and self-confidence	-	43.9
10. Feeling anxious	-	42.6
11. Increased irritability, short temper	46.7	41.4
12. Tearfulness, tendency to tears	-	36.5
13. Feeling of a “lump” in the throat	-	36.5
14. Strong feelings of guilt	-	36.5

The comparative analysis showed that as the adaptive functions of the body decrease, the prevalence of “current complaints”, both psychosomatic and psychosocial, increases. In the group of respondents with psychoadaptive conditions and in the group with psychodisadaptive conditions, the prevalence of psychosomatic “current complaints” was equally often noted: a feeling of general weakness and lethargy - 72.5% and 67.0%; fatigue, feeling tired 59.6% and 50.0%. Complaints of a psychosocial nature were quite high in both groups, such as: fear and apprehension about the possible occurrence of a serious illness - 59.6% and 50.0%; reduced bad and depressed mood was noted in 50.0% and 59.7% of cases. The analysis showed that among respondents in the third group, “current complaints” were represented to the maximum, but not only isolated symptoms were encountered, but their combinations were observed: sleep disturbances and fatigue, a feeling of fatigue was noted in 25.6% of cases. Concern about the possible occurrence of a serious illness and a feeling of general weakness and lethargy were noted by respondents in 36.5% of cases, headaches, and decreased depressed mood in 20.7% of cases. The correlation analysis carried out separately in each group showed that in the group with (non-pathological mental maladjustment), the closest direct connections of the total score (SPA) with social factors were identified: fear of a serious illness ($r=0.37$ at $p < 0.002$), with sleep disturbances ($r=0.31$ at

$p < 0.014$), and a weak connection with the factor characterizing the emotional background - low mood and depression ($r=0.25$ at $p < 0.05$). In the third group with psycho-disadaptive states (pre-pathology), the most widely represented relationships between the total score (TSS) and symptoms and complaints characterizing the psycho-emotional state. A direct correlation was found with irritability, short temper, increased anxiety, and decreased depressed mood ($r=0.42$ at $p < 0.001$). Significant relationships were identified with factors reflecting activity and performance: feeling of weakness, lethargy, fatigue, feeling tired ($r=0.42$ at $p < 0.001$). Direct connection with psychosomatic complaints: headaches, feeling of a “lump” in the throat” ($r=0.42$ at $p < 0.001$). With psychosocial factors: difficulties in communication ($r=0.41$ at $p < 0.001$), fear of the possible occurrence of a serious illness ($r=0.30$ at $p < 0.06$). A weak direct correlation was noted with loss of interest in life, indifference to everything that happens ($r=0.23$ at $p < 0.03$). Our studies have shown that individuals with optimal adaptation with prognostically favorable indicators accounted for about forty percent, which is 1.4 times more than individuals with signs of neuropsychic adaptation disorders. A pronounced decrease in adaptive potential was noted in the group of people with a psychodesadaptation state (prepathology), who had a high prevalence of “current complaints-symptoms”. Increased maladaptive symptoms, accompanied by a wide range of

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psychosomatic and psychosocial complaints, may be the first symptoms of diseases. It is necessary to conduct an in-depth psychodiagnostic and medical examination with this group of respondents, in combination with methods of psychological or (psychotherapeutic correction). In this regard, the development of a system of psychological assistance to residents of ethnic villages in YAMAL remains a very important task. Food security is an important component of national economic security of both the country as a whole and a particular region. In accordance with the policy documents of the Food and Agriculture Organization of the United Nations (FAO) and the “Doctrine of Food Security of the Russian Federation” (2001), this concept is used to characterize the state of the national or world food market and is interpreted as “the conditions under which people at any time have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary and nutritional needs and preferences for an active and healthy life” (FAO, 2021). Its components are food independence, physical and economic accessibility of food, and its safety for the consumer. Food security involves solving the following main tasks, namely:

- *providing the population of the territory with food products according to scientifically based standards without infringing on the competitiveness of the domestic food market and the interests of economic security;

- *protection of the population from low-quality imported and domestic food products, provided on the basis of control of quality characteristics according to established parameters in the monitoring mode;

- *continuous improvement of nutritional standards for gender and age groups of the population, especially in environmentally unfavorable regions, and stimulation of consumer interests in purchasing products that improve human health;

- *formation of the required size of reserve food funds for their use in the event of extreme situations (natural disaster, lean years, military conflict, etc.).

Despite the presence of program documents that secure the priority status of the problem of food security in the Russian Federation, in some regions (especially in the Arctic) it is very acute. Moreover, according to Professor V.A. Ivanova, “In terms of the degree to which the population is provided with medical nutrition standards through its own production, Russia is one of the countries that do not ensure the food security of the state.” This increases the significance of this problem and requires the development of emergency measures not only at the local but also at the federal level. Food security in the Russian Federation should be considered diversified even at the regional level, if it is identified with the concept of a subject of the federation. This is especially true in the Arctic zone of the Russian Federation, where there is a significant differentiation

in the level and quality of life of the permanent population living in populated areas and indigenous peoples leading a nomadic lifestyle. The significance of this distinction is noted by the Food and Agriculture Organization of the United Nations through the FAO Policy on Indigenous and Tribal Peoples (Rome, 2016). She estimates that indigenous peoples make up approximately 5% of the world's total population (and 15% of the total population of the Russian Arctic), but they account for 15% of the total number of people living below the poverty line. Indigenous peoples are at greater risk of food insecurity than other populations “due to high levels of poverty, declining resource availability and increasing dependence on cheaper, highly processed foods.” During the World Food Summit in November 2009, FAO Member States committed to “actively promote the consumption of foods, especially locally available foods, that diversify and balance diets as the best means of addressing micronutrient deficiencies and other forms of malnutrition, especially among vulnerable populations.” For indigenous peoples, food security also means the right to choose food and prepare it according to traditional methods. A sustainable food system using local foods ensures the preservation of ecosystems and traditions of indigenous peoples. Thus, the right to food is closely linked to the realization of cultural rights, and both rights must be realized together. In 2018, FAO prepared a regional review of the state of food security problems in Europe and Central Asia for 2021 and 2022. Analysis of the statistics showed that there were a range of issues that required attention, including rural deterioration, persistent poverty, poverty-driven migration, unsustainable use of natural resources and threats posed by climate change, as well as changing dietary patterns. In such circumstances, policy responses must be aimed at coherently addressing the underlying economic, social and environmental challenges to food security through interventions at the national and local levels. However, the FAO conclusions in relation to Russia are based primarily on statistical data collected at the level of federal subjects, and, therefore, do not reflect the real differentiation of the “degree” of food security problems in urban and rural areas, among the permanent population of municipalities and indigenous peoples leading a traditional way of life. There are practically no data on monitoring the level and quality of life of the latter in the Arctic region. The exception is a significant corpus of publications on nutrition and food security among the indigenous people of Alaska, as well as scientific works by employees of the State Institution of the Yamalo-Nenets Autonomous Okrug “Scientific Center for Arctic Studies”. According to FAO and the World Health Organization (WHO), global factors affecting the security of the food supply, including among indigenous peoples, are:

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*rapidly rising fuel prices with a dual effect: increased production costs and increased sales costs;

*extreme weather conditions in the main cereal producing countries;

*declining global cereal stocks as growing demand gradually (especially since 2005) outpaces supply;

*increasing demand for biofuel products;

*growing demand for food in emerging economies;

*impacts of climate change on agriculture, fishing, hunting and gathering.

Along with these problems, among the indigenous peoples of the Arctic, food security takes on specific features. Thus, in May 2022, the Inuit Circumpolar Council (Canada) prepared a background document of the Steering Committee in the field of health strategy for the Inuit of the Arctic region, "Food security in the Arctic region," which formulated two main problems in this area for indigenous peoples living in the Arctic region, and exactly:

*high prices, often combined with economic vulnerability;

*decrease in consumption of products provided by flora and fauna. The situation is complicated by environmental pollution and global climate change.

When developing specific ways to solve the problem of food security for the population of the Arctic territories, it is necessary to take into account its specific features. The most significant of them include:

–*low food self-sufficiency due to limited production capabilities in extreme natural conditions and dependence of the population's food supply on imports;

–*small rural population and poor provision of agricultural resources;

–*insufficient development of the agri-food sector and rural infrastructure;

–*lack of stable connections with areas of food production imported to the Arctic and subarctic regions;

–*focal nature of settlement and seasonal delivery of food to inland areas [10].

However, the development of logistics infrastructure and provision of regular food supplies will not completely solve the problem of food security of the indigenous peoples of the Arctic region. The guarantor of their savings can be, first of all, the preservation of traditional food patterns. This is only possible if the traditional economic activities of the nomadic population (reindeer herding and fishing) are developed and supported. And this, in turn, means the need to solve a complex of strategic problems, namely:

–*the development of biotechnologies that create demand for the procurement of plant raw materials, which will allow the indigenous population

leaving reindeer herding to switch to the procurement of raw materials, while continuing to lead a traditional way of life in the tundra. Increasing the profitability of procurement of reindeer herding products;

–*support for a traditional economy focused on the procurement of venison, or integration into the world economy through the development of antler reindeer husbandry;

–*transition to modern technologies for supplementary feeding of reindeer and development of penned reindeer husbandry;

–*preserving the nature of the tundra from overgrazing;

–*adherence to the historically established principle of common use of pastures, or transition to land surveying and the introduction of the concept of "ancestral lands";

*creation of a risk management system in reindeer husbandry based on the development of a scheme for the optimal use of pastures, forecasting overgrazing, preventing epizootics and deaths of reindeer based on remote monitoring of the condition of pastures, the movement of reindeer herder families and reindeer herds;

*monitoring the consumption of traditional foods and the medical and social well-being of the indigenous population. Development of consumption standards for various population groups. Studying ways to enrich the diet while reducing the consumption of traditional foods;

–*analysis of indicators of the family economy of residents of the tundra and national villages. Study of the transformation of reindeer herding culture;

–*creating economically advantageous conditions for reindeer herders to supply venison to national villages.

A comprehensive solution to the problems of traditional types of economic activity, as well as reasonable participation in providing food to the territories inhabited by indigenous peoples, will create favorable conditions for reducing the threat to food security and saving the indigenous population of the Arctic region. The involvement of Arctic territories in economic circulation, which are the resource storehouse of the Russian economy, causes population growth. A fruitful life in extreme climate conditions is possible with adequate nutrition. Affordable, high-quality food supply for the population of the Arctic zone of the Russian Federation (AZRF) is based both on local agricultural production and fishing, and on the import of food from other territories. This determines the specifics of food security in the Arctic territories. The term "food security", accepted in world practice, is used to characterize the state of the food market of a country, region and the world food market. In the materials of the Food and Agriculture Organization of the United Nations (FAO), the "Doctrine of Food Security of the Russian Federation", the components of food security are food

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independence, physical accessibility of food, economic accessibility of food, food safety for the consumer. Theoretical and methodological aspects of food security are constantly evolving. Currently, food security is interpreted as the satisfaction of each social group of the population with quality food according to rational consumption standards. The principle of food independence is unacceptable for regional food security. Self-sufficiency of the region is possible only with those food products for the production of which there is a high bioclimatic potential, land and labor resources. Food self-sufficiency is unattainable in regions with unfavorable conditions for agricultural development, primarily in the Arctic zone. So the level of self-sufficiency of the population in food consumption in the Murmansk region. in 2021 it amounted to 6.2% for potatoes, 0.4% for vegetables, 7.8% for meat, 8.1% for milk, 3.8% for eggs, and 0.3% in the Chukotka Autonomous Okrug; 6.5; 34.9; 0.2 and 2.4%. When justifying approaches and aspects of food supply for the population of the Arctic territories, it is necessary to take into account the following features, namely:

*low food self-sufficiency due to limited local production of agricultural products;

*dependence of the population's food supply on imports;

*low rural population and availability of biological resources;

*lack of stable connections with areas of food production imported to the Arctic regions;

*focal nature of settlement and seasonal delivery of food to inland areas.

Local agricultural production, due to unfavorable extreme conditions for development, is not able to provide the population with its own food. The basis for food supply for the population of the North and the Arctic is formed by the import of food products from other regions of the country and from abroad. An analysis of food imports into the Komi Republic showed that in 2021, 46.7 thousand tons of meat and meat products were imported into the region, which is 221% of the size of its own production, 174.7 thousand tons of milk and dairy products (309%), 134.2 million pieces eggs (113, 59.7 thousand tons of vegetables and melons (280%). Now the share of imports of food products of animal origin from the size of own production significantly exceeds this figure in 1990. The Russian Arctic is characterized by a low rural population. If in Russia as a whole the share The rural population is 26%, then in the Arctic zone it is only 12% (Table 7). With a small share of the rural population, its size in the subjects whose territories are entirely included in the North and Arctic zone decreased by 461 in 2000–2021. 6 thousand people Analyzing the current and future state of food self-sufficiency of the population of the Arctic, one should, first of all, proceed from their natural and resource potential. Here, compared to Russia, the provision of biological resources is significantly lower, with the exception of the number of deer per capita (Table 8).

Table 7. Share of rural population as of January 1, %

Country, region	2001	2005	2009	2013	2017	2021
Russia	27	27	26	26	26	26
Regions of the Far North and equivalent areas	23	23	22	22	21	21
Arctic zone*	12	eleven	12	12	12	12

Table 8. Availability of agricultural resources (per 100 people) in 2021

Country region	Cultivated area, ha			Cattle	Including cows	Pigs, goal.	Reindeer, goal.
	cereals	potato	vegetables				
Russia	31.9	1.5	0.5	13.0	5.7	14.7	1.1
Regions of the Far North and equivalent areas	0.8	0.8	0.2	8.7	3.8	2.4	16.1
Arctic zone	-	0.07	0.0	0.7	0.3	0.8	80.5

In the Arctic zone of the Komi Republic, compared to other territories, the per capita provision of farmland is 4.1 times lower, cattle – 430 times, pigs – 36 times lower. Moreover, with the population declining in 2000–2021. 2 times, the provision of

sown areas per capita was 4 times. Low provision of biological resources, unfavorable conditions for agriculture (lack of heat, short growing season, poor soils, excess moisture) hinder the population's self-sufficiency in local food products. Taking into

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account the peculiarities of agricultural production in the Arctic zone, in the future it is necessary to place emphasis on the municipalities of the southern and central regions of the North with more favorable conditions for the functioning of agriculture, as well as on the formation of rear food bases located in favorable agricultural regions adjacent to the Northern zone. An important role in food supply for the population of the Arctic territories belongs to agriculture and fishing. Own agricultural production and commercial farming here is aimed at supporting the population with meat, milk, sea, river and lake fish, eggs and greenhouse vegetables, and wild plants. These food products, as well as cranberries, lingonberries, cloudberries, blueberries, are indispensable in the balanced diet of Arctic residents, being at the same time medicines. Agriculture and fishing in the northern and Arctic territories has a long history. It developed along with the development of natural resources. Its specialization was formed under the influence of natural conditions, geographical location, natural-historical and socio-economic factors in the production of low-transportable and perishable products and products of traditional industries. The share of the North and Arctic zone in the population of the Russian Federation is 6.8%, the area of farmland is 2.5, and the number of cattle is 4.5%. In the northern and Arctic territories there are 1,605 thousand animals. domestic reindeer, or about 2/3 of the world's population. Of the total agricultural production in Russia in 2021, 3.3% of potatoes, 2.0 of vegetables, 2.3 of milk, and 1.4% of meat (by weight) were produced here. The share of fish catch from seafood production was 50.6%. Due to the reduction in production, the share of the northern and Arctic territories in the total agricultural production of the country is decreasing. Natural conditions in the Arctic zone hinder the development of agricultural production. Favorable conditions and competitive opportunities for agriculture are: long daylight hours during the growing season, good supply of moisture to plants; significant tracts of forage lands, including floodplain meadows, labor resources; good opportunities for the production of organic products in environmentally friendly areas; industrial nature of the economy, allowing significant financial resources to be directed to modernize the industry and comprehensive development of rural areas; presence of significant potential of agricultural science. The products of traditional industries are competitive not only in the regional, but also in the national and international food markets. Market reforms have had an extremely negative impact on agriculture. Moreover, the rate of decline in the volume of vegetables, livestock and poultry products in the Arctic zone was higher than in the North zone. In the Russian Arctic for 1990–2015. the production of vegetables decreased by 15 times, meat by 3.7 times, milk by 4.5 times, eggs by 34 times. In the Northern

zone during this period, meat production decreased by 3 times, milk by 2.7 times, and eggs by 3.8 times. Since 2005, there has been a slight increase in meat production due to an increase in venison. For 1990–2015 in all categories of farms in the North and Arctic, the number of deer decreased by 41%. The number of domestic reindeer fell especially sharply in the Chukotka Autonomous Okrug (3.2 times). An increase in the number of deer during the years of reforms occurred in the Yamalo-Nenets Okrug (by 50%). Since the beginning of the 2000s. The number of deer is growing in all regions of the North and the Russian Arctic with the exception of the Murmansk, Magadan and Sakhalin regions. Rapid growth of the reindeer population in the Yamalo-Nenets Autonomous Okrug in the late 1990s – early 2000s. led to degradation of the vegetation cover of reindeer pastures. The reindeer capacity of pastures in the district, according to ecologists, is 386 thousand animals, and at the beginning of 2016 there were 733.5 thousand. On the Yamal Peninsula, 300 thousand reindeer are currently grazed, and there may be less than 100 thousand animals. This factor, as well as the abnormally hot summer of 2016, caused an outbreak of anthrax in Yamal. To stop the degradation of tundra ecosystems in Yamal, the number of deer will have to be reduced by at least 200 thousand heads. The development of reindeer husbandry in the northern taiga will contribute to the preservation of depleted tundra pastures from irreversible degradation in a number of regions of the North and Arctic. Currently, there is positive experience in forest reindeer husbandry in the Khanty-Mansi Autonomous Okrug, Trans-Baikal Territory and Yakutia. Forest reindeer husbandry in Komi was widely used in the 20-30s of the last century. Then, before the start of market reforms, it successfully developed at the Pomozdinsky state farm. The reduction in agricultural production has led to a constant decrease in the supply of local food products to the population. An assessment of the ratio of the level of consumption of own food per capita to rational consumption standards in the Arctic zone indicates a decrease in this indicator for meat, milk, eggs and vegetables during the reform period. A particularly significant reduction in indicators was observed in the Murmansk region. and Chukotka Autonomous Okrug. The priorities for the development of our own agricultural production are: innovative modernization of food production; improvement of specialization, cooperation and integration; ensuring sustainable sales of products; transition to targeted management of each municipality's own food sector; formation of an effective organizational and economic mechanism.

The use of selection-genetic, technical-technological organizational-economic and socio-ecological innovations will allow the formation of the fifth and sixth technological structures in the agricultural sector. Innovation should be carried out

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not only in collective and peasant farms, but also in rural households, whose role in the conditions of cyclical economic crises is great. Small businesses may be more receptive (compared to large enterprises) to the use of innovations.

To implement the technical, technological and socio-economic development of the agricultural sector, significant financial resources will be required, including public investment. Since private investors in the Arctic, due to the low profitability of agriculture and long payback periods for investments, are not interested in investing capital in its development, in this case the role of the state is especially great. Financial support for the agricultural sector of the Arctic territories is proposed to be provided in the following areas, namely:

- *increasing the volume of financial resources for the agricultural development of the rural periphery through the redistribution of subsidies from agricultural organizations that are self-sustaining and self-financing;

- *state support for business entities implementing investment projects in the form of providing state property as collateral to ensure the fulfillment of loan obligations;

- *state support in the form of targeted grants to peasant farms;

- *support for small businesses that ensure increased employment in remote rural areas (development of private farms, organization of collection and processing of wild plants);

- *providing subsidies for the development of fish farming;

- *reimbursement of part of the costs of loans;

- *exemption of peasants from taxes for 5 years;

- *providing a preferential loan for the construction of livestock buildings for a period of up to 20–25 years, the purchase of machinery and equipment – for 6–8 years;

- *removal of restrictions on state support for agriculture under the “yellow basket”.

So, unfavorable natural conditions for agriculture, low availability of biological resources, and underdevelopment of agriculture from financial support hinder the food supply of the population of the Arctic territories. The basis of food supply is formed by the import of food products from other regions of the country and from abroad. During the period of market reforms, the share of imported food increased significantly. Increasing self-sufficiency in food will require accelerating the modernization of the agricultural sector, improving the living conditions and quality of life of peasants, intensifying and stimulating the sale of products, the formation of an effective organizational and economic mechanism, and the creation of rear food bases located in adjacent, favorable agricultural zones. The system and structure of human nutrition is determined by the availability of food resources (products), which depends on the

natural geographical environment, socio-economic living conditions, the availability of technologies for processing food resources and politics. Natural and climatic conditions determine the diversity of different types of animal resources and species of wild plants used as food. This is especially important for indigenous peoples (with hunting and gathering traditions), who have developed their balanced food system over centuries. In the modern world, it is quite difficult for indigenous peoples to maintain a certain food structure, which threatens the traditional knowledge necessary for its preservation. On the Kola Peninsula, traditional economic activity is represented by two main types of households that emerged by the end of the 19th century: indigenous peoples (Sami) and newcomers (Pomors and Komi-Izhemtsy). Despite the fact that both types are based on a natural resource base, the models of economic activity and food traditions are different. Let's focus on one of the main food resources of the region - fish. Fishing was one of the main means of subsistence for the Sami. Fish was divided into three categories: salmon; lake and river fish; sea fish: salmon, brown trout, palia, char, trout, grayling, whitefish, pike, etc. The fishing season, according to the way of life of the Sami, mainly lasted from spring to autumn; during this period, fish stocks were stocked, both for own consumption and for sale. The nutritional structure corresponded to the seasonal availability of food resources and the adaptation of the people to the local characteristics of the territory. This also determined food processing technologies, both for long-term storage and for current consumption.

Technologies for harvesting and storing fish were quite simple. To prepare fish for long-term storage, two methods were used: salting or drying in the sun without salt, for which the fish was stripped along the back, gutted and hung on poles. Supplies were stored in barrels buried in the ground. Former residents of the village of Varzino (northeast coast of the Barents Sea, the village was resettled in the 70s) remember how their parents buried barrels of fish, laying roofing felt, insulation and boards on top to make it convenient to open in winter. Both herring and salmon were stored this way. In summer they ate only fresh fish, in winter salted and dried. The peculiarities of preparing fish, associated with constant seasonal movements, are described in his book “Three Years in the Arctic Circle” by A.E. Fersman “Lapps fry fish in a very ingenious way, first cleaning it, sprinkling it with salt and poking it through the tail onto a stick. In this case, the fish is cut transversely, and its sides are cut with a sharp knife in several places. The stick is stuck into the ground obliquely near the fire, so that the fish is fried over the fire. A Lapp sitting by the fire changes the position of the stick several times, turning first one side or the other towards the fire; After 20–30 minutes, the fish is ready, having been fried in its own fat.” It is also necessary to note that, along with

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general trends in the nature of the people's diet, there are also local differences in nutrition associated with the peculiarities of the people's settlement. Depending on the location of the traditional household (pogost), the diet also differed. The coastal Sami treat the inhabitants of the central part of the peninsula with a certain degree of irony. "If you get married in Lovozero, you'll go and eat wet fish (whitefish). But we cannot live without our "vitamin" (that is, without salmon). Eating fish with berries was also one of the features of the traditional Sami food system. In the book "Lapponia" of 1674, I. Schaefer describes the fish dish of the Swedish Sami: "They like to eat fish with fresh cloudberries and from this mixture they prepare another very strange dish. The fish, boiled in water, is cleaned of bones and, mixed with cloudberries, crushed with a wooden pestle so that it turns out something like a stew, which is then slurped with spoons." Traditional Sami cuisine was often perceived negatively by the immigrant majority, although the Sami food is very balanced. It takes into account everything, including the method of extracting substances useful in the polar night, fat-soluble vitamins, as well as caloric content and other nutritional properties necessary for life in these latitudes. Politics plays an important role in preserving traditional food knowledge and the use of traditional feed systems by indigenous peoples. Colonization of the Kola Peninsula influenced the preservation of the cultural traditions of the indigenous people. In the 20th century, with changes in the way of life, much in cooking also changed. A variety of kitchen utensils appeared. Previously, the basis of kitchen utensils was a copper or cast iron cauldron; they cooked over a fire or a fire pit. Mass distribution of vegetables, in particular potato production dates back to Soviet times. A Pomor remains a Pomor only when he lives by the sea and is engaged in fishing - this is the self-determination of Pomors. Historically, the Pomors of the Kola Peninsula are immigrants from Novgorod. During almost 800 years of their stay in this region, they adapted to the natural environment. This applies to the highest degree to nutrition: "The adaptation of traditional nutrition represents the close attachment of this element of folk culture to the capabilities of the natural environment in the habitat. Adaptation means a person's action to change the conditions of food supply in accordance with his needs and demands, as well as adjusting newly introduced products and dishes to national taste." The first settlers brought the beginnings of agriculture to the region. Before their appearance, there was no bread at all in the culture of the indigenous population. The Pomors also grew turnips, which produced a bountiful harvest, and cabbage. Sea fish and fish dishes form the basis of Pomeranian cuisine. On the Kola coast of the White Sea there is still a saying: "If you don't eat crackers and don't drink tea, you won't work." Consequences of the loss of traditional food systems. If people

remain close to their traditional environment, reducing the use of their traditional food is a gradual process. People displaced from their homelands have little ability to retain traditional knowledge about available resources and technologies for processing and use. They are forced to adapt to new food patterns and are less likely to pass on traditional food knowledge to the next generation. In general, the loss of traditional food systems will result in a decline in culture-specific foods, reducing dietary diversity for rural residents, especially if hunting, gathering and other traditional activities are no longer practiced and food is purchased in stores. There may be medical consequences from changing Indigenous lifestyles. By reducing the use of marine mammals, fish and fish oils, indigenous peoples who have these items in their traditional food systems will see a reduction in the amount of omega fatty acids in their regular diets, which may affect the occurrence of various chronic diseases. Maintaining the integrity of knowledge about traditional cultural food systems is essential for sustainable development. The Arctic zone of Western Siberia is the homeland of indigenous peoples engaged in traditional reindeer herding and fishing. The life of a reindeer herder is harsh. In the structure of morbidity among the adult indigenous population, respiratory diseases occupy the first place. According to a number of authors, dietary intake of vitamins and ω -3 fatty acids prevents the development of chronic bronchopulmonary diseases. The main source of these protective food components for the indigenous population is traditional food (venison and local fish). The purpose of our study was to study the impact of traditional nutrition on the most important mechanisms for preventing respiratory and circulatory diseases among reindeer herders of the Yamal Peninsula. 1015 people were examined, of which 796 were indigenous village residents and 219 were indigenous tundra residents. Diet analysis was carried out using questionnaires developed at the Federal Research Center for Nutrition and Biotechnology. All patients underwent: history taking, examination by a therapist, pulmonologist. An analysis of the dynamics and monitoring of the consumption of venison and local fish was carried out for the period 2018–2022. Among the indigenous inhabitants of the tundra and national villages over the course of 5 years, there has been a decrease in the consumption of local fish by 50.0%, venison by 40.0%. The highest incidence of hypertension is observed in the Tazovsky region, chronic non-obstructive bronchitis and excess body weight - in the Nadym region. There was a tendency towards a decrease in the prevalence of chronic non-obstructive bronchitis and an increase in hypertension and excess body weight. Depending on the travel routes, an increase in the prevalence of chronic non-obstructive bronchitis was revealed due to the severity of the climate (increase in the northeast direction), excess body weight - depending on the availability of

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imported products (increase near large settlements). Thus, the health of the indigenous population is most influenced by the provision of traditional food products and the impact of weather and climatic factors. The use of animal and plant raw materials from the Arctic zone is not only a contribution to the health of the inhabitants of the Arctic, but also an important social project that makes it possible to provide the indigenous population with work and, at the same time, preserve the traditional way of life. In the food supply of the population of the Arctic and the Far North, a significant place is occupied by traditional industries - reindeer husbandry, fishing, hunting, procurement of wild products, etc. Of these, in economic and social terms, the most important industry is reindeer husbandry, since today in the Arctic there is no other type of domestic animal that could convert the phytoresources of many millions of hectares of tundra and forest-tundra into meat, antlers, EPS, leather and fur raw materials and other products useful for humans. Just like there is no other similar branch of livestock farming with which the fate of the indigenous peoples of the North would be inextricably linked. Sales of products from this industry are the main and often the only source of cash income for reindeer herders. In Russia, which ranks first in the world in the number of domestic reindeer, until recently reindeer husbandry was a branch of production specialization in more than 260 large collective and state farms. In the structure of marketable products of specialized farms, income from the sale of reindeer herding products before the

start of perestroika averaged 16–19% in the North. Denationalization of large reindeer herding farms, their transformation into privatized small collective ones, peasant, clan forms of management coincided with a period of general economic crisis in the country as a whole. Those regions that did not disaggregate and privatize existing reindeer herding farms turned out to be relatively viable - these are the Nenets and Yamalo-Nenets Autonomous Okrugs, the Komi Republic and the Murmansk Region. In all other Arctic regions, after the disaggregation of reindeer herding farms, there was a sharp decline in commercial production. During the period from 2018 to 2022, the number of domestic reindeer in the Russian Federation decreased by 22.4%. At the beginning of the new millennium, reindeer husbandry, as a commercial industry, survived only in four regions of Russia - the Murmansk region, the Komi Republic, the Nenets and Yamalo-Nenets autonomous okrugs. State support for reindeer husbandry in 2009–2011. due to the general economic situation in the country during the global crisis, it was slightly less than in the previous period, and in 2012–2013. increased slightly and contributed to a slight increase in the number of domestic reindeer. In 2013, the federal target program “Sustainable development of rural areas for 2014–2017 and for the period until 2020” and the industry program “Development of northern reindeer husbandry in the Russian Federation for 2013–2015” were approved with a total funding of 5.9 billion rubles.

Table 9. Number of domestic reindeer in the Russian Federation for 2018–2021.

Region name		2018	2019	2020	2021 as a percentage of 2018
No.	Russian Federation	1642.2	1531.6	1602.3	97.5
1	Komi Republic	89.9	85.31	85.8	95.4
2	Arkhangelsk region	188.5	173.4	179.3	95.1
3	incl. Nenets Autonomous Okrug	186.6	171.5	177.5	95.1
4	Murmansk region	54.9	54.4	56.2	102.3
5	Khanty-Mansi Autonomous Okrug	38.1	38.5	40.6	106.5
6	Yamalo-Nenets Autonomous Okrug	739.9	671.4	733.5	99.1
7	The Republic of Buryatia	0.5	0.6	0.6	120.0
8	Tyva Republic	2.5	3.3	3.5	140.0
9	Transbaikal region	2.6	2.9	3.1	119.2
10	Krasnoyarsk region	99.0	107.1	116.3	117.5
11	Irkutsk region	0.5	0.7	0.9	180.0
12	The Republic of Sakha (Yakutia)	177.1	165.3	156.0	88.1
13	Kamchatka Krai	42.3	44.8	48.8	115.3

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14	Khabarovsk region	6.0	5.8	6.1	102.0
15	Amur region	6.5	6.7	6.7	103.1
16	Magadan region	21.2	12.8	14.4	67.9
17	Sakhalin region	0.1	0.1	0.1	100.0
18	Chukotka Autonomous Okrug	172.5	158.2	152.3	88.3

The decline in animal numbers was especially noticeable in such regions as the Republic of Sakha (Yakutia) - by 11.9%, Magadan Region - by 32.1%, Chukotka Autonomous Okrug - by 11.7%. In the Northwestern Federal District, a slight decrease in livestock numbers was recorded in the Arkhangelsk Region (Nenets Autonomous Okrug) and the Komi Republic, in the Ural Federal District - in the Yamalo-Nenets Autonomous Okrug due to an environmental disaster on pastures in 2014. At the same time, albeit small, but positive dynamics showed the regions of forest reindeer husbandry: Khanty-Mansi Autonomous Okrug - 106.5%, Republic of Buryatia - 120.0%, Republic of Tyva - 140.0%, Irkutsk region - 180.0%, Trans-Baikal Territory - 119.2%. The stability of the livestock is demonstrated by the Khabarovsk Territory, Amur and Sakhalin regions. Such an important reindeer herding region as the Krasnoyarsk Territory demonstrates good growth rates of livestock - 117.5%. Unfortunately, for the Russian Federation as a whole, the planned figure for the program - 1.624 million animals - was not achieved in 2015. At the same time, the 2016 sample agricultural census showed the number of domestic reindeer at 1.906 million heads, which indicates the inaccuracy of the census of this type of animal using the survey method. In the natural-geographical format, reindeer husbandry can be divided into two large types: tundra and taiga. At the same time, the predominant part of reindeer herding farms can use both tundra and taiga zones during the annual nomadic cycle, i.e. in fact, it is interzonal reindeer husbandry. Of the 1,600 thousand domesticated reindeer, only 120 thousand, or less than eight percent, are grazed in the forest zone all year round; the rest of the reindeer herding is tundra or interzonal. Tundra interzonal

reindeer husbandry in the northwestern part of the Arctic zone of the Russian Federation can be a profitable sector of the economy even at the current level of prices for reindeer meat. In addition to increasing meat prices, the profitability of reindeer husbandry can be increased by approximately 1.5-2 times due to the sale of ESF, blood, skins, heads, dry horns, antlers, camus, etc. In this case, reindeer husbandry can successfully develop even in the taiga zone. By using new technologies that make it possible to obtain medicines from deer blood and endocrine glands, even higher incomes can be obtained. However, the introduction of such technologies is effective only when slaughtering a large number of reindeer, that is, only in tundra large-scale reindeer herding. According to the review "Analysis of the Venison Market in Russia," prepared by BusinesStat magazine in 2016, the Russian market's need for venison in 2011-2015. was almost entirely satisfied through domestic production. Over the five-year period, venison production decreased by 34.3% - from 9.9 thousand tons to 6.5 thousand tons. The dynamics of the indicator were multidirectional. In 2012 and 2014 his growth was recorded. In 2013 and 2015 Venison production showed a decrease of 14.2% and 32.3% compared to previous years, respectively. During these years, the main efforts of reindeer herders were aimed at increasing the number of animals. This was especially relevant in 2015 due to the need to eliminate the consequences of the local death of deer as a result of lack of food in 2013-2014. In 2016 and 2017 There was a significant increase in venison production - by 12.3% and 16.4%, respectively. This became possible thanks to the ongoing restoration of the livestock.

Table 10. Potential of the Far North pastures for grazing domestic reindeer

Region name	Total area of reindeer pastures, thousand hectares	Design reindeer capacity of pastures, thousand heads.	Actual livestock as of 01/01/2022, thousand heads.
Komi Republic	6342.0	110.0	85.8
Nenets Autonomous Okrug	12375.0	180.0	177.5
Murmansk region	7127.1	63.7	56.2
Khanty-Mansi Autonomous Okrug	6086.5	48.0	40.6
Yamalo-Nenets Autonomous Okrug	48551.6	452.0	733.5
Taimyr (Dolgano Nenets) MR	33194.7	91.6	112.0

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Evenki MR	12150.8	65.0	7.2
The Republic of Sakha (Yakutia)	92453.7	406.2	156.0
Kamchatka Krai	16506.2	135.0	48.8
Magadan Region	18475.9	122.0	14.4
Chukotka Autonomous Okrug	42597.8	410.6	152.3
By district Far North	295861.3	1962.1	1602.3

During the years of reforms, reindeer husbandry in the Russian Federation has largely lost its commercial value, primarily in the northeastern tundra and taiga part of the Arctic zone. At the same time, it retains its socio-economic and ethnocultural significance for the indigenous peoples of the North. Federal target programs for the development of northern reindeer husbandry were fully funded, but the effectiveness of their implementation turned out to be low: the number of reindeer in 7 regions did not reach the planned ones. Commercial reindeer husbandry is maintained only in 4 regions, and venison production in the Arctic zone, after some decline, is again picking up pace. This became possible thanks to the ongoing restoration of the livestock. In 2018, the production of deer for slaughter in live weight in farms of all categories was estimated to be 16.9 thousand tons, which is 62.5% or 6.5 thousand tons more than the 2016 level. In 2018-2020 production is growing at a more moderate pace - by 2.2-4.7% per year. Exports of Russian venison are growing and are expected to reach 600 tons in 2020. An important source of commercial products, including export ones, are antlers and reindeer antlers. The possibility of increasing the number of domestic reindeer in the Russian Federation is more than 360 thousand individuals. There are especially great prospects for increasing the number of livestock in the Republic of Sakha (Yakutia), the Chukotka Autonomous Okrug, the Magadan Region, the Kamchatka Territory, and the Evenki Municipal District. Forest commercial reindeer husbandry practically does not exist today due to the lack of shepherds who have the skills and technologies for year-round grazing of domestic reindeer in the taiga zone. The habitat of the reindeer species (*Rangifer tarandus*) is located in areas with a harsh arctic climate. Reindeer is an exclusively grazing animal; its diet contains no stimulating additives or industrial feed, with a variety of green vegetation in the summer and lichen (moss moss) in the winter. According to the international classification, such meat belongs to grass fed – raised on pasture. As a result of such nutrition, unique dietary characteristics of venison are formed: relatively low fat content, the predominance of biologically active microelements - copper, zinc, iron. It contains virtually no hormones, pesticides or antibiotics. In terms of the content of toxic substances: dioxins, chlorine, lead, cadmium, nitrates and nitrites,

venison is the safest type of meat. Scientific research data allows us to confidently recommend venison for regular, preventive, therapeutic, special, rehabilitation and baby food. According to the general chemical composition, venison contains protein - 21–23%, fat 3.3–4.8%. This ratio makes venison an important product of dietary and gerontological nutrition, especially for people suffering from overweight, cholesterolemia, and metabolic disorders. In the Arctic zone, about half of the venison comes from the slaughter of six-month-old animals. There is an opinion, that at this age their meat is less valuable in its biochemical, nutritional and taste qualities compared to meat from animals of older age groups. In 2015, GOST 32227-2013 “Deer for slaughter. Venison in carcasses and half-carcasses. Technical conditions”, according to which animals from 4 months to 2 years of age, regardless of gender, were classified as young deer; accordingly, the meat from their processing was called “venison from young animals”. Previous studies have shown that when slaughtering adult males, a carcass weighing 52–66 kg is obtained, adult females – 36–53 kg, the slaughter yield being 50.3 and 49.2%, respectively. When studying the morphological composition of carcasses of young animals of 6 months of age, it was found that they contain an average of 70% muscle tissue, fat – 4.4, connective – 8.3, bone – 17.3%, in adult carcasses, respectively, 70.9; 6; 7.1; 16%. The area of the “muscular eye” studied in domestic deer is 12-15 cm² in young animals 6 months of age and 18-22 cm² in adults (Fig. 1). The diameter of the muscle fiber is 33-37 and 42-60 μm, respectively. Taking into account the low cost of meat products, slaughtering young animals at an early age makes rearing them economically more profitable than keeping reindeer to older ages. Early slaughter has been practiced in industrial reindeer husbandry since the 60s of the last century; to increase the yield of marketable young animals in herds, it is recommended to increase the proportion of queens to 60-65%. In traditional ethnic reindeer herding, early slaughter of young animals is usually carried out to obtain high-quality skins for further tailoring of national clothing. Deer begin to be slaughtered for meat, as a rule, from the age of 1.5 years. The question of the quality and taste of meat when slaughtering young animals at 4-6 months of age still remains controversial. Opponents of early slaughter of deer point to the wateriness and low

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nutritional value of veal, while its supporters classify these qualities as positive, determining the dietary properties of young venison. Live weight, the weight of the carcass and internal organs of deer were determined by the weight method directly at the slaughter sites of reindeer herding farms in the Yamalo-Nenets Autonomous Okrug during autumn slaughter. Animals of 6 and 18 months of age, typical in development and live weight, were selected for slaughter. Slaughter, deboning, sampling, biochemical and organoleptic analysis of meat were carried out according to the methods of VNIIMP and VIZH. A total of 40 carcasses of males of each age were examined. The longissimus dorsi muscle was taken from 3 males and 3 females from each age group on a transverse section between the 9th and 12th ribs. Samples were cleared of surface fat and fascia and placed in a double polyethylene bag. Samples of minced meat and longissimus dorsi muscle were stored frozen at a temperature not exceeding 18°C before the study. The contours of the longissimus dorsi muscle were sketched on tracing paper, then the area of the “muscle eye” was determined using a planimeter. In the longissimus dorsi muscle, the

amino acids tryptophan (according to Graham and Smith) and hydroxyproline (according to Neumann and Logen, modified by Verbitsky and Deterage) were additionally determined. The protein quality indicator was determined by the ratio of tryptophan to hydroxyproline, the content of other amino acids was determined on an ND-1200 amino acid analyzer. The diameter of the muscle fiber was determined on the longissimus dorsi muscle, after preparation, using an MBI-1 microscope (8x objective) equipped with an AM-9-2 screw eyepiece-micrometer (15x eyepiece), which contained a microscopic ruler. In each sample, the thickness of 100 fibers was determined. Organoleptic evaluation of boiled meat and broth was carried out on a 5-point scale; the longissimus dorsi muscle was examined from 3 males from each age group. Calculation of the cost of venison was done according to the generally accepted method in reindeer herding farms. Our research has shown that the carcass weight of 6-month-old deer is 51.8% lower than that of adult males, i.e. almost 2 times; at 18 months of age this difference is reduced to 28.3% (Table 11).

Table 11. Changes in meat quality indicators depending on the age of reindeer

Index	6 months	18 months	Adults	Young animals in relation to adults, %	
				6 months	18 months
Live weight, kg	55.6	82.4	109.4	50.8	75.3
Carcass weight, kg	27.3	40.6	56.6	48.2	71.7
Slaughter yield, %	49.1	49.2	51.5	95.3	95.5
Meat factor	4.0	4.4	5.5	72.7	80.0
Area of the "muscle eye", cm ²	16.5	21.4	25.1	65.6	85.5
Muscle fiber diameter, mm	33.7	45.7	62.3	54.1	73.3
Fat in meat, %	4.5	5.1	6.7	67.4	76.3
Energy value, mJ/1 kg (kcal) OE	5.2 (1246)	5.6 (1332)	6.0 (1428)	86.8	92.8

The difference in slaughter yield between the studied groups is insignificant; it increases with age by 0.1–2.4%. Morphologically, meat has a complex tissue complex and the most valuable part of meat is skeletal muscle. The color of the muscle tissue in the studied samples was dark red, and in adult individuals it was darker than in young animals. The dark color of deer meat is due to the higher content of myoglobin, the hemes of which contain a lot of iron. With age, reindeer, like other farm animals, increase their meat coefficient (the yield of meat and fat per 1 kg of bones). In our experience, this increase was 20–27%. Another quality indicator of meat, the area of the “muscular eye,” increases in adults by 34% compared to 6-month-old animals and by 14% compared to 18-month-old animals. The diameter of the muscle fiber is 46% and 17%, respectively. An important indicator that determines the dietary properties of any meat is

the relative fat content. Venison obtained from the slaughter of 6-month-old calves has 33% less fat than that of adult males; when slaughtered at 18 months of age, this difference decreases to 24%. Accordingly, the energy value of venison increases with age by 13 and 8%. In almost all studied indicators, except for slaughter yield, adult deer had a significant advantage over young animals. One of the main characteristics of the value of proteins of any food raw material of animal and plant origin is the ratio of nonessential and essential amino acids or amino acid index. A comparative assessment of the amino acid composition of meat from animals of different ages (Table 12) showed that 6-month-old animals are inferior to 18-month-old animals in the content of lysine (42.0%), histidine (25.0%), arginine (34.0%), methionine (50.0%), isoleucine (36.0%) with a significant difference (p=0.001).

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Table 12. Changes in the amino acid composition of meat depending on the age of reindeer, g/100 g protein

Amino acid	6 months	18 months	Adults
Lysine	1.64 ± 0.05	2.33 ± 0.12	0.85 ± 0.10
Histidine	0.84 ± 0.01	1.05 ± 0.05	0.91 ± 0.13
Arginine	1.32 ± 0.06	1.77 ± 0.04	1.85 ± 0.44
Threonine	0.94 ± 0.01	0.91 ± 0.02	0.79 ± 0.26
Valin	0.93 ± 0.01	0.87 ± 0.05	0.48 ± 0.07
Methionine	0.14 ± 0.01	0.21 ± 0.02	0.18±0.10
Isoleucine	0.89 ± 0.02	1.21 ± 0.04	0.93±0.22
Leucine	1.64 ± 0.03	1.67 ± 0.06	1.27 ± 0.19
Phenylalanine	0.87 ± 0.02	0.83 ± 0.03	0.76 ± 0.06
Total essential acids	9.21	10.85	8.02
Aspartic acid	1.75 ± 0.03	1.79 ± 0.08	1.81 ± 0.51
Serin	0.81 ± 0.02	0.76 ± 0.02	0.42 ± 0.64
Glutamic acid	2.73 ± 0.05	3.81 ± 0.18	0.98 ± 0.17
Glycine	0.84 ± 0.01	0.78 ± 0.02	0.82 ± 0.95
Alanin	1.17 ± 0.02	1.12 ± 0.02	1.32 ± 0.25
Tyrosine	0.81 ± 0.02	0.72 ± 0.03	0.71 ± 0.11
Proline	0.83 ± 0.02	0.87 ± 0.02	0.67±0.14
Total nonessential acids	8.94	9.85	6.73
Amino acid index	1.03	1.10	1.19

In terms of the amount of essential amino acids (valine, leucine, threonine, phenylalanine), the difference does not exceed the limits of random variables. Young venison surpasses the meat of adult deer in the content of almost all essential amino acids with the exception of arginine (the difference is unreliable). Thus, in terms of the amount of essential amino acids, meat from 18-month-old deer exceeds meat from adult and 6-month-old animals by 36.3% and 17.8%, respectively; in terms of the sum of nonessential amino acids, this superiority was 62.5% and 10.2%. The amino acid index changes slightly with age: at 6 months of age its value is 1.03, at 18 months - 1.10, in adult deer - 1.19. The results of studies of the amino acid composition of the meat of Even breed reindeer in Sakha (Yakutia) showed that

calf meat is richer in methionine and lysine than adult animals. As is known, proteins of sarcoplasm and myofibrils of animal meat contain essential amino acids and do not contain the amino acid hydroxyproline. In connective tissue, proteins are deficient in amino acid composition (collagen, elastin, reticulin) and do not contain the amino acid tryptophan. Therefore, by the ratio of tryptophan and hydroxyproline, one can judge the biological value of meat proteins, and this ratio of amino acids is called the protein quality indicator (PQI). In our study, in deer at 6 months of age (Table 13), the tryptophan content is 40% higher in males, in females - by 44% than in 18-month-old animals.

Table 13. Protein quality index (PQI) of the longissimus dorsi muscle (m. Longissimus dorsi) of reindeer of various ages

Index	Age, months			
	6		18	
	Males	Females	Males	Females
Tryptophan, mg%	247.7 □ 11.47	273.7 □ 7.12	146.8 □ 2.64	155.2 □ 3.02
Hydroxyproline, mg%	23.4 □ 1.44	22.2 □ 0.95	9.3 □ 1.13	11.3 □ 1.76
BKP	11.8 □ 0.51	12.4 □ 0.54	17.0 □ 2.49	14.6 □ 1.48

The content of hydroxyproline decreases by more than half with age in deer. As a result, the BCP

of 18-month-old males exceeds the BCP of 6-month-olds by 41%, and in females by 18%, respectively.

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The lack of data in the literature on the ratio of tryptophan and hydroxyproline content in adult deer does not allow for a comparative analysis between groups of animals of different ages. It was previously noted that the maximum BCP is observed in 1.5-year-old deer and is largely associated with the fatness of

the animals. The organoleptic characteristics of meat and broth in 6-month-old calves were rated by experts as the lowest (Table 14); the quality of the broth was higher in adult deer. The total venison grade at slaughter at 18 months of age was equal to adult.

Table 14. Organoleptic evaluation of deer meat of different ages on a 5-point scale

Indicator under study	6 months	18 months	Adults
Boiled meat	4.2±0.22	4.8±0.19	4.5±0.33
Bouillon	3.9±0.36	4.4±0.25	4.7±0.41
Total score	8.1	9.2	9.2

A comparative analysis of the cost of meat from deer of different ages shows that the economic efficiency of slaughtering deer at 6 months of age is twice as high as slaughtering adults (Table 15).

This is due to low labor costs for raising deer up to 6 months of age with the same selling price of meat products.

Table 15. Cost of venison obtained at different ages

Expense item	6 months	Adults
Costs per 1 quintal of products, person/day,	2.7	5.2
incl. salary per 1 quintal of products, rub. %	490	1250
	63.3	72.9
Indirect costs per 1 quintal of products, rub. %	280	560
	36.7	31.0
Cost of 1 quintal of increase, rub.	780	1810

Thus, a comparative analysis showed that the meat of 18-month-old deer is superior to that obtained from the slaughter of 6-month-old calves in terms of fat content, amino acids, BCP and organoleptic indicators. The slaughter yield and amino acid index of reindeer change slightly with age. Due to the low content of metabolic energy, hydroxyproline and high amino acid index, venison can be used as a dietary product. To produce quality meat, deer should be slaughtered at 16–18 months of age. Mass slaughter of young animals at 6 months of age can significantly reduce the cost of venison production, and in case of a shortage of winter pastures, reduce the load on them. The latter is especially important for the overloaded tundra pastures of the Yamalo-Nenets and Nenets Autonomous Okrug.

The geographical concept of the Arctic includes territories whose southern border is the southern border of the tundra. But, based on Decree of the President of the Russian Federation of May 2, 2014 No. 296, the land territories of the Arctic zone of the Russian Federation include, in particular, the entire territory of the Yamalo-Nenets Autonomous Okrug, the southern border of which lies in the taiga zone. This allows us to use a larger range of historical examples that we find it possible to comment on.

In 1643, from the Berezovsky district, which included the territory that now belongs to the Yamal-Nenets Autonomous Okrug, a petition was sent to the tsar, speaking, among other things, about, firstly, the impossibility of paying tribute due to the lack of furs. The petitioners explained this absence by the “lean” years for squirrel, as well as for fish, which the petitioners had previously exchanged in dried form for “soft junk” from the visiting “Kun Kazym Samoyed”. This “self-eating” probably means the forest Nenets, who “in the year 151 fought... with the Karachi self-eating // Nenets of the coast of the Gulf of Ob // and did not go to wild trades.” Secondly, it reports famine to the point of mass mortality (“And many Ostyaks from Obdorsk [with] us and their children died of hunger,” “And many Ostyaks of the Kunovatsk volost with their wives and children died of hunger”). The mentioned events took place, in particular, in the territory that today belongs to the Shuryshkarsky district of the Yamal-Nenets Autonomous Okrug, i.e. to the southwestern, taiga part of the Autonomous Okrug. G.F. Miller in the 18th century, in “Description of the lower reaches of the Ob River and the rivers flowing into the Ob: from the place of its division into the Big Ob and Small Ob,” reported the death of the population of the town in the lower reaches of the Nadym River in 1730 [2]. The

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historian's report is confirmed by the tradition of local indigenous people. We are talking about a case of famine of a relatively small group of people caused by completely exceptional circumstances. Obdorsky assessor Yu.I. Kushelevsky, who in the 19th century, on the instructions of the Krasnoyarsk businessman M.K. Sidorov's research into promising summer and winter routes between the river. Yenisei and the village of Obdorsky, testified to the famine among the "Turukhan foreigners" in the spring of 1863. At the same time, Yu.I. Kushelevsky noted: "Fisheries along the river. Taza and especially at the mouth of this river are so rich that I have never seen anything like them anywhere. So my workers cast their small net and pulled out 90 salmon at a time, each weighing at least 15 pounds (more than 6 kg). There is nothing to say about moksuns, broads and pikes of amazing size." Trying to resolve the observed contradiction between the abundance of local natural resources and the poverty of the ethnic group, the traveler writes: "Meanwhile, the foreigners there are not able to get themselves a net. Need forces them to make seines from talnik bast and, despite this such an inconvenient and unusable means, they catch fish both for daily food and for reserve. The long, cold spring alone causes them to starve and even often starve to death." On another page of his notes, Yu.I. Kushelevsky reported a typical example of seasonal malnutrition in the family of a priest of the Tazovskaya church. Pictures reflecting the problematic food existence of the aborigines of the taiga and forest-tundra, whose reservoirs, according to travelers, were extremely rich in fish, suggest that one of the reasons for the hunger strikes of the indigenous groups of the region is the difference in the mentality of reindeer herders-hunters, on the one hand, and fishermen, on the other. Fishermen have never been forced to work as continuously as reindeer herders. In addition, with the presence of alcohol imported by merchants, fishermen could even afford the long group drinking bouts described by many contemporaries, which was unthinkable for the owners of reindeer herds. As a result, periodically, under unfavorable climatic conditions and abnormally prolonged springs, the results of the fishermen's labor were sometimes insufficient. Hunger began among them. Vasily Ivanovich Nemirovich-Danchenko (elder brother of the Russian theater reformer Vladimir Ivanovich Nemirovich-Danchenko), widely known in the late 19th and early 20th centuries. as a writer, traveler and describer of the northern outskirts of the Russian Empire, in particular, he visited the Turukhansky region, the territory of the western part of which falls on the current Tazovsky and Krasnoselkupsky districts of the Yamal-Nenets Autonomous Okrug. In the essay "Yuraks" we find the following: "The main occupation of the Yuras is reindeer herding. The deer gives them material for housing and fur and leather for clothing and methods of movement. The Yuraks value

it to such an extent that sometimes they do not dare to slaughter a domestic deer, whereas, having killed a wild one, they greedily pounce on its meat and eat it for 14 pounds. for everyone. They are ready to endure hunger rather than sacrifice one of these gentle and useful animals from their herd. Fishing and bird hunting provide them with abundant food, which is why in the summer they migrate to river and lake shores.

To the surprise of Russian researchers, the Khanty (with the exception of the Kazym) and Nenets, despite the abundance of berries, did not collect them, just as they did not collect and did not eat mushrooms at all. Culinary art did not play any significant role (as, indeed, it still does not). Large quantities of meat were consumed raw (as was fish), fresh in the summer and ice cream in the winter. In the spring, residents of the region collected goose eggs for food. The Nenets ate all birds, not excluding loons, skuas and raptors. The onset of the Bolshevik era brought completely new realities to the extreme north of Western Siberia, as well as throughout the country. Already in the very first years, the state's pressure on the population of the northern outskirts of the country grew disproportionately with previous times. As a result of the civil war, its manifestations in the form of anti-Bolshevik riots in 1921, as well as as a result of economic collapse, crop failure and state obstacles to self-organization of the population to overcome food shortages (bagmen), 1921 and 1922 became famine years for Russia. In many areas of the middle and lower Volga region, and other southern territories, this led to mass mortality; newspapers reported numerous cases of suicide and cannibalism. Mass mortality was also observed in the southern regions of Western Siberia, so in the Tyumen district the number of officially registered starvation deaths on May 20, 1922 was 573 people. In the far north of Western Siberia, the famine did not take its full form; however, the collapse of the fishing industry and the trade that accompanied it created significant problems, expressed at least in the depletion of both the diet and the volume of food. In addition to these destructive factors, after the suppression of the Siberian peasant rebellion of 1921, firearms were taken away from indigenous and non-indigenous local residents, which, as the press organ of the Tobolsk Military Revolutionary Committee "Soviet North" reported, "are partly stolen, partly stored and perishing in some "some primitive warehouses." As a result, as evidenced by one of the archival documents from 1922, a situation arose where hunters were forced to hunt as in ancient times with the help of bows and even simple sticks. Despite these collisions, part of the population of the territories adjacent to the north of Western Siberia tried to flee here to escape severe famine. As a result, for example, the number of residents of the largest village of He on the shore of the Gulf of Ob grew by 73% from 1921 to 1923. The

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northerners, despite all sorts of regulations and prohibitions, were, as always, saved, first of all, by the fish wealth of the local reservoirs. The assumption expressed before the revolution by individual officials, scientists and ordinary people about the process of extinction of the local “foreigners” that had been going on for a long time, since tsarist times, turned into almost an official statement in the first years of the new government. In materials prepared in 1922 for the leadership of the Main Northern Sea Route, a certain Berezyanin stated: “Our northern foreigners were once a large population of a free and rich country, which knew its heroes, its heroes, had its own laws and customs. Now these foreigners are just the pitiful remnants of dying tribes, who have stopped at one of the lowest stages of cultural development and are little by little deprived of even what once ensured, at least, their material well-being: reindeer husbandry has fallen into decay, the fur trade has greatly declined, even fishing poorly provides for foreigners - these natural fishermen.” Some dissonance with the above was followed by the recognition of the same author that he personally “... managed to collect statistical material in the summer of 1914 on the birth and death rates among the Ostyaks - Samoyeds of the river delta. Obi. It is necessary to make a reservation that the foreigners who were covered by the survey were in the most unfavorable living conditions. Despite this, out of 48 registered families, only one was childless, 2 families gave unclear testimony, 45 mothers had 223 children, or an average of 5 children for each mother. Thus, based on the obtained material, the childlessness of foreigners is not confirmed. But be that as it may, the general extinction of aliens remains a fact that must be taken seriously.” The history of the Arctic zone of Western Siberia knows examples of famine that occurred among special settlers who were “dispossessed” and deported to the far north of Western Siberia. This famine led to mass mortality. Including on about. Puiko, in the middle reaches of the river. Nadym, on the eastern coast of the Yamal Peninsula. Nenets reindeer herders were strictly forbidden to treat the settlers with any food. And the surrounding nomads could only do this in those rare cases when the authorities could not see it. As old-timer A.G. stated about the years of the Great Patriotic War. Kotlyarchuk: “We lived here at the expense of the Nenets. If it weren’t for them, we would have died of hunger here, like they did in Nadym.” In 1947, there was a famine among reindeer herders in the north of the Yamal Peninsula. The famine was a consequence of the authorities’ general, often repressive policy towards reindeer herders and a number of their specific short-sighted management decisions. As S.V. wrote Lezova, “Documentary evidence leads to the conclusion that the main goal of the actions of the Soviet government in Yamal during this period was the systematic destruction of the elite part of the native population and the destruction of the traditional life

support system of tundra reindeer herders. The administrative and economic policy of the Party and its local executors led to a catastrophic decline in North Yamal reindeer husbandry and brought the native population to the brink of extinction.” A number of documents indicate that the depletion of pastures was not the only reason for the population's hunger. For example, in a report to the chairman of the executive committee of the Tyumen regional council, Koshelev, the deputy chairman of the Yamalo-Nenets district executive committee, Pogorelov, reported on July 1, 1947: “At the same time, I am informing you that that in connection with the no less difficult situation of the national population in the Baydaratskaya tundra of the Priuralsky region and the Gydoyamskaya tundra of the Tazovsky region, a partial resettlement of collective farmers was carried out to collective farms located on the river. Ob: Priuralsky district 64 farms Tazovsky district 25 farms.” A secret telegram to the Tyumen Regional Party Committee from the Yamalo-Nenets Regional Executive Committee on June 30, 1947 reported: “... part of the population, especially reindeer herders, are in dire need of money to buy food, that is, systematic assistance. A set of products set at the established norm for a family of 4 costs 500 rubles a month or 6000 salary per year. 51 collective farms have a family income of less than 3500 rubles. Collective farm fishermen of the Shuryshkarsky district could not go out on expeditionary fishing trips without having the means to buy bread. Most collective farmers will not have any income in October and November, that is, between the fishing and fur seasons.” To summarize, we consider it appropriate to quote researcher I.I. Krupnik, who wrote: “...there is every reason to consider the demographic history of the Siberian Nenets during the first three centuries of contacts to be very successful. <...> the main factor contributing to the numerical growth of the Nenets and some of their neighbors in the 18th-19th centuries was their transition to a large-scale reindeer herding economy. ... Thanks to the rapid growth of herds of domestic reindeer, the increasingly frequent slaughter of animals for meat and skins for personal consumption, exchange, sale, etc. families of reindeer herders were able to switch to eating meat from their domestic animals more regularly. Seasonal and annual fluctuations in the abundance of food and regular hunger strikes, so typical for hunting or small-reindeer farming, have sharply decreased. In a large herd economy, reindeer meat has become an abundant and year-round resource. Even families with few reindeer now have the opportunity to eat reindeer meat through mutual assistance, exchange, and association with more prosperous families.” Just ten years ago, we had to observe widespread seasonal (winter) natural exchange between large-herd reindeer herders of Yamal, on the one hand, and low-reindeer and reindeer-less aboriginal fishermen of the southern

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coast of the Ob Bay, on the other. Reindeer herders offered reindeer meat and reindeer skins, and fishermen offered frozen and salted fish, yurok (dried fish fillet), varka (a mixture of melted fish oil with crushed fish meat and caviar) and wooden products (sledges and sorcerer boats). Opposing supporters of the ecological approach in anthropology, which explains the low population density in the Arctic by low "ecological capacity," I.I. Krupnik noted: "The land of Yamal accepted and provided the resources necessary for existence of several powerful waves of migrants - from the ancient hunter-reindeer herders of the Kharyuchi phratry to hundreds of families of Nenets and Khanty reindeer herders who fled collectivization and repression of the Soviet administration in the 1920-1930s. All of them found a place in Yamal along with the former inhabitants of this territory; for all of them, as well as for their descendants, the harsh arctic tundra of Yamal was a land of plenty, security and freedom." We find the description of famine in the Arctic zone of Western Siberia, if this zone is understood strictly physically and geographically, very difficult for the reason that the available historical information, even if it reflected serious food problems in the history of the region, these problems, as a rule, were caused either by very temporary natural conditions and did not last long, or exceptional personal circumstances of the place and time of a small group of individuals or individuals, or the actions of the state. In general, since the massive penetration of fishing industry into the Arctic zone of Western Siberia, i.e. from the end of the 19th century, food problems reaching the level of real famine arose only in Soviet times and were not initially caused by natural factors, but were generated in this region by state policy aimed, first of all, at increasing the "socialist marketability of the national economy." That is, to create the opportunity for the state to confiscate from the northerners any amount of the results of their labor in the form of deer, fish and furs, in return maintaining only a minimum level of food well-being. And at times without supporting him either.

Conclusion

The transition of Arctic single-industry towns to a sustainable model of development of the local economy and local community is a complex task,

taking into account the extreme dependence of reproductive processes on the life cycle of the city-forming enterprise. One of the foundations of sustainability in these conditions is the organic development of social and human capital. Institutions of interaction, formed within the framework of socially useful activities, are one of the key components of the formation of social capital of the local community, which, in turn, allows for the consolidation of human capital in the territory. The purpose of the study is to identify the characteristics of social activity and social capital of the local indigenous community, as well as the migration attitudes of population groups that are systemically important for its reproduction. A complex of sociological, statistical and general scientific methods was used. The general prevalence of social practices in the indigenous peoples community has been revealed, systemically significant population groups for the reproduction of social capital have been identified and characterized, and their migration attitudes have been identified and compared. Based on the results of the study, conclusions were drawn about the sustainability of the reproduction of the social capital of indigenous minorities, as well as the influence of its aspects on the consolidation of human capital. To increase local sustainability by consolidating social and human capital, it is necessary to intensify the efforts of local authorities to expand the social space by involving the surrounding indigenous peoples in the socio-economic processes, as well as to prevent institutional distortions in the work of social elevators. The scientific novelty of the study is determined by the methodological approach, which consists in the synthesis of the functional-role and time components of social activity in the analysis of sociological research data. Also, indigenous peoples as a new administrative entity within the Russian Arctic and a certain exception in terms of indicators of socio-economic development of Arctic single-industry towns have previously been studied to an extremely limited extent. The results have scientific value and practical applicability in the framework of the development of strategic documents for regional development, as well as the operational management of the socio-economic system of a single-industry town with indigenous minorities.

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Article



Alena Alekseevna Yudakova

Institute of Service Sector and Entrepreneurship (branch) DSTU
 bachelor

Alexandra Alexandrovna Zolotova

Institute of Service Sector and Entrepreneurship (branch) DSTU
 bachelor

Artur Aleksandrovich Blagorodov

Institute of Service Sector and Entrepreneurship (branch) DSTU
 master's degree

Vladimir Timofeevich Prokhorov

Institute of Service Sector and Entrepreneurship (branch) DSTU
 Doctor of Technical Sciences, Professor
 Shakhty, Russia

Galina Yurievna Volkova

LLC TsPOSN «Ortomoda»
 Doctor of Economics, Professor
 Moscow, Russia

POSSIBILITIES OF THE SHIFT AS A RESERVE OF DEMOGRAPHIC PROBLEMS OF INDIGENOUS PEOPLES FOR SOLVING THEIR MIGRATION PROCESSES

Abstract: *in the article, the authors analyze the implementation of investment projects in the regions of the Russian Arctic, which require adequate staffing, which, in conditions of negative migration dynamics, becomes one of the key risks. Today, the shift is a fait accompli, which is viewed ambiguously and requires separate, careful study to enhance its positive effects and level out possible negative consequences, including to ensure strategic indicators for the development of the Arctic zone of the Russian Federation (AZRF), one of which is the migration growth rate population of its regions, which currently has a negative value, which indicates an outflow of population. At the same time, the existing prerequisites for the development of the rotational work method in the Russian Federation force us to look at it in a new way - as a source of attracting and retaining the population. Thus, the purpose of this study is to determine the possibilities and conditions of shift management for the transformation of migration processes in the regions of the Russian Arctic. The scientific novelty lies in the development of an approach to managing shift work that can change the existing negative migration trends in the regions of the Russian Arctic associated with the outflow of population. The research method chosen was a written survey of workers working on a rotational basis at one of the large Arctic enterprises. It was confirmed that the shift can be a reserve in the transformation of migration processes in the regions of the Russian Arctic. At the same time, it is necessary to change the approach to the shift as an object of management, clarify its types and build a consistent policy for the transition from one type to another based on taking into account the characteristics of the migration motivation of each of them. The specification of the policy of such a transition and the development of certain measures, the procedure for their organization and the formation of an integrated management mechanism that takes into account the state and corporate components will be the subject of further research.*

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Key words: rotational work method, region, Arctic, migration process, socio-economic development, Arctic zone of the Russian Federation, regions of the Far North, state policy in the Arctic zone of the Russian Federation, State Commission for the Development of the Arctic Zone, migration, low innovative potential of the region, increasing efficiency government controlled.

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Introduction

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The studies examined the features of the socio-economic situation of the regions that are part of the Far North and the Arctic zone of the Russian Federation, and analyzed the regulatory framework of the Russian Federation, in which the North is defined as a separate object of state regulation. The main directions of the state policy of the Russian Federation in the Far North and the Arctic zone are shown, the purpose of which is to increase Russia's competitive advantages in the Arctic, the socio-economic development of the northern territories and ensure national security. Organizational issues of implementing state policy and strategic management of the northern macro-region are considered, such as the creation of the State Commission for the Development of the Arctic, the development and implementation of an action plan for the socio-economic development of the territory. Particular attention is paid to the analysis of indicators of socio-economic development of the regions of the Far North; the main problems that entail destructive changes in the socio-economic system of the macroregion are shown. These are historically established, territorially determined phenomena: harsh natural and climatic conditions, remoteness from the "mainland", the focal nature of the economic development of the territory, and modern negative trends: a decrease in the standard of living of the population, an outflow of qualified labor resources, low labor productivity, wear and tear of transport, industrial and energy infrastructure, critical condition of housing and communal services, low innovative potential of the North. The article presents the intermediate results of state policy in the Arctic zone of the Russian Federation: against the backdrop of positive trends in the development of the North, generally negative phenomena are noted in the socio-economic systems of some subjects, which leads to an increase in disproportions within the macroregion.

Currently, the political views of leaders of countries around the world are directed to the north – the Arctic. This is due, first of all, to the richest mineral reserves of this region, including the Arctic shelf, biological resources, the intersection of major transport arteries, as well as an advantageous location for

equipping military bases, allowing control of various strategic objectives.

Russia is a major maritime power, 21 of whose subjects, in whole or in part, belong to the regions of the Far North (and equivalent areas) and including 8 to the Arctic zone of the Russian Federation. Possession of the Arctic coast is a competitive advantage of our country, allowing us to pursue our policy in the Northern macro-region.

The allocation of the Arctic zone as a separate object of state regulation for the purposes of the socio-economic development of this territory is a very important strategic decision right now, during the period of tightening global sanctions against Russia, when the creation of optimal conditions for managing the Arctic zone comes to the fore. Northern regions have historically faced a large number of problems, namely:

- harsh natural and climatic conditions that affect the health of residents and increase the resource consumption of enterprises;
- remoteness from the "mainland", which determines high transport costs for the livelihoods of the population and the organization of economic activities;
- the focal nature of economic development of the territory, concentrated mainly in urban districts, and the low population density in general;
- high dependence of ecosystems on anthropogenic changes.

Analyzing the legislative framework of the Russian Federation, we can conclude that currently the socio-economic development of the Russian Arctic is regulated by the following main legal acts, namely:

- state program "Socio-economic development of the Arctic zone" Russian Federation for the period until 2035";
- strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period until 2035;
- fundamentals of the state policy of the Russian Federation in the Arctic for the period until 2035 and beyond.

Achieving sustainable innovative development is expected to be achieved through the development and improvement of public-private partnership mechanisms in the implementation of key investment projects, state participation in eliminating

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infrastructural restrictions on economic development, solving social problems, as well as stimulating economic activity. In order to radically increase the efficiency of public administration in this macro-region, the President of the Russian Federation established the State Commission for the Development of the Arctic (Decree No. 50 dated 02/03/2018), which has 9 working groups in such areas as ensuring national security, socio-economic development, development of education and science, development of the transport system, energy development, development of international cooperation, development of industry and technology, ensuring environmental safety and rational use of natural resources, implementation of state policy towards indigenous peoples living in the Arctic zone, as well as two temporary working groups: on the creation IBD on the situation in the Arctic region and on improving the regulatory framework for activities on the Arctic shelf.

The State Commission for the Development of the Arctic, according to the Regulations, is a coordinating body that ensures interaction between federal executive authorities, executive authorities of constituent entities of the Russian Federation, other state bodies, local governments and organizations in solving socio-economic and other problems related to the development of the Arctic zone Russian Federation and ensuring national security. The commission has been working for a year already, but the current situation in the North of the Russian Federation, according to Rosstat, continues to be characterized by destructive processes in the socio-economic system of the macroregion against the backdrop of small positive changes.

The current socio-economic and infrastructural state of the Arctic zone and the Far North is of interest, namely:

one of them is a decline in the standard of living of the population. Although in general the level of average monthly accrued wages of employees of organizations in the regions of the Far North increased and amounted to 55,614 rubles, in such subjects as the Perm and Primorsky territories, as well as the Republics of Tyva and Buryatia, it does not exceed 30,000 rubles. If we subtract tax payments from this amount, then the amount "on hand" will turn out to be completely ridiculous for a northern salary. Additionally, it should be noted that the level of income is calculated taking into account high salaries in the field of mining, but in budgetary organizations (I can confirm this, based on personal experience) it is much lower. And if we talk about unskilled personnel, then their salary is somewhere around the subsistence level. Thus, the northern "long ruble" was practically equal to salaries throughout Russia and turned out to be significantly lower than salaries for similar positions in cities such as Moscow and St. Petersburg. The dynamics of real income of the population, according to statistical data, continues to decline, and against the

backdrop of a significant rise in prices for goods and services (especially housing and communal services), the population has no incentive to continue living and working in the North;

the second of them is the outflow of qualified labor resources, mainly to the central and southern regions of the country. According to Rosstat, migration growth in the Far North has been negative for the last 5 years. This is especially true for such subjects as the Tyumen and Arkhangelsk regions, as well as the Komi Republic and the Khabarovsk Territory: in these territories the rate of negative migration is several times higher than in other subjects of the macroregion. Due to the lack of an effective personnel training system, a problem arises such as a shortage of qualified labor resources. The population is finalizing the northern experience, "harmfulness", "underground" (if there is a strong desire, this can be achieved by 35-40 years) and is looking for a place in warmer regions;

The third of them is the formation of labor resources - this is undoubtedly an important direction of socio-economic policy in the Russian Arctic.

However, in addition to this, it is necessary to solve several more pressing problems:

low labor productivity due to wear and tear of transport;

industrial;

energy infrastructure;

critical condition of housing and communal services facilities.

Researchers claim that already in 2021 these figures were close to 70% and the funds should last for a maximum of 5 years.

The low innovative potential of the northern regions of the Russian Federation is also not encouraging. In general, the volume of investments in fixed capital in the regions of the Far North increased by 13.5%, but in such subjects as the Republics of Komi and Tyva, Kamchatka and Primorsky Territories, Arkhangelsk and Tyumen regions, it continues to decline significantly, the number of investment projects within the framework of government-private partnerships are also decreasing.

Main part

The attention of researchers to the World Arctic (circumpolar North) is due to the fact that in the 21st century this mega-region is turning from the northern periphery into a zone of economic interests of all major states. Considering these strategic interests, it can be assumed that the field of "economic and political confrontation" will be the struggle for energy resources. "There will be a dialectical coexistence of the forces of cooperation and competition – a scenario that can be called a "friendly race"." Over the coming decades, the Arctic may become "the main storehouse of energy and mineral resources, and, therefore, the attention to it from the world community will be special. Thus, according to Science magazine, the

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Arctic contains 83 billion barrels of oil, which is 13% of the world's undiscovered reserves. Natural gas resources – 1550 trillion. m³ [, almost two thirds - off the coast of Russia. The U.S. Geological Survey estimates that the Arctic could hold up to a quarter of the world's undiscovered hydrocarbon reserves. The World Arctic includes eight states: Russia, Canada, USA, Norway, Denmark, Finland, Sweden and Iceland. Such a list of Arctic countries is given in the “Arctic Human Development Report” and materials of the Arctic Council. E.A. examines in detail the composition of the Arctic territories of the named states, their population and natural and economic potential, and state strategies. Korczak. Currently, non-Arctic countries are also showing significant interest in the Arctic: China, Japan, South Korea, Singapore, India, Great Britain, Germany, France, Italy, Spain, Switzerland and Poland. They have received observer status in the Arctic Council and take part in economic, social and cultural projects in the Arctic. The Arctic is the habitat of indigenous peoples, who are presented in international political discourse as the “Fourth World”. In Russia they are called a special community of the “fourth dimension”, forming an ecological system of values, as well as “saviors of civilization.”

The development of the Arctic has led to the emergence of many problems: demographic, environmental, social and settlement. All Arctic countries are attempting to resolve them using different approaches. Our focus will be on the consideration of demographic processes and the settlement of the Arctic. Based on this, the purpose of the article is to reveal approaches to the study of demographic processes and settlement of the World Arctic (MA). The following tasks were set: to conduct a comparative analysis of existing approaches to the study of demographic problems and the settlement of Arctic territories; identify the main characteristics of the population and demographic processes in MA; determine the features and trends of the processes of settlement and evolution of the settlement system of the Arctic territories. The object of the study is the World Arctic, which includes the territories of eight states, the subject of the peculiarities of approaches to the study of demographic problems and the settlement of Arctic territories. The scientific novelty of the article is due to a comprehensive retrospective and comparative analysis of approaches to the study of demographic problems and settlement of the Arctic. The practical significance of the study is that the results obtained can be used by executive authorities in developing programs and strategies for the development of the northern and Arctic territories.

Let's consider approaches to studying the demographic problems of the Arctic territories. To study demographic problems in domestic and foreign practice, various approaches are used. Let's consider the main ones, namely:

*statistical approach is most widely used in demographic studies. It includes obtaining statistical information about the population, processing the obtained data, constructing time series and distributions, analyzing patterns, as well as calculating population reproduction indicators. Statistical methods make it possible to model the reproduction of the population as a whole and individual demographic phenomena.

The descriptive-historical approach is based on the same information base and processing methods. It is used to determine the total population and its structure in certain historical periods in relation to the world population, the population of individual countries or parts of the world;

*the sociological approach is widely used in demographic research for a deeper understanding of the factors underlying the processes of natural reproduction of the population, marriage and family relations and migration mobility. It allows you to analyze not only the factors themselves, but also their reflection in the human mind. Using a geopolitical approach, the impact of migration outflow and natural population decline on national security is assessed. A reduction in population to a critical level, leading to depopulation of the Arctic territories, their low population compared to neighboring countries with rising demographic dynamics in the absence of free land for a growing population, can lead to a number of serious geopolitical disagreements;

*the socio-psychological approach is aimed at searching for the reasons for this or that intensity of processes, in the plane of the socio-psychological characteristics of an individual or social groups. A relatively new point here is the transition from the identification of the subjective interests of the individual, family and society as a whole, characteristic of early research, to the study of the socio-psychological aspects of the demographic behavior of individual groups of the population;

* the gender approach takes into account the variety of factors influencing demographic processes, the crisis of the modern demographic situation, primarily in marriage and family relations, through “the phenomenon of social self-organization in the relationships between the largest and primary social groups - men and women.” The importance of using a gender approach is mentioned in the report of the UN Economic and Social Council;

*demographic zoning is an approach that helps determine the composition of the population of Arctic territories.

There are three types of territories, namely:

*firstly, these are territories with relatively favorable natural and climatic conditions, where medical and geographical indicators allow the formation of a permanent population;

*secondly, these are territories that are uncomfortable for the permanent population to live in,

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in which priority should be given to the rotational method of development;

*thirdly, territories where, despite the need to resettle the excess population, it is necessary to preserve at least part of the permanent population.

When analyzing demographic processes, an intersectoral approach is effective. For example, to reduce mortality, “not only the capabilities of healthcare must be involved, but also all sectors that influence health, ensuring improved environment, working conditions, increased income, improved lifestyle, etc., so that funds for these goals were regarded as investments in human capital”;

*techno-economic approach interprets demographic behavior and differences in population growth rates from the standpoint of “the rationality of the economic interests of society, family and the individual”;

*ecological-biological approach considers demographic development from the point of view of its impact on the natural environment and ecological situation;

*a combined approach includes an analysis of the totality of socio-economic and biological relations between man and nature, in which substantive activity is of decisive importance for demographic processes and behavior. This method marks multiplicity or pluralism in assessing all manifestations of the demographic development of the world's population and allows us to identify the negative consequences of population growth/decline;

*the economic-social-material approach is used at the state level in almost all Arctic states in order to neutralize the harsh natural and climatic conditions of the Arctic, isolation from the “mainland” and difficult production conditions. The use of this approach makes it possible to attract human resources to the Arctic territories and form stable production teams;

*qualitative approach focuses on the influence of historical, spiritual, moral, ideological, psychological and other factors on demographic processes.

V.N. Barsukov and O.N. Kalachikov, according to the priority factor of demographic development, distinguishes economic, socio-economic, socio-psychological, institutional, population (biosocial, biogenetic), civilizational (historical-cultural) and phenomenological approaches, describes in detail what theory or concept each approach is based on, cites personalities.

There are a number of particular approaches to the study of fertility, mortality, migration and family. They propose measures to overcome the crisis of marriage and family relations, determine the degree of permissible state intervention in regulating the birth rate, what state policy measures can change the reproductive attitudes of the family to have few children or childlessness, how to make Russia attractive for migration, depopulation is justified by the spiritual distress of the family and society. “The whole

variety of points of view can be reduced to two paradigms - the paradigm of modernization and the paradigm of the family crisis.”

When developing the Arctic, foreign approaches differ from Russian ones in many areas: in demographic terms, in building interbudgetary relations, in infrastructure development. Thus, our northern neighbors are relying on the sustainable development and settlement of the territory. In Russia, northerners are almost forcibly resettled to the “mainland,” while the authorities of the state of Alaska subsidize (200–250 US dollars per month) old-timers and pensioners who remain to live here. In Alaska, “resettlement is encouraged, new infrastructure is being actively created, and working and living conditions are increasingly approaching the quality of life standards characteristic of the American mid-latitudes.” In Russia, the Arctic territories need a financial mechanism for development, but only stabilization is proposed. The Arctic regions transfer more to the federal budget than they receive transfers back; the level of budgetary security is lower than the Russian average. However, it is well known that inequality entails economic and demographic losses. Foreign companies use their technologies and the local population to develop the Arctic. In Russia, the situation is somewhat different: in an effort to reduce costs, mining companies are inclined to attract foreign suppliers of machinery and equipment and hire highly qualified foreign labor.

As for infrastructure, its lag is due to the established practice of developing the North and the Arctic, which in the Soviet period was based on the social standards of the Gulag and did not provide for the creation of normal living conditions for people. The North and the Arctic are both Tsarist and Soviet, and are currently treated as a “resource storehouse.” The development of the social sphere lagged significantly behind and was carried out “quickly and carelessly.” The huge spatial potential was practically not taken into account; those resources that could be sold without deep processing were used.

Let's consider approaches to settling the northern and Arctic territories. First of all, it is necessary to determine the goals and priorities for the development of the Arctic space. Today, two opposing approaches have emerged, namely:

within the first approach, the Arctic is considered as a source of natural resources, which makes the rotational method of development a priority while reducing the permanent population;

the second approach declares the Arctic a springboard for an innovative economic breakthrough, allowing for sustainable development of the Arctic territories and ensuring national security.

From this understanding of development priorities, two approaches to spatial planning for the development of the Arctic follow, namely:

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rotational – used in “resource” regions with a shortage of local labor resources or in conditions of insufficient infrastructure saturation of the territory. It is aimed at realizing the primary advantages of the Arctic territories - natural resource reserves. The weakness of this approach is that it consolidates the specialization of the region in the extraction of raw materials, the unevenness of development and development;

network (linear-nodal) - focused on the formation of large nodes in the Arctic agglomerations, which, thanks to the agglomeration effect and a high level of infrastructure development, will be able to serve as a core in the network structures of the economy. The concentration of labor resources in large nodes creates an “economy of scale”, and the rest of the territory acts as a raw material base (Russia, Norway - the Spitsbergen archipelago, Denmark - Greenland). However, such an organization leads to an outflow of labor and human potential beyond the boundaries of the “nuclei” of settlement.

Given the large territory of the Arctic and limited human resources, intensive and extensive approaches are used when resettling the population:

the first involves the development of agglomerations and group settlement systems, interconnected economically and by transport, the development of limited territories occurs at a minimum of costs;

The extensive approach involves the formation of a developed settlement system covering as large a territory as possible, with a network of support settlements, especially in border areas, taking into account the interests of the country’s defense capability.

The settlement system in the foreign Arctic is considered within the framework of the concepts of proximity and remoteness, a network approach, and transport connectivity of settlements. Its important feature is the presence of extremely remote or outlying settlements (from the English settlements at the edge) [and rotational settlements. It is noted that the evolution of the settlement system in the future will be influenced by climate changes occurring in the Arctic.

Thus, having examined the approaches most commonly used in domestic and foreign practice, we will demonstrate their application in the study and analysis of demographic processes and settlement systems in the World Arctic. Population and demographic processes of the World Arctic. The study of demographic processes in the World Arctic is reflected in foreign scientific literature. There is a connection between demographic processes, population migration and cycles of natural resource extraction. In recent years, the number of publications

on the socio-demographic characteristics of the population has been growing.

The World Arctic, which occupies an eleventh of the earth's landmass, is home to 5 million 438.5 thousand people, or 0.07% of the planet's population. Such “scissors” between indicators made the Arctic a sparsely populated territory - 0.41 people per square meter. km. Canada and Greenland are the least populated - 0.03, the USA - 0.43 and Russia - 0.51 people per square meter. km (Figure 1). At the same time, 232.5 billion dollars of GRP were produced in MA, which is 0.31% of world GDP.

The dynamics of the MA population are determined by the demographic processes occurring in the Russian Arctic. From 1989 to 2019, it lost 1 million 46 thousand people, or 30% of the original population. In the foreign Arctic, on the contrary, the population has been growing throughout the years - from 2 million 579 thousand in 1989 to 3.0 million in 2019, an increase of 420.5 thousand people, or 16.3%. As a result, the share of the Russian Arctic in the total population of MA decreased from 57.5% in 1989 to 44.9% in 2019. In 1989, there were 906.4 thousand more people living in the Russian Arctic than in the foreign Arctic, however, in 2019, the population of the foreign Arctic began to exceed the Russian population by 560.1 thousand people. The numerical superiority was lost at the turn of 2002/2003. In general, the population of MA from 1989 to 2019 constantly decreased (from 6.06 to 5.44 million people, or by 625.6 thousand people, Figure 2). In the population dynamics of the Arctic states, two opposite trends can also be traced: downward dynamics in the Russian Arctic and upward dynamics in the foreign Arctic (Greenland and the Faroe Islands had multidirectional dynamics). The numerical losses of the Russian Arctic - 1046 thousand people - could not cover the positive population growth of the Arctic states: USA - 202.2, Iceland - 105.1, Canada - 42.2, Norway - 28.9, Finland - 25.7, Sweden – 11.6, Faroe Islands – 3.9 and Greenland – 0.8 thousand people. There is one more feature - in the Arctic part of Canada, Iceland and the USA, the population growth rate was faster than that observed in the country as a whole: 51.7, 41.7 and 37.8%; 38.5, 41.1 and 33.7%, respectively, which indicates the active settlement of the Arctic territories. However, the long-term dynamics of population growth is fraught with the fact that newcomers will replace local residents. The shares of the population living in the Arctic part are insignificant: minimum in the USA - 0.2, Canada - 0.3 and Russia - 1.7%, maximum in Sweden - 5.0, Norway - 9.2 and Finland - 12.0 %. In most countries they are declining, which has led to a decrease in the share of the population living in the World Arctic as a whole from 1.4 to 1.0%.

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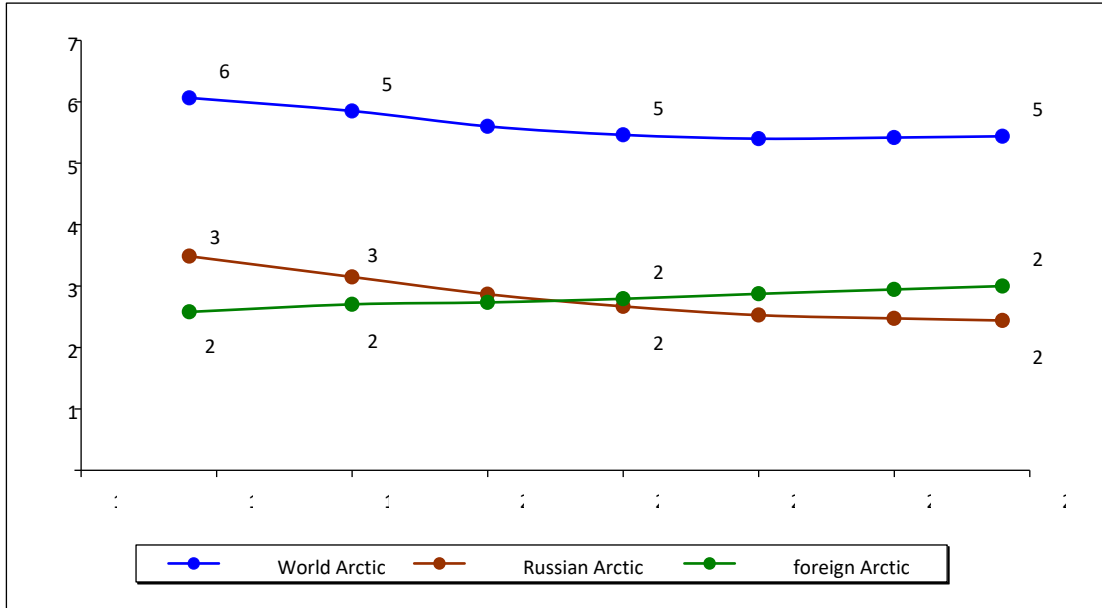
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Pic. 1. Map of population density of the Arctic territories at the beginning of 2021

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Rice. 2. Population of the World Arctic, 1989–2020, thousand people.

Let's consider indicators that reflect the similarities and differences in the demographic development of the Arctic part and the country as a whole. An analysis of the population structure by gender shows that in all foreign countries of the World Arctic, the proportion of men is more than 50% and higher than in the Arctic countries as a whole. In the Russian Arctic, the proportion of men is the lowest - 48.0%, which could not but affect the gender structure of the population of MA, where it is 49.6%. The increased proportion of people of working age has led to the fact that in the World Arctic the demographic burden on the working-age population is lower - 775 - than in the Arctic countries as a whole - 827, per 1000 people. It is lower in Canada - 667 and in Greenland - 672, high in Sweden - 955 and on the Faroe Islands - 947.

The relatively young age structure of the Arctic population ensures a high birth rate. If in the Arctic

parts the total fertility rate (TFR) is 1.71, then for the Arctic countries as a whole it is 1.67. The highest TFR is in the Faroe Islands - 2.48, in Canada - 2.09 and Greenland - 2.00. The lowest birth rates are in Norway - 1.54 and Finland - 1.59. The TFR correlates with the share of indigenous people in the population: where it is more than 15%, the birth rate is higher.

An integral indicator of the quality of life and health of the population - life expectancy (LE) in the Arctic countries as a whole is higher than in their Arctic parts, with the exception of women in Finland. This can be explained by gender differences in life expectancy - they are more significant in the Arctic territories, and the overall mortality rate is higher here. The highest life expectancy in the Arctic is for women in the Faroe Islands - 84.8 years, Finland - 84.3 years and Iceland - 84.1 years. Men have a high life expectancy.

Table 1. Demographic indicators and population settlement indicators for the countries of the World Arctic and their Arctic territories

A country	Population at the beginning of the year, thousand people			Change in number for 1989–2019, %	share of men, %	Demographic load per 1000 people of working age*		TFR, 2018	Share of indigenous population, %**	Life expectancy at birth, years*	
	1989	2000	2019			young	elderly			men	women
Arctic territories of the World Arctic	6064.1	5600.4	5438.5	-10.3	49.6	349	426	10.71	7.5	73.0	80.4
Russia	3485.2	2867.0	2439.2	-30.0	48.0	346	334	10.66	4.0	67.1	77.3

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USA	535.2	626.9	737.4	37.8	51.5	409	403	10.97	14.8	75.0	8
Finland	638.0	651.1	663.7	4.0	50.4	306	608	10.59	1.4	78.3	8
Sweden	509.1	514.8	520.7	2.3	51.0	336	619	1.69	3.9	79.8	8
Norway	460.3	466.7	489.2	6.3	50.9	325	527	10.54	11.4	78.9	8
Iceland	251.9	279.0	357.0	41.7	50.2	355	400	10.71	-	81.0	8
Canada****	81.6	93.3	123.8	51.7	50.8	382	285	20.09	53.3	74.1	7
Greenland	55.2	56.1	56.0	1.4	52.8	372	300	20.00	89.7	69.5	7
Faroe Islands	47.6	45.3	51.5	8.2	51.7	437	510	20.48	-	80.1	8
Arctic countries in general	444571	485940	541893	21.9	48.6	351	476	10.67	0.4	73.7	80.9
Russia	147400	146890	146781	-0.4	46.4	337	467	1.58	0.2	67.8	7
USA	246819	281422	329969	33.7	49.5	365	472	1.73	0.03	75.1	8
Finland	4964	5181	5523	11.3	49.4	354	635	10.41	0.2	78.6	8
Sweden	8493	8883	10324	21.6	50.3	358	537	10.75	0.2	80.6	8
Norway	4227	4478	5328	26.0	50.4	338	469	10.56	1.1	79.7	8
Iceland	252	279	357	41.1	50.2	355	400	10.71	-	81.0	8
Canada	27282	33477	37797	38.5	49.1	285	497	10.50	4.9	79.9	8
Denmark	5133	5330	5815	13.3	49.7	329	535	10.73	0.9	79.0	8

* Finland and Canada: men – 15–59 years old, women – 15–54 years old; other countries: men – 16–59 years old, v 16–54 years old.

** Russia - indigenous peoples of the North in 2010, USA - Indians and Alaska natives in 2010, Finland - Sami in 2017, Sweden and Norway - Sami in 2017, Canada - aboriginal population in 2016. , Greenland - Inuit in 2018 *** Norw. 2011-2015, Sweden - 2014-2018, Finland and Canada - 2015-2017, USA - 2017, Denmark - 2017-2018 , Russia an Iceland – 2018

**** Yukon, Northwest Territories and Nunavut included.

The settlement of the northern and Arctic territories from the perspective of a descriptive-historical approach took place in the form of colonization. In addition to the economic impact, resettlement and colonization had an impact on the culture of peoples. The specificity of Russian colonization was manifested in the fact that the surplus population moved not to other countries, but to remote territories of the Russian state. The Russian settler did not feel like leaving his fatherland. The difference between colonization and resettlement is that “resettlement is a private act, while colonization is a public act.”

The most essential prerequisite for successful colonization is the state's right to the country's natural resources, primarily land. But when settling territories where the indigenous population lives, there is a need to reconcile opposing interests and conduct land policy in such a way as not to offend either those who want to preserve their land or those who want to acquire it. How colonization took place in Russia, America and other parts of the world is discussed in detail in the work of L.L. Rybakovsky. Colonization

of the European North began in the 10th–12th centuries. with the penetration of the Slavs into sparsely populated lands with a Finno-Ugric population (Karelians, Komi, Nenets, Vepsians, Sami) and ended in the 17th century. with the entry of the North into the Moscow state. The annexation of Siberia and the Far East took place from the end of the 16th – beginning of the 17th centuries, ending in the middle of the 19th century. Using a demographic approach, we can conclude that by the beginning of the twentieth century. the process of colonization of the Russian outskirts, including the Arctic, was completed. “The main component of population growth—resettlement—is being replaced by another component—natural population growth.”

Let us briefly consider the history of the colonization of the foreign Arctic. In Northern Norway it began in the early Middle Ages, during the Viking Age. The Norwegian North has undergone an accelerated transition from the old communal life and welfare state to rigid market relations. Today the future of the country is connected with the oil and gas industry. The colonization of Alaska occurred in the

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mid-18th century by Russian people. Trade and fishing activities were a form of cooperation with the local population. Coal mining began in the 19th century. In 1867, Alaska was sold to the United States, followed by gold and copper rushes. In 1930–1950 military construction was actively carried out. Overall, this contributed to a sharp increase in population. The first Europeans appeared in the Canadian North in the 9th–10th centuries, but until the middle of the 18th century. The settlement process was sluggish, only the capture of Canada by England accelerated the penetration of Europeans into the Canadian North. In the 20th century, the impetus for settlement came from military construction and the availability of natural resources. In the 10th and 1st centuries, the process of systematic settlement of MA, the formation of a network of permanent settlements, and a settlement pattern continued. The main economic interest of all countries of the World Arctic is energy resources. There are features of the development of territories that are characteristic of both the Russian and foreign Arctic: an increase in the cost of most types of activities; spatial unevenness and discontinuity, low population density and infrastructure placement; few settlements. The stages and specifics of the formation of settlement systems in the World Arctic are described in sufficient detail by O.M. Blagodeteleva. For the Russian Arctic, the vector of population settlement for the long term is determined by the “General Scheme of Settlement on the Territory of the Russian Federation.” It proposes a number of fundamental approaches, namely:

- *not to form permanent settlements in places with unfavorable medical and geographical conditions, in connection with which a transition from a residence policy to a residence policy for the non-indigenous population is proposed;
- *develop large urban settlements - the basic centers of population residence, concentrate the population in promising settlements with a stable socio-economic base, do not create new small settlements, and more widely introduce the rotational method of labor organization;
- *it is recommended to limit urban growth as much as possible; ensure strict selection of persons arriving in the northern regions based on profession and health status; a gradual transition to the implementation of planned shifts of workers;
- *it is necessary to overcome the increasing stagnation of small and medium-sized urban

settlements that determine the economic and social life of the surrounding rural areas.”

The modern settlement system is formed by the industrial nature of the development of the Arctic, which determined the increased share of the urban population and the specifics of Arctic urbanization. However, when assessing the level of urbanization, we are faced with the existing methodological difficulty of classifying settlements as urban. In most countries, the criterion for city status is population size. The UN proposes to take the population of 2 thousand inhabitants as the lower boundary of the city, which does not negate national specifics. Thus, in Norway, cities include settlements with 5 thousand inhabitants, in the USA - with 2.5 thousand inhabitants, in Sweden, Iceland and Denmark - with 200 inhabitants. In Russia a city is considered to be a populated area with a population of at least 12 thousand, but there are cities with smaller populations. In the Russian Arctic, along with cities, there are urban-type settlements as a transitional form between real cities and rural settlements. The diversity of approaches makes it difficult to compare the degree of urbanization of Arctic territories. In the development of settlements, two opposite trends have emerged: the number of small settlements with the number of inhabitants up to 5 people is increasing, while the population is concentrated in large settlements - over 5 thousand inhabitants. Today, world statistics take into account settlements with a population of over one thousand, which narrows the information base. In the World Arctic there are 416 settlements with a population of over a thousand people. Of these, 34.9 are located in Russia, in Sweden – 13.9, in Finland – 13.7, in Norway – 12.5, in Iceland – 8.2, in the USA – 6.7, in Denmark – 5.3 and in Canada – 4.8%. The density of settlements in MA is very low - 0.32 settlements per 10 thousand km². The overwhelming majority of them have a population of up to 5 thousand people - 71.6%, from 5 to 10 thousand - 11.8%, from 10 to 20 thousand - 8.4, over 20 thousand people - 8.2%. The highest proportion of settlements with a population of up to 5 thousand people is in Denmark – 86.4 and Canada – 85.0; the lowest in Russia – 66.2 and the USA – 60.7%. The maximum population of settlements in the USA is 16,688 and Russia is 15,944, and the minimum in Canada is 4,281 and Denmark is 3,472 people.

Table 2. Population distribution of the World Arctic, %

A country	Population, total	Including by settlements with the number of inhabitants						
		up to 1000	1000–4999	5000–9999	10000–19999	20000–49999	50000–99999	100,000 or more
World Arctic	100.0	18.2	12.2	6.3	10.4	12.0	6.8	34.1

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Russia	100.0	5.9	9.0	3.9	11.3	13.0	6.8	50.1
USA	100.0	37.0	5.9	8.1	-	8.8	-	40.2
Finland	100.0	24.9	11.5	10.1	7.2	8.6	7.9	29.8
Sweden	100.0	26.7	19.9	6.6	13.6	16.3	16.9	-
Norway	100.0	37.7	17.2	9.4	14.2	8.3	13.2	-
Iceland	100.0	4.8	17.6	7.5	14.8	18.9	-	36.4
Canada	100.0	29.1	27.5	6.4	16.2	20.8	-	-
Greenland (Denmark)	100.0	17.5	40.8	9.8	31.9	-	-	-
Faroe Islands (Denmark)	100.0	39.2	34.5	-	26.3	-	-	-

Most of the population of MA lives in settlements of up to 50 thousand people - 3 million 213 thousand (59.1%), and in Iceland the number of this group is 215.1 thousand (63.6%). In Finland, 358.1 thousand live in settlements of up to 20 thousand (53.7%). In the USA and Sweden, half of the population lives in small settlements of up to 10 thousand - 378.1 (51.0%) and 275.0 (53.2%) thousand, respectively. In Norway, Canada, Greenland and the Faroe Islands, the population is concentrated in small settlements of up to 5 thousand people - 404.9 thousand people, or 24.5% of the total MA population living in such settlements (Table 2) .

In 2017, there were 15 cities in the World Arctic with a population of over 50 thousand people, of which 9 are located in Russia, 5 in Western Europe, 1 in the USA. The largest Arctic cities of Russia are Arkhangelsk (351,488 people), Murmansk (298,096), Severodvinsk (183,996), Norilsk (178,018); USA - Anchorage (298,192 people - 40.2% of the population of Alaska); Finland - Oulu (198,358 - 29.8% of the urban population), Rovaniemi (52,481); Iceland - Reykjavik (123,246 - 36.4% of the urban population); Sweden - Umeå (87,238); Norway - Tromsø (64,448). A number of countries have only small cities: in Canada - Whitehorse (25,085 people) and Yellowknife (19,569); in Greenland - Nuuk (17,796) and on the Faroe Islands - Tórshavn (13,130). Considering the dynamics of the population of large cities for 1989–2019, it can be noted that in all cities of the foreign Arctic there was an increase, and in the Russian Arctic - only in 2 out of 9 (Noyabrsk and Novy Urengoy). The largest loss of residents was registered in Vorkuta, Monchegorsk, Murmansk and Apatity. It is important to preserve cities because they are poles of economic growth, “connecting transport hubs, important information, scientific and cultural centers for the surrounding areas.” From the above material, a number of conclusions can be drawn, namely:

*despite the fact that in most works and policy documents preference is given to the rotation method, it should be noted that base or support cities are

needed for the development of rotation. They could be cities that have been successfully operating in the North and Arctic for decades. For example, for all oil fields in Siberia, the base city is Tyumen, and the city of Mirny, in addition to servicing oil fields, supplies watches to diamond fields. In the Komi Republic, such a city is Usinsk, Vorkuta and Inta could become such a city;

*the need to preserve the network of permanent settlements is related to the geopolitical approach:

1) in order to consolidate your sovereignty in the Arctic, you need to have a permanently living population in it, adapted to local climatic conditions;

2) rely on medium and small cities, since agglomerations attract the population, expose adjacent territories, make them “nobody’s”, tasty lands for other states; 3) it does not seem appropriate to transfer established cities to the category of rotational cities for both technological and social reasons.

Issues related to population, demographic processes and settlement of the World Arctic are considered. It is noted that many problems have accumulated in the Arctic: from socio-demographic to settlement. Each country solves these problems in its own way, using both universal and specific approaches. The work aims to consider the approaches used in Russian and foreign practice when studying demographic processes and settlement of the World Arctic: demographic zoning, gender, geopolitical, qualitative, combined, cross-sectoral, descriptive-historical, statistical, network, systemic, socio-psychological, sociological, technical-economic, ecological-biological and a number of others. Using these approaches, the process of settlement/colonization, the population settlement system, and demographic trends in the World Arctic were studied. It is noted that the colonization of the European North of Russia took place from the 10th to the 17th centuries, Siberia and the Far East - from the end of the 16th to the middle of the 19th century. The settlement was carried out by its own people; Russia did not need to attract migrants from other countries. Based on the demographic approach, it was concluded

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that by the beginning of the twentieth century. the colonization process was completed, natural demographic development and further development of outlying territories began. In the foreign Arctic, in the initial period, colonization was of a trade and fishing nature, then the extraction of raw materials was carried out. From the first half of the twentieth century. Military interest began to dominate, today economic interest prevails in the development of the Arctic. In demographic development, two opposite trends are noted: the declining dynamics of the population in the Russian Arctic and its constant growth in the foreign Arctic. The settlement network of the Russian Arctic was formed by cities of different sizes; in the foreign Arctic, small settlements were created in the initial period; now the network of medium and large cities is expanding. In recent years, the rotation method has become more widely used in the World Arctic.

Conclusion

Thus, the expected results of the activities of the State Commission for Arctic Development have not been achieved. Chairman of the Commission Dmitry Rogozin considers the reason for the negative interim result to be inconsistency on the part of all executive authorities: "Systemic decisions taken collectively by the state commission are often reduced to zero by the lack of subsequent proper execution." What conclusion can be drawn from the above? Work on the development of the Arctic zone of the Russian Federation is underway, and although we all face huge intractable tasks, there is still time until 2035. And in order for projects and strategies to work, it is necessary to include them "on the ground." Regions, with the help of support and control "from above," must help themselves move from the heroic exploration of the North to comfortable living in it.

Attention to the World Arctic has grown steadily over the past hundred years and will continue to grow due to its natural resources. Despite the increased interest of the governments of the Arctic states, the presence of strategic plans, and significant investments, many problems have not been resolved and require new understanding and "redevelopment." As in the previous period, the cost minimization approach remains. Taking this into account, the following approach to the settlement of the Arctic is proposed: move from a policy of residence to a policy of residence of the newcomer population, in particularly extreme conditions, make maximum use

of the rotation method. There is still no single point of view on how to populate the Arctic. Proponents of the intensive approach propose to develop the Arctic in a targeted manner, creating large agglomerations and group settlement systems, which reduces costs. From the point of view of geopolitical and extensive approaches, it is necessary to form a settlement system that maximally covers the border Arctic space. The accumulated experience of the development of the North and the Arctic shows that a significant part of small and medium-sized settlements with the depletion of the resource base will cease to exist, since they have no options for changing their specialization. An example of this is the miner Inta. At best, some of them can become the basis for intra-regional shifts, if corporate interest in the use of the rotation-expedition method does not prevail.

In the World Arctic there is a peculiarity in the development of demographic processes: in the foreign Arctic there is an upward population dynamics, in the Russian Arctic there is a downward trend, which reduces the already low population of the territory. This led to the fact that the population of the foreign Arctic began to exceed the Russian one by 0.5 million people. The Arctic has a younger age structure, a lower demographic burden, and a fairly high life expectancy. In a number of Arctic countries, the TFR practically ensures simple reproduction of the population.

The North and Arctic are highly urbanized. In the Russian Arctic, a developed settlement system has been formed, including cities of different populations, full-fledged infrastructure, and developed transport. The foreign Arctic was initially developed using a rotational expedition method with a few settlements of narrow specialization, but in recent decades there has been an increase in urban settlements with developed infrastructure, no different from the main part of the country.

The contribution of this article to the study of the problem under study lies in the fact that almost all known approaches to the study of demographic problems and the settlement of Arctic territories are summarized in one work. The elements of novelty include the fact that the proposed approaches are used in the analysis of demographic problems and consideration of the features of settlement of the entire World Arctic. In the future, it is necessary to study the experience of solving demographic problems and population resettlement in the World Arctic.

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Article



Alina Aleksandrovna Matvienko

Institute of Service Sector and Entrepreneurship (branch) DSTU
 bachelor

Anastasia Viktorovna Prokudina

Institute of Service Sector and Entrepreneurship (branch) DSTU
 bachelor

Artur Aleksandrovich Blagorodov

Institute of Service Sector and Entrepreneurship (branch) DSTU
 master's degree

Vladimir Timofeevich Prokhorov

Institute of Service Sector and Entrepreneurship (branch) DSTU
 Doctor of Technical Sciences, Professor
 Shakhty, Russia

Galina Yurievna Volkova

LLC TsPOSN «Ortomoda»
 Doctor of Economics, Professor
 Moscow, Russia

**ON THE IMPORTANCE OF THE SOCIAL BASIS OF TRANSPORT FOR
 THE SOCIAL AND ECONOMIC DEVELOPMENT OF REGIONS OF THE
 RUSSIAN FEDERATION**

***Abstract:** in the article, the authors consider the structure, functions, and specifics of the systemic status of the social form of transport in the historical context and as a policy factor. The author's understanding of social transport differs from the existing one, but it is not an alternative. The analysis of social transport was carried out as a desire to solve ideological and methodological problems related to the fact that the officially recognized definition of transport is one-sided, both theoretically, logically, and methodologically. It reflects the level of general ideas in the process of cognition and cannot be correctly integrated into a systems approach, which, in turn, reduces the productivity of knowledge in its practical and political application. The use, along with the term "social", of the terms "human", "artificial", "social" does not mean their substantive identity, it's just that in the existing epistemological situation these differences are not significant, therefore, within the framework of solving the main task - to overcome the one-sided interpretation of transport as carrier and to develop the functional purpose of transport in the organization is necessary - sufficient conditions for social construction can be neglected for now. The methodological and theoretical aspects of the study of social transport, where appropriate and justified, are brought to practical conclusions. Verbal analysis is accompanied by conical analysis. Particular attention is paid to the issues of managing the organization of social transport, in particular, the capabilities of multi-transport complexes as ways to effectively design space and time as conditions for the implementation of free human activity and the implementation of social progress in general. If the general goal of social progress is considered to be the improvement of human well-being with the full development of the freedom of his activities, then the strategy of social construction should be focused on the systemic importance of the development of social transport, as a carrier and as a constructor of the conditions of freedom of all social subjects.*

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Introduction

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Transport, which is a universal tool in organizing the movement of matter, has a unitary nature, which, depending on the form of movement, acts in a specific way, creating the impression of autonomy of its individual expressions. There are no different types of transport, there is a variety of ways of its manifestation, revealing the qualitative specifics of movement. Spiral; twisting transport history, common to all varieties, but within the development of transport, each of them has its own historical turn, distinguished by the originality of patterns that complete the unified essence of transport. The differentiation of transport shows its participation in the formation of new levels of movement; the diversification of transport functions reflects the need for new actions in connection with the development of the organization of matter. The general theory of transport allows us to maintain a course focus in the study of its varieties, their relationships, but, especially importantly, the general theory and methodology for determining the political value of transport in the process of social construction and preserving the natural conditions of social movement. A social movement turns natural conditions into factors that ensure social progress, so political correction is required. Factors that naturally ensure social progress should not be factors in crises of natural development itself. And here an understanding of transport adequate to its actual status is necessary as a measure of both social and natural movement. Managing the interaction of the movement of the natural environment of society is based on transport policy, in which human interests and the laws of the natural system must be coordinated. The history of mankind does not allow one to smile when reading the phrase: transport policy forms the core of the system-forming factor in organizing the interaction of society and the natural environment of its movement. "National" and "universal" (global) ideas designed to consolidate social advancement must be based on a socially dominant attitude in policy towards transport construction. In the meantime, it will dominate in the public consciousness, the utilitarian - local idea of transport, as a means of ensuring the movement of people and cargo, cannot be rationally solved either national or global problems. It seems that the military was the first to approach this

truth. In any case, armed competition is already built on achieving an advantage in traffic control, or more precisely transport, as a tool of movement. There are encouraging examples of awareness in civilian practice: China has raised railway traffic to the Himalayas, Japan is energetically investing in the development of high-speed rail traffic, Russia is seriously engaged in transport provision in the Arctic, more and more countries are rushing into space, striving for its practical use, the EU is trying to be a leader development of "green" transport. The complex essence of transport was improved in the process of its evolution. By the time transport ascended to the next round of the spiral of its development and became "human" transport, it was already clear that the spiral of transport ascent had a specific design. The spiral of historical transformations of transport is double. It is similar to the helix of DNA organization in living matter. The double helix is a sign of the perfection and significance of the status of the phenomenon that transport is for all regions of the Russian Federation.

Main part

The privilege of transport is due to the peculiarity of its place in the movement of matter. The very immanence and universality of the presence of matter in the movement is sufficient to recognize the special purpose of the phenomenon, and transport, moreover, as we have shown in previous publications, plays a key role - it serves as an instrument of movement. In this connection, it is advisable to clarify one essential detail in understanding movement.

Taken in general, that is, as a set of all forms and types, movement is most often interpreted through the way it manifests itself. In Russia, as a rule, they refer to F. Engels' definition of movement, reducing the author's text to the basic concept of "change." F. Engels really emphasized the key meaning of change in movement, but, firstly, he did not reduce movement to change, and secondly, what is important is how he interpreted change, drawing specifically for this purpose on a historical outline of the progressive progress of natural science. And without question, it is clear from the text that changes in the form of movement are extremely significant, but they are the simplest manifestation of movement. F. Engels wrote: "Movement, considered in the most general sense of the word, that is, understood as a way of existence of matter, as an attribute inherent in matter, embraces all the changes and processes occurring in the universe,

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starting from simple movement and ending with thinking.” The interpretation of transport, which is an instrument of movement in its total understanding, should not be limited to noting changes in space and time. Transport takes various parts in all changes occurring in movement, including in the reconstruction of the existing reality and in the construction of a new reality. We have already noted that, in our opinion, the construction function of transport is mainly focused on creating necessary and sufficient conditions for construction. In this way, transport apparently differs from construction as such, that is, we are not talking about the displacement of transport from the construction movement structure.

They complement each other. Unlike construction, which is always construction, transport is always a tool for organizing the conditions of the construction process in space - time, the space of temporary support for construction. His work is more like a preparatory process for the main part of the construction. Transport prepares and accompanies the construction part of the movement. The construction function of transport can be expanded on the example of its human form of development. Cognitive activity is inherently associated with the development of human transport.

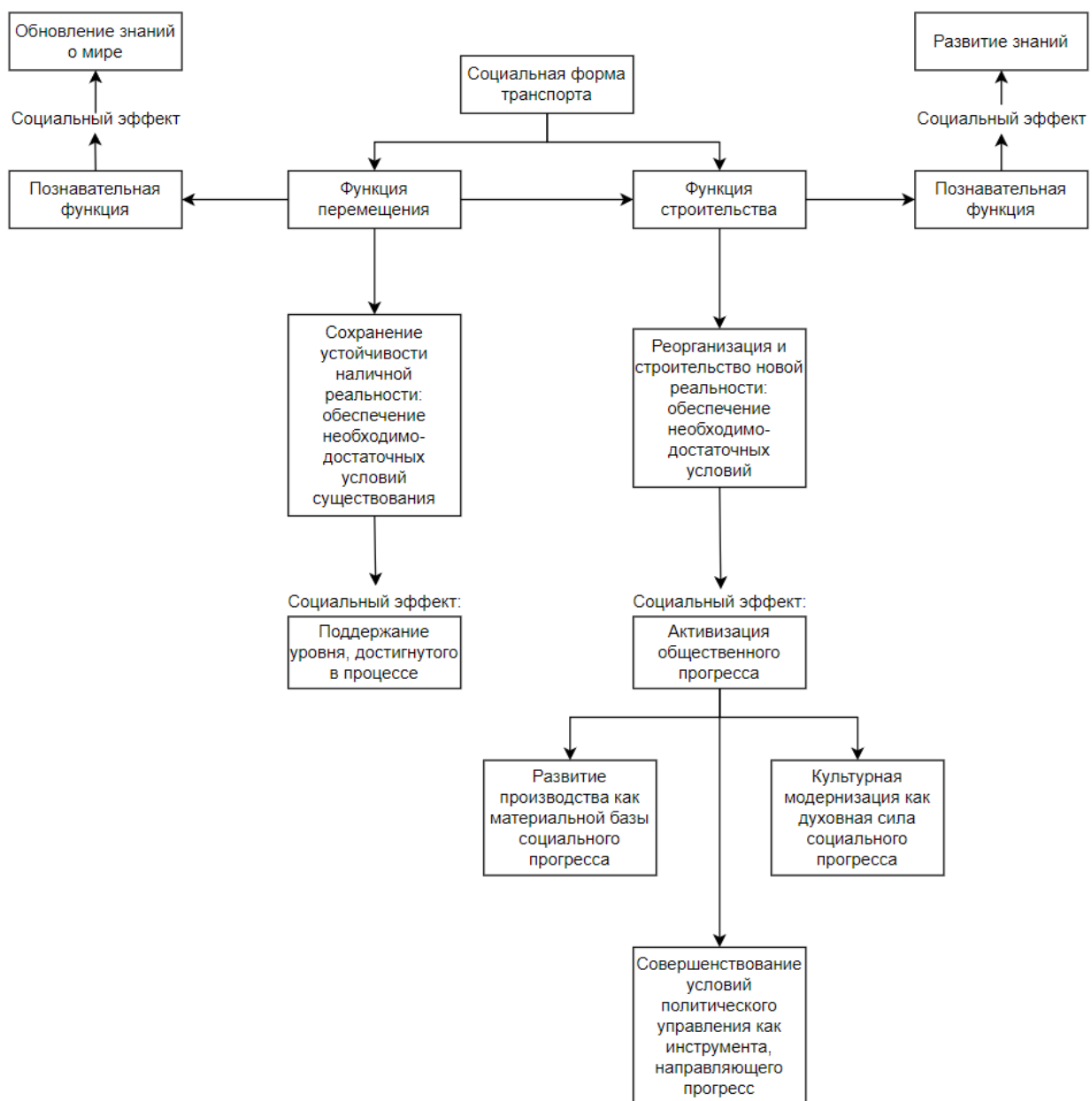


Figure 1. Functions and social effects of the functioning of a social form of transport.

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Participation in the process of cognition, as well as the very process of the formation of cognition, starting with its history in the animal world, is indicative of understanding the development inherent in transport. This function, unlike the first two - to serve as a tool for movement and to provide necessary - sufficient conditions for construction, is not universal and therefore does not belong to the fundamental tasks of the existence of transport, but it is of utmost importance for the actualization of transport in society. It was the basis for man's "conquest" of the world and ensuring the growth of individual freedom of activity. Transport was initially the only tool for man to move from a known part of the world to an unknown one; expansion and deepening of a person's worldview and understanding of the world.

A simple list of social effects from the implementation of the functions of transport support for social progress allows us to assess the significance of transport in the history of mankind, first of all, in improving material production and the conditions of individual freedom. The definition of social transport as a branch of production reflects only the external manifestation of transport and, unfortunately, not in proportion to the actual role of transport. Transport has long been a product of labor; moreover, it forced people to develop a special branch of transport production. In those cases where the construction of vehicles was carried out in places located on waterways that were important for life, transport specialization of production became the leading industry. There is enough evidence for this: T. Heyerdahl, planning the passage across the Pacific Ocean, used the experience of building rafts that had developed over centuries of practice among the local population - Indian tribes. The plan of the famous Norwegian researcher turned out to be correct, his calculations and expectations came true. The journey undertaken under the leadership of T. Heyerdahl from Peru to the Tuamotu archipelago first showed and then confirmed the possibility of the settlement of Polynesia by residents of the eastern coast of South America. In 1953, T. Heyerdahl discovered the remains of settlements of the pre-Incan period on the Galapagos Islands. Three years later, a researcher of the Indian migration route, conducting archaeological excavations on the Easter Islands, Rapa-Iti and Marquesas Islands, clarified the time of their settlement by mainland migrants (IV century AD). Convinced of the validity of his version of the settlement of people using homemade vehicles from natural materials available for primitive production, T. Heyerdahl in the 1970s organized passages on papyrus boats "Ra" and "Ra-2" from the shores of Morocco to the shores of America. His last expedition along the route Iran - the mouth of the Indus - Djibouti was also carried out on papyrus ships. Some African tribes were considered masters of making watercraft from

papyrus. Domestic Northern Slavs - Pomors, who lived on the shores of the White Sea, had experience in building large boats for coastal navigation for the purpose of fishing and catching sea animals, by the 11th century they designed a sailing and rowing fishing vessel "koch", flat-bottomed, single-deck with raised edges and a small draft. Koch was equipped with a mast, sail and mounted rudder. The length of the vehicle did not exceed 20 m, the carrying capacity reached 30 tons. Kochis were built without the use of metal. In the Middle Ages, kochi were actively used for the development of the Urals, Trans-Urals and Western Siberia. It was impossible to settle new lands without nomads, or it was extremely difficult in practice and would have required much more time, which significantly limited the pace of social development. Representatives of the Scandinavian peoples were called "Varangians" in ancient Russian chronicles, without distinguishing them by nationality. The "Varangians" played a significant role in the formation of statehood in Rus'. Before the Romanovs ascended the throne, power belonged to the Rurikovichs, who were descended from representatives of the Scandinavian leaders called upon to rule. In the domestic mass historical consciousness, the mention of the Varangians is usually associated with the hired armed force, which made up a significant part of the Russian army that was under the princes. In reality, Scandinavian mercenaries were only part of the Scandinavian presence in Russian history. The "Varangians" actively developed merchant shipping along the famous Middle Ages highway "From the Varangians to the Greeks," that is, from the shores of the Baltic to the Black Sea, where settlements created by the Greeks remained, mainly in the Crimea. Transport not only connected the South of Eastern Europe with the North, but also made a major contribution to the social development of that territory, which the great Russian princes subsequently united under their rule. The transport route, like an electric line, created fields of attraction for the population around itself - the organization of construction, trade, production, and cultural life. Along the river systems used during the transition "from the Varangians to the Greeks", many domestic cities were formed as political and cultural centers of the Russian land. The dependence of social progress on the development of transport described above is a natural phenomenon. It was typical of Antiquity, when most of the famous states were formed on the shores of the Mediterranean Sea and in the basin of rivers flowing into it. The same thing happened in the northern part of Europe adjacent to the Baltic Sea. The magnetic power of transport lies in its ability to move, however, apparently, the main factor is not the fact of movement itself, but a sign of stability, repeatability, and the ability to control the movement of transport. Thanks to its ability to act with a given consistency of repetition, transport

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becomes not only a means of movement, it becomes a way of communicating with people, opening up for them the prospect of communication and activity. In Russia, the departments responsible for transport transportation were officially called departments, corps, and ministries of transport. The last government agency with a name containing the combination of “communication route” was abolished in the 1990s. This was the Ministry of Railways, which managed the railway transport of the USSR. History does not forgive haste in making political decisions on a state scale. It was during this decade that for the first time since 1837, the growth of railway lines decreased by 1,200 km. Reformers in the 1990s tried to simplify transport costs by eliminating its function as a means of communication for the state's population, which could lead to the collapse of the integrity of the state. It is also impossible to imagine the highest socio-economic achievements of the USSR, as well as its main successor the Russian Federation, without the development of railway transport, like US progress without improving the highway network and

automobile production. Already at the beginning of the reign of Alexander II, who replaced Nicholas I, individual railways were united into a network (1857), and a ministerial form of government was formed (MPS - 1865). As a result, over the remainder of the 19th century, the length of public railways increased from 680 km (1851) to 70,260 km (1917). Railways, which domestic conservatives fiercely fought against, believing that they could undermine autocratic power and its social supports - serfdom of peasants, class gradation of the population, which deprived a significant part of civil rights, who argued that the climate and topography of Russia would make railway communication impossible or wasteful for the treasury, became a national mode of transport. The founder of domestic railway construction, P. P. Melnikov, argued: “Railroads are extremely necessary for Russia, they can be said to have been invented for it more than for any other country in Europe, the climate of Russia and its space characterize them as especially precious for our fatherland.” (Figure 2).



Figure 2. Change in the total length of railways in Russia, the USSR and the Russian Federation

The railway connection has a number of significant features: it is the most materially and energy-intensive, it requires a developed construction industry, a high level of scientific and technical support and the art of management. The history of Russian railways is an excellent encyclopedia of what should and should not be done and how it should be done when managing such a large-scale and nationally significant facility. The political events that became

the content of two decades after the abolition of the USSR showed not only the significance of great national achievements in the development of transport, but also high risks. In order to undermine the economic foundations of a state, whose history since Peter the Great has been based on transport construction, there is no need to destroy the entire national economy. It is necessary to break the transport system and there will be a complete

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economic collapse. The domestic economy, managed by reformers, stopped at the very edge of the abyss of national bankruptcy thanks to those who ran the Ministry of Railways, held the defense against the shock initiatives of pseudo-democrats until the change in the political leadership of the country. Reforms at the end of the 20th century deprived Russia of river and sea transport, as well as famous shipyards, automobile production stalled, and aircraft production stopped. The entire burden of transport responsibility fell on the shoulders of the railways. And the systematic way of organizing them coped with its task, although not without losses. The reform initiative, always distinguished by energetic pressure, is very often disqualified by historical illiteracy and poor knowledge of international experience, in particular Great Britain, France, and Spain. The history of railway transport, and not only it, indicates the need to adapt the requirements of self-financing and the combination of private ownership with state ownership from the specificity of production activities. The economic component of the transport management system in a national format cannot be absolutized where transport determines the quality of national development. We have no reason to doubt the good intentions of either ours or all other reformers. Politics is a complex matter, therefore, in addition to the desires of the most noble, politicians are obliged to build their plans in a system of objectively determined coordinates of the social movement in space - to measure the size of the social space and the time of implementation of the plan, but most importantly, they must realize that reforms in society are something, a related transport organization. Any movement requires its own locomotive. Reforms risk becoming "good intentions" that pave the way into the social abyss if they are not theoretically supported and the reformers have not decided on a "locomotive" that can be trusted to move towards the desired future. The social structure and the logic of its change, in a formalized form, look very simple: society is a system of people, their activities and relationships determined by activity. Activity creates an economy, culture and the need to manage the social complex. The social contradictions of a developed society cannot be resolved on their own. The state comes to the rescue, also a product of people's activities in their own interests. Ideally, the state should be equidistant and equally concerned in relation to all its citizens. Formally, democratic power looks like this, but real contradictions are much richer than the formally established responsibilities of the state. Forces in society swing social movement "right", "left", "backwards", "forwards", like sea waves and ship currents. On ships, they maintain a course with the help of a compass and instruments that orient themselves by celestial bodies; in politics, the course should be set by a scientific understanding of the movement of social progress. In existing existence,

politics is capable of disregarding the laws of development. Social laws have a statistical form; they are expressed in the dynamics of phenomena that are themselves mobile and can, therefore, be "moved" by politics. Phenomena gain social strength over time, and the shrinking force field of space gives strength a vector of action. The law in society is that a perfect ship at sea will take its course and straighten its movement, but time will be wasted, and the social space will not be properly equipped. All subsystems of society have a "human face", are created and are driven by people, economic policy should not steer the movement of society. Its destiny is to ensure the exchange rate movement of production development. Social policy is called upon to steer. All political decisions require humanitarian expertise, checking to what extent they correspond to the interests of those who did everything that politicians manage. Economic policy, due to its status - to move the production base of human life, to create material wealth, is significant and responsible. However, it is a component of the social system, and it is not supposed to measure its quality by its own criteria. It is not economic, but social and humanitarian criteria that determine the quality of any policy. "Profitability" is a purely economic indicator, and it is undoubtedly significant in determining the economic organization of a business, within the framework of localizing the production process. The spread of profitability as a universal measure contradicts the systemic construction of society and its orientation towards improving human life as a social rather than an economic subject. The economization of the management of social progress introduces a dangerous tilt into the social movement, and during "shock" reforms this tilt acquires critical significance. Even when it is possible to neutralize the risks, their delayed effects for a long time do not allow society to calm down and return to normal movement and stability. Let us repeat: the movement of a "social ship" is formally the same as that of an ocean-going vessel. Private railways appeared in the Russian Empire at the end of the reign of Nicholas I. In 1868, part of the state-owned roads was sold. After 13 years, the government realized the shortcomings of commercialization of the railway service and began to buy out private roads. After which the development of the road network and the quality of construction work noticeably intensified. Economic development in general has become more intense. However, the Russian rulers of the Romanov dynasty failed to extract and correctly use the advantages of the construction of railways. Transport in the USA and economically mobile countries of Western Europe was recognized as a locomotive of socio-economic development already in the third quarter of the 19th century. Russian monarchs and most of their courtiers continued to plan transport construction with an eye to the possibility of undesirable changes for the

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autocratic system. They were frightened that in the domestic economy, even before the opening of the first “real” railway St. Petersburg - Moscow, characteristic signs of a market economy appeared, which, according to European history, was followed by a bourgeois-democratic restructuring in the socio-political sphere. During the transition to steam traction in railway transport, the number of workers in Russia increased to 505.1 thousand people, increasing 6 times compared to 1804. Almost 90% of the workers were already civilian employees. The number of industrial enterprises has exceeded 15 thousand, and a third of them were built over the past 25 years. The government of Nicholas I, with some decrees, opened up the prospect of railway construction, while with others it hampered the progress of the economy. The Industrial Revolution created scientific and technical conditions for organizing mass production; mass production presupposed the need for transport support with modern technical means. The consolidation of production was required; you cannot connect a railway to every village or small urban settlement. The desire to make the first railway as efficient as possible left even large cities aside from the main route. At the same time, with the knowledge of the emperor, the organization of centralized production was restrained in every possible way: the construction of new factories and plants, technical modernization was prohibited. In the Vladimir province there were 18 thousand machines in factories in the 1840s, and 80 thousand in private village houses. Handicraft production was encouraged. They did not see it as a serious danger to the existing political system, and besides, the artisans paid rent to their landowners. The Minister of Finance, Count E.F., vigorously opposed industrialization and the development of railways. Kankrin is a person known for his conservative autocratic views. Meanwhile, the count's surname is often used by historians of our time in an innovative context, as well as P.A. Stolypin, who, on the contrary, sought to actively load the railways with settlers in the Eastern regions of Russia in order to reduce the density of the rural population of the Central part and relieve the growing political tension.

The peasants practically did not participate in the revolution of 1905 - 1907, which became one of the main reasons for the defeat of the revolutionary forces. The possibility of a new mass peasant protest, this time, seriously frightened the authorities. More consistent bourgeois reforms were developed by Count S.Yu. Witte, who enjoyed authority in Western Europe, worked successively as Minister of Railways, Minister of Finance, and Chairman of the Government. Nicholas I considered his ideas too liberal and replaced Witte with Stolypin, who was considered an exemplary conservative. During the time when S. Yu. Witte was in power, the growth of railways almost doubled, he actively contributed to the construction of the Trans-Siberian Railway. The

reform of the Russian monetary system based on gold monometallism, carried out by S. Yu. Witte, saved the country from default; he was a co-author of the Manifesto of October 17, 1905 on the granting of “the unshakable foundations of civil freedom,” consistently collaborating with large domestic and European industrial circles, financiers, enjoyed stable authority among them. It was Witte who developed a number of provisions of the Stolypin reform, but he was not a supporter of Stolypin’s harsh repressive methods. The diplomatic talent and international authority of S. Yu. Witte helped Russia achieve a worthy result when signing the Portsmouth Peace Treaty with Japan. Biographical details from the personal history of S. Yu. Witte are directly related to the topic of our study of social transport. Before graduating from the Southern Russian University in Odessa, Witte planned his life completely differently from how it ultimately turned out. Having completed his mathematical education at the university, Witte, a graduate, published part of his diploma research in the works of the Sorbonne, which he himself learned about much later. As the best among the worthy, he was invited to work at the department of his native university and was preparing for a career as a professor. So, perhaps it would have happened if not for the accident. Father S. Yu. Witte met his comrade, who by that time held the post of Minister of Railways, and spoke about his son. The minister was very interested in what he heard and said that the department lacked specialists with the abilities inherent in mathematically organized thinking, and suggested that his son go to work at the Railway Administration. In his memoirs, S. Yu. Witte said: I decided that I would need to take another professional course at a specialized transport institute in St. Petersburg, but Mr. Minister explained: there is no need to do this, we have enough railway engineers, we need specialists, able to look at the peculiarities of railway transport as if from the outside. And in order to avoid “superficialism”, you will have to quickly go through all the key positions in order to deepen your familiarity with the matter. That's how it all happened later. S. Yu. Witte, by the way, warned with calculations about the inevitability of a disaster for the imperial train on the section of the route where it happened. Railway officials did not dare to make amendments to traffic along the route. At the university, the individual was clearly better prepared to express a professionally informed point of view in difficult situations. S. Yu. Witte managed to leave a noticeable mark on the state, financial and transport policies of the difficult historical period of the Russian Empire. He passed a significant part of his journey under the sign of transport construction and improvement of transport operations, along with the development of domestic railways. The Emperor, unable to withstand the pressure of the reactionary wing of politicians, clearly turned the needle on S. Yu.

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Witte's political path into a dead end at the wrong time. It is possible that it was then that he directed his movement to the final station. Transport manifests itself everywhere as a significant socio-political factor. The scale of transport challenges is not an obstacle. Transport participates in the formation of an individual destiny, the destiny of a family, political movements, and state policies. In the history of the Industrial Revolution, indisputable achievements of scientific and technical creativity stand out, among them the development of a steam engine for mass use, the connection of a steam engine with the movement of a platform on rails and on water, the birth of a steam locomotive and a steamship.

Behind each of these outstanding achievements of social progress are famous personalities. The logic of historical development is as simple as an elementary algorithm. First, it is necessary to mature the social need for the implementation of a technical project, for example, the working part of technical tools - machine tools, machines was brought to a high level of perfection, even before the creation of the steam engine, but the development of production stalled - there was no constant energy source. Individual systems-minded, technically trained, persistent individuals find a technical solution to an urgent production problem. Production brings the invention to the point of practicality for mass use. Technically busy production needs professionally trained workers in large numbers. Crafts are inferior to industrialization. Industrial development no longer requires shop secrets and loyalty to the traditions of product manufacturing; it forces society to improve the organization of education and culture. The construction business in Russia before the development of railway production was based on the craft method. The researchers reported: "Construction equipment of the first half of the 19th century differed just as much from the construction equipment of the second half of the 19th - early 20th centuries as the manufacturing period of production in pre-reform Russia differed from the machine production of post-reform Russia." Machine production equips human labor technically and, at the same time, forces him to change his attitude both to work and to life in general. The palace conservatives were partly right in fearing that the democratic ideals of Western Europe would be promoted to Russia via railways. They only primitively represented the very mechanism of the spread of humanistic ideology. This, of course, was not about transporting books, newspapers, proclamations and other literature. Democratization was carried out through the deep laws of progress, determined by the development of mass industrial production, which in the literal sense of the word pulled the locomotives of the Russian railways. The transformation of the talent of individual outstanding individuals into a mass social movement began in Russia in the 19th century, indeed, with railway

construction. Historians of the first wave of domestic emigration often associated the decline of autocracy in Russia with the weakness of the Romanov personalities, who turned out to be incapable of strong-willed politics in the conditions of tension of political forces in the country and in the world. They are to some extent right, the subjective factor of the representatives of the ruling dynasty of the early twentieth century was really not adequate to the situation, but the true explanation should not be sought in Nicholas II and his immediate circle. The autocracy previously coped with both liberals and revolutionaries, not because Nicholas I was a more active politician than Nicholas II or Alexander II and Alexander III were radically different from the last monarch as autocrats. The predecessors of Nicholas II dealt with the formation of capitalism in the country; it was easier for them to restrain the bourgeois restructuring of the economy. No one could stop her. History left the Romanovs the only chance to retain power - to join the process on the side of creating the bourgeois foundations of social development, as their relatives did in Great Britain, Denmark, Germany and other European countries, but in return they had to abandon the specifics of the Russian autocracy. Under Nicholas II, it became absolutely clear that politics had become an excessive brake on the country's development. The high economic indicators of 1913 testified only to the tension of the limit values, after which either collapse or a new form of organization of political power should have occurred. Nicholas II brought both Russia to a historical crisis and the history of the Romanovs to a political end. In 1917, the country had a choice exclusively between liberal democracy outside the monarchy and the revolutionary restructuring of society according to the program of the Social Democrats, who from the very beginning of their history fought the autocracy as the main enemy.

Domestic autocracy defeated capitalism, the movement towards which was opened by railway construction. The paradox is that the autocracy, which tried to slow down the bourgeois development of the country, deliberately drove itself into a historical dead end, demonstrating what a lack of flexibility leads to in politics. The foreign relatives of the domestic Romanovs turned out to be more politically farsighted and retained their form of power. If Peter I had been in the place of Alexander II, Alexander III, it is quite possible that the Romanovs would still rule in Russia. Pyotr Alekseevich had an excellent political sense for scientific and technological progress in the economy. His active nature was fully consistent with the beginning of the Industrial Revolution and the importance of the economically proactive behavior of the head of state for the timely sale of its products. Peter the Great, as you know, had a special love for transport. Steamboats and locomotives would be his personal concern and he would never miss the

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opportunity to benefit from the progress of transport. To compare the economic policies of the late Romanovs with similar results of Europeans and the United States, let us turn to the statistics of Professor I.Kh. Ozerov is one of the authors of the five-volume book "Three Centuries", published for the 300th anniversary of the Romanovs' reign (1913). There were 155.5 km of railways per 1000 km² of Belgium, 114.8 in Great Britain, 102.1 in Germany, 20.3 in Japan, and only 9.3 km in Russia. There are many navigable bodies of water in Russia - lakes, rivers, canals. At the beginning of the twentieth century, 3,600 steamships and 25,000 non-steam vessels with a total tonnage of 800,000 thousand poods sailed along them. In terms of capacity, the Russian river fleet exceeded the entire fleet of Great Britain and took first place in the world. The domestic fleet was almost three times the capacity of the entire rolling stock of Russian railways. Despite this, during the entire second half of the 19th century, the government allocated only 80 million rubles for work on modernizing the river fleet. A similar situation occurred with the development of institutions and communication networks: postal services and telegraphs. In 1905, there were 8.33 posts per 10,000 residents in the United States, 6.48 in Germany, 5.37 in Great Britain, and 0.96 in Russia. From his analysis I.Kh. Ozerov concluded: "And without communications, with the country insufficiently equipped with post and telegraph, it is impossible to conquer space." Adding something that is not at all complementary to the anniversary of the Romanovs: "Russia, with its wealth, needs a different economic policy, we need statesmen with a broad outlook, with an understanding of the great tasks and the great role that Russia is destined to play... The economic policy that was carried out in Russia did not put its task of sustainable development of the country's productive forces; here they were chasing more effect, they were thinking of creating an industry, without creating a solid foundation on which it could develop." At the time when I. Kh. Ozerov wrote his article, the authorities did not allow direct criticism of the economic policy of the autocracy, so the author deliberately did not prove his idea, believing that the critical reflection of consciousness is capable of covering the remaining part of the path on its own. I. Kh. Ozerov meant by "a solid foundation" the transformation of social relations, including industrial relations. In addition, like all thoughtful domestic scientists, he did not miss the opportunity to emphasize the special role of modern transport in the social progress. He was well aware of S.Yu.'s position. Witte, who believed that for the successful development of Russia, its space must first be "contracted" by transport, primarily through railway construction. One line of transport route was clearly not enough. The potential of railway transport could only be revealed in combination with the active

construction of ships and the development of land transport. These days, Switzerland is not going to wait for vehicles to become massively environmentally friendly and switch to hydrogen and electric energy. The ruling circles of this important state for Europe want to fully develop the capacity of electric railway traffic. In this connection, it is interesting to remember that N.G. Garin - Mikhailovsky - a travel engineer, in the first years of the last century proposed a project for the construction of an electric railway along the eastern coast of Crimea, and thirty years later, Soviet engineers - enthusiasts Yu. Kondratyuk and N.V. Nikitin won a competition initiated by G.K. Ordzhonikidze to develop a powerful wind power plant on Mount Ai-Petri in Crimea. Crimea has long been the object of environmentally friendly technical development. N.V. Nikitin, who later developed the project for the Ostankino TV tower in Moscow, recalled with great warmth his work with Yu.V. Kondratyuk in Crimea: the station resembled, he wrote, a twin-engine aircraft, the engines of which were located vertically. "The dynamics were very difficult, (Yu.V. Kondratyuk - one of the first enthusiasts of space design) considered it absolutely necessary to consider the dynamic effect of the wind load. He felt very well that gusts of wind could cause forces that were completely different from the forces caused by the static action of the wind. Yu. V. Kondratyuk liked the design of the train of trolleys for braces that I came up with." History convinces even the most persistent skeptics that the development of transport plays a critical role in creating an economy that can provide a reliable foundation for accelerating social progress. In political competition, victory is celebrated by those states that are earlier aware of this historical pattern. Logically, everything here is frank and obvious: movement, in principle, is self-movement to a certain state, after which external factors are needed in the macrocosm - nature, production. They become a kind of locomotives for further movement until they ascend to the next round of the development spiral. Then a new cycle begins, again due to self-propulsion. Let us recall the political history of the Ancient Mediterranean period. It began on the Middle Eastern shores of the Mediterranean Sea - in Babylonia and Egypt. What made the strongest impression on travelers in these places? The scope of construction work required large-scale transport work moving huge masses of building materials horizontally and vertically. In the encyclopedic dictionary F.A. Brockhaus and I.A. Ephron's "Ancient Civilizations" describes the building structures of the capital of Babylonia, built under Neohudonoser (after 567 BC). They formed a giant regular square, each side of which was equal to 21 versts. The city was surrounded by two concentric walls with hundreds of bronze gates. According to archaeologist Rawlinson, the outer wall was up to 200 feet high and 50 feet wide, so that four-horse chariots

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could easily travel along it. This required 18,765,000,000 bricks of the largest size. The history of the flourishing and decline of another state - a giant born in the fertile expanses of the Mediterranean - is indicative. Transport connected the Roman Empire, breathed into it the stability of life, but turned out to be powerless when the state lost its internal sources of vitality. Transport strengthens the position of the state, but it does not have the potential that is intended to save the state. Reliance on transport promotes ascension due to the fact that with the help of transport it receives a unique opportunity to expand its boundaries and tighten space to manageable sizes. The spatial chaos that accompanies the intervention must be given the form of some order, without which it is unrealistic to exercise power in the acquired territories. Roman rulers recognized this need for transportation and began road construction on a scale comparable to the size of the empire itself. They built roads, combining their strength with comfort. "Already during the era of the Republic, the Romans began to build magnificent paved roads, which gradually covered not only Italy, but also numerous provinces." The most famous of the roads built in the Roman Empire is the Appian Road, which connected Rome with the cities of southern Italy. One of the Roman poets called her "the queen of the roads that run along them." Near Rome, the road was paved with large slabs of tuff, while the main part was covered with blocks of volcanic lava. The width of the canvas ranged from 4.3 to 6 meters. Without excellent roads laid everywhere, allowing quick travel between cities, it was impossible to reliably control the outskirts of the country from the center, and the provinces could not communicate with the capital. A. Yu. Nizovsky, referring to specialists - builders and archaeologists, states: "The total length of Roman roads, calculated from ancient remains, was several thousand kilometers. The roads were laid on a strong stone foundation and everywhere had a standard width of 6 meters; the road surface was lined with tiles and small stones and ended with rounded bevels. This road has not required repairs for centuries, and troops and transport could quickly move along it. The surface of some particularly strategically or economically important roads consisted of a number of successive layers of stone and crushed stone, held together with lime mortar. Roads were carefully built in western Syria. Stone slabs were laid in a specially prepared bed, on which a layer of crushed stone and lime mortar was poured. From above, the entire structure was covered with large stone slabs. Such roads had vertically placed slabs on the sides for strengthening. The most important roads were built in North Africa. The road connecting Carthage with Leptis Magna was 800 kilometers long, and the road from Carthage to Lanbesis was 275 kilometers long. The Via Egnatia road crossed the entire Balkan Peninsula, began at the modern Albanian city of Durres (the ancient name was

Dyrrachium) and ended in the Greek port of Thessaloniki. Emperor Tiberius ordered the installation of mileposts - milliaries - along all roads, indicating the distance between the nearest cities. Roman builders also learned to build reliable arched bridges. European roads in our time remain exemplary for the organization of high-speed and safe automobile traffic, for which grateful drivers and passengers usually thank the current founders, forgetting about those who left the Europeans of the New and Contemporary times an exceptionally rich legacy in terms of experience. Of course, little has been preserved from the Roman roads that crossed the length and breadth of the European continent, and even then they have been modernized, but the main thing in the legacy is the culture of construction, which should be symmetrical to the special importance of road construction for the development and functioning of transport. Spain owes the highest part of the history of development to naval shipbuilding and the timely awareness of all the advantages of being the mistress of the sea - in fact, to gain the opportunity to manage affairs in the maritime space and keep the coast, which is a promising springboard for an offensive inland, under control. The Age of Discovery was a triumph of ship transport. Until that time, sea vessels, as a rule, moved along the coast. There was no necessary knowledge for orientation on the open sea, and the design of the ships itself did not meet the requirements of testing by sea storms. The history of the Vikings can confirm this. They moved far to the south on their ships, colonizing Sicily and part of Southern Italy. As long as their routes passed close to the coast, fleet losses were insignificant. When they tried to sail to the invisible West to the shores of America, the situation changed radically. At the end of the 10th century, out of 25 ships with 500 people: men, women and children, only 15 reached the shores of Greenland. When science convinced sailors that the Earth is not a disk, but a ball, therefore, there are no edges, but there is confidence that after a certain time, you can return to the starting position, shipbuilders began to create ships that were reliable for long voyages. Spain forestalled all competitors and managed to attract famous navigators who were ready to take risks in new circumstances. H. Columbus, while in Spanish service, discovered the New World and thereby laid the foundation for the colonization of rich lands. Under King Charles I, Spain became a world power. Its power rested mainly on its navy, which was used both to suppress resistance and to carry out expansion and economic activity. It became clear to numerous opponents of Spain's political ascent that "a wedge can only be knocked out with a wedge," that is, by uniting and creating a stronger fleet. In 1588, the "Invincible Armada" of the Spaniards was crushed in a battle with the British fleet. Having lost its leadership in the navy, Spain also lost its political weight, and the era of

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decline of its European significance began. England is emerging as a European leader. During the reign of Elizabeth I, the country experiences a “golden age”, turns into the “mistress of the seas”, confirming the historical truth that the fleet, having clear advantages in movement and traffic control, in comparison with land means, provides the necessary grounds to be the driver of the political destinies of states on a planet whose surface is 70% covered with water. The expression: “time measures a person’s living space” perfectly suits the description of active Englishmen. They wasted no time and, as a result, with their energetic transport policy, they forced half the world to serve the British Crown, including not only huge parts of the Asian and American continents, but also the entire continent - Australia and New Zealand. All the acquisitions of the British were made due to their modern attitude towards life. They were among the first to understand the advantages inherent in scientific knowledge, studied well, and most importantly, comprehensively, that is, not only achievements, but also failures, the experience of building seaworthy ships and the art of sailing ships. Having defeated the Spanish “invincible armada”, the British convinced everyone of their political and military strength, seizing and consolidating supremacy at sea. The fleet was built in England, sparing no expense, knowing full well that only with its help can everything conquered be retained as a single whole and a common cause. In the Great Illustrated Encyclopedia, just listing the composition of the British Empire took up a page in 8-point font. A flexible policy regarding the status of belonging to the British Empire - to be a colony, protectorate, etc., opened up the prospect of reducing transport costs. For three centuries the British government ruled this collection of dependent countries. Political history forced the original name “British Empire” to be adjusted. It was replaced by the “British Commonwealth of Nations”, later replaced by the “Commonwealth of Nations”. Political history naturally changed, but one invariant conclusion from history remained: Without the active inclusion of transport in the historical process, the described history of Great Britain would not have happened. Politicians needed means to implement their economic and political plans. British policy would have remained on the coast if the coast had not been developed as a seaport. Even those whom it had to deal with as enemies - pirates - served the crown. It is impossible not to note two patterns discovered by the transport policy of the British rulers - the importance of transport expansion in strengthening political dominance and the need to develop a systematic organization of transport support for a successful policy. British leaders were committed to embodying the idea of combining vehicles to move in different environments. In order to conquer someone - to force them to serve the interests of the victors - a strong military fleet may be enough, but it alone is clearly not

enough to pull together an empire and provide it with a special history in history. For this, firstly, a diverse fleet will be required, and secondly, the creation of local transport networks. It was no coincidence that Great Britain was the birthplace of the Industrial Revolution. The progress of science and technical creativity in the country was determined by the intensity of production development, that is, objectively prevailing circumstances placed them on a solid socio-economic foundation. This made scientific knowledge and the technical pursuit of perfection sustainable. They turned into state policy, as illustrated by the state status of the genius of British and all European science I. Newton. The policy consistently embodied the principle of combining “external” and “internal” transport. With the help of the first, the territory of the empire was increased, the second ensured the management of new territories. Despite the fact that Britain was an island state and nature itself suggested which type of transport was most natural for the country, politicians actively stimulated the development of land transport traffic. While land transport did not have a steam power plant, its capabilities were significantly limited, however, the muscular energy of animals turned out to be quite sufficient to present the prospect of progress in movement along ordinary converted roads. For the uninitiated, water transport looks, although dangerous, but cheaper to organize traffic. Professionals know how much time, lives and finances were required to make rivers, lakes, seas, and oceans accessible and relatively safe for mass navigation. Only in the second half of the 19th century, thanks to the unique research of the outstanding Russian scientist - mechanic A. N. Krylov, who calculated the formulas for roll and pitch, shipbuilding was put on a strictly scientific basis. It is curious, but natural, that the first to appreciate the merits of Academician A. N. Krylov’s discovery were in England, where he reported the results of scientific searches for solutions to ship control problems. In 1680, D. Papin designed and built a steam boiler capable of producing work. T. Newkamen in 1717 carried out the project of a steam-atmospheric engine. In 1763, I. I. Polzunov proposed a project for the world’s first two-cylinder engine with the combined operation of the cylinders on one shaft. It was a universal continuous-action motor. The work was interrupted due to another project - the first steam power plant introduced in Russia with a capacity of 32 hp. As a result, the internal and external competition of scientific and technical thought was won by the project of a universal steam engine by J. Watt. The designer worked on it for 10 years (from 1774 to 1784). “The appearance of P.M. (the steam engine) and its spread became one of the main factors in the rapid pace of development of industry and transport, first in England, then in other countries.” To this conclusion it should be added: initially the steam

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engine had limited use. It was actively used in mining as a lifting device, including for transporting water from mines, which was very important. The steam engine became a mass industrial tool only after it was placed on a cart and thereby turned into a truly universal mechanism. As a lifting vehicle, the steam engine had limited demand for production; not every production required a lifting mechanism. When the steam engine became the driving force of the cart, then immense prospects opened up for such a machine. It was then that the transport industry was born, which changed a lot in human life. The history of the steam engine can be seen as a turning point in the history of human-made transportation. The path from the invention, brought by D. Watt to a prototype acceptable for production, and then to a real steam locomotive and the construction of railways according to the rules of the “road map” consisted of several “steps”, namely: including for transporting water from mines, which was very important. The steam engine became a mass industrial tool only after it was placed on a cart and thereby turned into a truly universal mechanism. As a lifting vehicle, the steam engine had limited demand for production; not every production required a lifting mechanism. When the steam engine became the driving force of the cart, then immense prospects opened up for such a machine. It was then that the transport industry was born, which changed a lot in human life. The history of the steam engine can be seen as a turning point in the history of human-made transportation. The path from the invention, brought by D. Watt to a prototype acceptable for production, and then to a real steam locomotive and the construction of railways according to the rules of the “road map” consisted of several “steps”, namely: including for transporting water from mines, which was very important. The steam engine became a mass industrial tool only after it was placed on a cart and thereby turned into a truly universal mechanism. As a lifting vehicle, the steam engine had limited demand for production; not every production required a lifting mechanism. When the steam engine became the driving force of the cart, then immense prospects opened up for such a machine. It was then that the transport industry was born, which changed a lot in human life. The history of the steam engine can be seen as a turning point in the history of human-made transportation. The path from the invention, brought by D. Watt to a prototype acceptable for production, and then to a real steam locomotive and the construction of railways according to the rules of the “road map” consisted of several “steps”, namely:

*the first step is connecting the steam engine to a trolley capable of moving;

*second step - development of a technical mechanism for controlling a moving cart;

*the third step is the transformation of a moving trolley into a carriage and the specialization of the carriage for a specific function;

*the fourth step is the construction of the path, including the laying of rails that provide and guide the movement;

*fifth step - organizing traffic in accordance with rules that guarantee safety and uninterrupted traffic;

*sixth step - creation of the necessary infrastructure;

*seventh step - a reversal of public consciousness towards the social and personal usefulness of the railway.

The last step was especially significant. History knows many examples when political and public reactions turned out to be inadequate to an event. The first trains showed the reality of railway traffic back in 1804 and 1808 (R. Trevithick). A continuation of the experience gained were the flights of M. Murray trains, composed of 6 and 8 cars, each of which contained 3.5 tons of coal. In addition, the train was carrying almost 50 curious people. In principle, the train could move up to 27 cars with a total load of over 90 tons at a speed of 5.5 km per hour. M. Murray's trains served for about 20 years. In 1813, the future Emperor of Russia Nicholas I also came to see the work of the railway. Until the early 1820s, politicians looked closely at the railway, but were in no hurry to make a decision. Public opinion about rail transportation has also not developed. The situation changed under the pressure of industrial progress, which required stable and increasing freight transportation in a shorter time. The Industrial Revolution gave birth to the railway, and it also decided its future fate in social progress. The first public railway was the route between Stockton and Darlington. Its length is 35.8 km. The movement opened on September 27, 1825. The date was subsequently designated as World Day of the Commencement of Rail Traffic on Public Roads. In the context of our study of the social value of transport, the dynamics of decision-making on the construction of the Stockton-Darlington road are very interesting. The owner of the mines, E. Pierce, proposed building the road at his own expense back in 1817. Parliament, despite the obvious attractiveness of the project, “thought” for more than 4 years. Politicians were clearly in no hurry to support the industrial use of the achievements of science and engineers as means of sociocultural progress. On the other hand, the politicians could have been justified. Public opinion was formed contradictory: the peasants were afraid that the iron “monster” moving with great noise would scare away and suppress the animals that belonged to them, which would have a negative impact on economic activity; the church took a long time to determine - the priests believed the movement of the steam engine was too similar to a manifestation of the devil; the townspeople were frightened by the noise of the trains; shipowners and port workers feared the railroad as a direct competitor. There was no solidarity in political circles themselves. Even at

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the beginning of her reign, Queen Victoria was delighted to travel by rail: “Yesterday,” she wrote in her diary, we arrived by rail from Windsor. It was a charming walk for half an hour without dust, heat or crowds.” It was about a trip along the newly built railway from London to Bristol (1842). Queen Victoria remained true to her first impressions and actively promoted railway enterprise until the end of her long tenure on the throne. The Duke of Wellington, who was then Prime Minister of Great Britain, not sharing the queen’s assessment, he said: “I see no reason to believe that such a machine can be usefully used.” It is known that Napoleon also failed to appreciate the steam engine. Among those who saw the prospect of railways was G. Heine. One of the geniuses of European literature wrote: “Railroads were a defining event, giving humanity new opportunities, changing the image and colors of its life. A new period in World history is coming, and our generation should be proud to live in such a time. Even the basic concepts of space and time are shaken. Railways conquered space. Now only time remains... Our ancestors must have experienced the same thing when America was discovered, when the invention of gunpowder announced itself with the first shots, when printing told the world the first title pages of the divine word.” As an illustration of the prophecy of G. Heine, one can consider a friendly caricature of those years. On it the artist placed a steam locomotive with the name “Time”, in the cabin of which there was the “god of time” as the driver. Thanks to the “railway”, on August 28, 1850, numerous fans of R. Wagner’s work were able to reach Weimar, where the premiere of the opera “Lohengrin” took place, ensuring its resounding European success. The young Englishman Thomas Cook arranged for 500 members of a temperance society to travel from Leicester to Loughborough to protest against alcohol abuse (5 July 1841). This is how the famous travel agency appeared, and Russian cultural historians considered this event the beginning of the history of tourism. It is wrong, because educational tourism was organized much earlier as Crands tours of the British and Scots across continental Europe. The history of cinema began with the showing of a train arriving at the station. The Lumière brothers had a large choice in 1895, but they chose the railway, valuing it as a symbol of civilization. Transport, by definition, as an instrument for the movement of matter in all its manifestations, could not but actively participate in the successful implementation of human evolution. His active participation is easy to detect at all stages of human history. In addition, it is illogical to consider the current level of development of Homo sapiens as the result of this story. He is perceived as such when a person’s abilities are assessed within the localization of his reality. Man historically manifested himself physically - “by walking upright”; an active attitude towards the conditions of existence - “doing”; mental

potential - “reasonableness”. His evolutionary “road map” is rightly perceived as being built in a fairly well-reasoned manner. But there is one serious objection to the desire to make homo sapiens the final link. So to speak, the Olympus of human development. To absolutize modern human rationality, it is not enough to study evolution within a single developing system. In our case, this is the progress of human reality. The evolution of man and his way of life took place in the natural environment and was the product of a systemic interaction between natural factors that allowed man to develop, and man himself. There was a natural competition in which two subjects of the relationship participated.

Until a certain point, the natural environment was an object, a normally functioning environment, but as human positions strengthened, it was forced to transform into a counter-participant. Competition is a competition between subjects connected by the struggle for existence in a common space-time. Human evolution was accompanied by significant changes in the natural environment caused by human activity. The influence of forces that violated natural connections and relationships increased. The natural environment increasingly transformed from the original relationship between object and subject into subjects of interaction. Within the limits of its systemic potential, nature is able to “withstand the blow”; when natural reserves run out, it itself begins active offensive actions. Then it’s the person’s turn to “repel the blow.” At the same time, both nature and people rely on transport. Each has its own, but they are united by their functional fundamentality and universality of manifestation in their localization. Social transport not only made a decisive contribution to the creation of conditions for human evolution, it is also associated with the history of everything that distinguishes the social arrangement of human life. The latest “creation of transport” is the organization of conditions for the development of civilization. Unfortunately, the development of civilization itself, which determined the process of formation of the natural environment into a subject of relations with humanity, along with a positive charge, also contained negative consequences. Nature, in principle, should not be a subject. It is universal and remains as an objectively existing reality, changing according to its own laws. Any human intervention in the natural world is infinitesimal and in this context the natural system is unchanged. The natural environment as a part of nature with which practical interaction of human activity takes place is a different matter. The natural environment is its component localized within nature. Whatever the scale of the natural environment, in relation to the infinity and boundlessness of Nature, it remains an insignificant value. Its deformation is assimilated by Nature and will heal like a wound on the body of a healthy organism. The natural environment itself, forced to compete with humans,

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defending the systematic nature of its organization, is very vulnerable. In this connection, science has raised as an urgent problem the formation of the noosphere as the most rational direction of competition. The reality of the noosphere turns out to depend on the quality of the rationality of homo sapiens, and it is excessively unstable, balancing between rationalism and empiricism, going to extremes, activating subconscious and mystical thinking, leaving the most important moral and aesthetic guidelines of the movement on the periphery. In our publications, we increasingly have to raise the question that the creation of the noosphere will require the continued evolution of “homo sapiens” into “homo sapiens”, sufficiently equipped morally and aesthetically to solve systemic problems in relation to nature. Homo sapiens, already within the existing quality of rationality, will have to overcome the selfishness of thinking and recognize the natural environment as its home, reorganize itself into perceiving it as a subject of cooperation, without attention to which, without solidarity with which, its path will naturally end in a dead end. The relationship between man and the natural environment has been systemic from the very beginning. The system-forming factor was their general dependence on action within Nature as a platform of relations, what F. Engels called a natural component of the historical process. The relationship between man and the environment should be approached dialectically, that is, considered not only mutually binding, but also developing.

The “phenomenon - conditions” system is evolving. “Conditions” turn into a “factor”, being built directly into a change in the phenomenon. The human body does not perceive normal temperature and atmospheric pressure, because they fully correspond to its requirements for existence. He reacts completely differently to significant deviations from normal conditions. The body turns on protective and compensatory mechanisms, and they are rebuilt to suit these new circumstances. The circumstances (conditions) themselves become factors in the changing state of the body. With certain changes, environmental factors can evolve further, up to the transformation of the environment from an object opposing the phenomenon as a subject of interaction, into a subject of interaction, bringing the system to new horizons of development. Of course, in the systemic relations of subjects, the specificity of their natural basis is preserved. Natural factors, having become the subject of relations, will remain “conditional subjects”. The uniqueness of the status of the conditions formed into the subject of systemic relations with the phenomenon determines the specificity of their function. The phenomenon is born in concrete conditions. The natural origin of the conditions ensures their stable repeatability, which causes a contradiction with the order of changes in the phenomenon, the quality of which is different from the

conditions. Conditions are capable of testing phenomena to the strength of normal development, but such challenges to phenomena are random, they are qualified as force majeure. Regularity and orderliness in changing the conditions of movement of a phenomenon restrains the excessive activity of the phenomenon that shapes the system for itself. All these metamorphoses are carried out with the help of transport, from which it is easy to conclude that the formation of transport systems among subjects and intersubject interactions should serve as a criterion for the formation of systemic relations. The ability of local systems to integrate into intersystem formations, up to macro and mega systems, depends on the degree of perfection of system construction. Systemic defects are also more visible at the level of more general systemic formations. Social egoism grew out of the balanced development of relationships with the ecosystem as it included the increasing presence of human action in it. The competitive struggle within a developing society was carried out not only and not so much by eliminating a direct rival, but by violating systemic “obligations” in relation to the natural conditions of development. Since the Industrial Revolution, humanity has perceived the natural environment not as a place and condition for its development, but as its natural reserve for all cases of its own systemic calculations and miscalculations. Today we are already living at the expense of future generations, and this form of selfishness will continue as long as the importance of competition in social progress is absolutized, or until environmental tension breaks down, past the crisis, into catastrophe. In the 21st century, it is necessary to decide on the main question: what sign should we live under? Continue the fight for political leadership, or strengthen solidarity. I. Kant was right when he spoke about the perfection of the celestial order of the stars and the need to subordinate all life activity to the moral law. Let us repeat, the economy is just the basis of a person’s social and personal life. It is a great mistake to make it the goal of social progress. It will first lead to the death of hundreds of millions of mostly sinless people, and then to the degeneration of homo sapiens, as incapable of evolving into a “prudent man.” What is the role of transport in modern human history? She remained the same. Transport is deprived of its own intelligence, is not able to set goals and objectives, or determine its own “road map”. It is built into the objective reality of movement and within these limits of his natural position a person must show his rationality. The intelligence of homo sapiens, as well as its bearer himself, is in the process of movement. The reason for human stupidity, since the stage of movement is defined as the acquisition of rationality, must be sought in the underdevelopment of the rationality of thinking, which, in our opinion, based on the history of the philosophical search for truth, consists in the imperfection of the systematic

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rationality of human thinking - the imbalance of the rational and empirical, utilitarianism with responsibility to moral and aesthetic maxims. Humanity is overly satisfied with development here and now. It continues to expand living space, without, however, showing due concern for the reasonableness of its arrangement. Something similar happened during the intensive construction of railways, when attention to the quality of the road surface and rail track turned out to be disproportionate to the scale of the increase. Reasonableness realizes itself only when a person's rationality replaces the egoistic vector and spreads to the reasonable organization of the arrangement of the entire living space, everything becomes reasonable. A truly new reality of the noosphere will be formed. Human transport does not build the noosphere. It provides the organization of necessary and sufficient conditions for this construction. It is in this status that transport manifests itself as a real builder of the rationality of human history. The settlement of the Indians on the west coast of South America across the Pacific islands using primitive means of transport is not an illustrative example. More interesting is the history of the capture of the Eastern coast of North America by the Vikings. Their transport was more suitable, but they could not or did not want to gain a foothold in the new lands. As a result, the brave sailors returned to their homeland. The Vikings wrote a significant chapter in the annals of transport history, but this is also a private story. The history of the transformation of entire continents through transport is truly instructive. The population of the USA and Canada, Australia and New Zealand, and Antarctica mainly consists of ethnic Europeans, descendants of people from Africa and Asia. Great migrations saved humanity and opened up new prospects for it. No less significant was the subsequent resettlement in new places. Their arrangement - economic, socio-cultural, is again due to transport. Without exaggeration, we can state: it was transport that made modern political geography possible. Of course, in the light of instrumental support. Transport could not be a sufficient condition for the successful outcome of mass migration; it served as a primary necessary factor. Great migrations in human history stimulated the development of transport, the emergence and improvement of new vehicles. The history of transport of modern civilization has a rich heritage, and the main thing is man's awareness of the importance of transport for life. The classic of Russian poetry F. I. Tyutchev, using the Leipzig-Dresden railway, compared it to magic back in 1841: "Thanks to the railways, he wrote, some of which have already been completed, all these cities have come closer to each other, as if by magic." . The pace of railway construction was also magical. The first railroad in the United States appeared in 1829. It connected Baltimore with Ellicott Mills and was only 24 km long. Forty years later, 85,000 km of equipped railway

track were put into operation in the United States alone by private companies. By 1916, the US railroad network was 409,000 km long. In the 1930s, 63,300 steam locomotives, 54,800 passenger cars, and 2.4 million freight cars operated on railroads in the United States. In the second half of the 19th century, an average of 20,000 km of railways were built in the world per year. By the beginning of the 1910s, the total length of railways in the world exceeded 1 million km. In 1879, at the Berlin Industrial Exhibition, E. Siemens demonstrated a working model of an electric railway, and in 1881, a 3 km long electric city railway appeared in Berlin. The era of trams and metro began. However, it has long been known that social progress is a contradictory process, combining all manifestations of movement from ups and downs of development to recessions and crises. The development of social transport, as expected, was accompanied by diversification and competition. Railroad transport has replaced land transport, and in countries where rivers, lakes, canals and seas freeze for a long period, also water transport, mainly internal. The invention of the internal combustion engine gave land transport a chance to successfully compete with railway transport, but railway transport still had an important advantage in all-weather performance and greater safety. The technical equipment of transport required the improvement and technical training of those who manage or service the traffic. The qualifications of drivers and technical personnel in railway transport are continuously and professionally monitored by the state inspection; the control is systematic and self-certified. Statistics also support higher safety of railway traffic. There are a lot of trains in the world today, but even so, their number is very small compared to the number of vehicles, the speeds of which are comparable to trains. It is hardly feasible to train qualified drivers for such a mass of vehicles. This is the logic of comparing railway and road transport. Air transport is highly professional, however, its infrastructure is extremely complex and expensive. The dependence of flights on weather conditions is also serious. Crisis symptoms for railway transport began to increase after the Second World War. In the 1960s and 1970s, passenger and freight traffic fell in Europe and the United States. Transportation over short and medium distances was especially affected due to the increase in personal and cargo vehicles. Many travelers preferred airplanes. The railways were able to get out of the crisis situation towards the end of the twentieth century by creating a new generation of high-speed trains that provide comfortable and accessible travel to the destination. The attitude towards train travel among tourism lovers has also changed. Tourists realized that little interesting could be seen from the airplane window during a long flight. A completely different impression is created by the opportunity to observe what is happening outside the window of the carriage.

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Fascinating routes have appeared along the Trans-Siberian Railway, along the Indian Pacific line across Australia, along the Coastal Starlight road in the American Wild West. Projects for hovercraft trains are being developed in France, magnetically suspended trains in Germany and the Russian Federation, design and modeling work is underway to improve the classic “wheel-rail” scheme (TGV in France, ICE in Germany). They are successfully working to improve high-speed and high-speed traffic in Japan, Korea, and China. All types of social transport entered the third millennium with optimism. In the historical process, the logic of the dialectical development of transport that we noted again manifested itself. All changes are carried out through relations of opposites, competition between internal and external forces. Heraclitus already understood that struggle is universal. But its absoluteness is relative. The struggle of opposites, that is, that which excludes each other by definition, is productive within the

limits of their unity and strives to achieve optimal interaction. The particular is rational, acting within the general, as its component. Struggle, in our case, competition, within social transport is important as a force for improving its types, but struggle always remains only a means of obtaining a result different from struggle. Moreover, the result of the struggle should be the opposite of it. Transport diversifies in the course of its development, multiplies in the specificity of its manifestation, within the limits of its integrity. The quality of transport is determined by its essence, and the essence consists of the invariance of the functional purpose of transport. The essence is specifically concrete and unitary, which is understandable for only in this way can the different manifestations of the essence be placed under a common “roof”, presented as one, conditionally divisible.

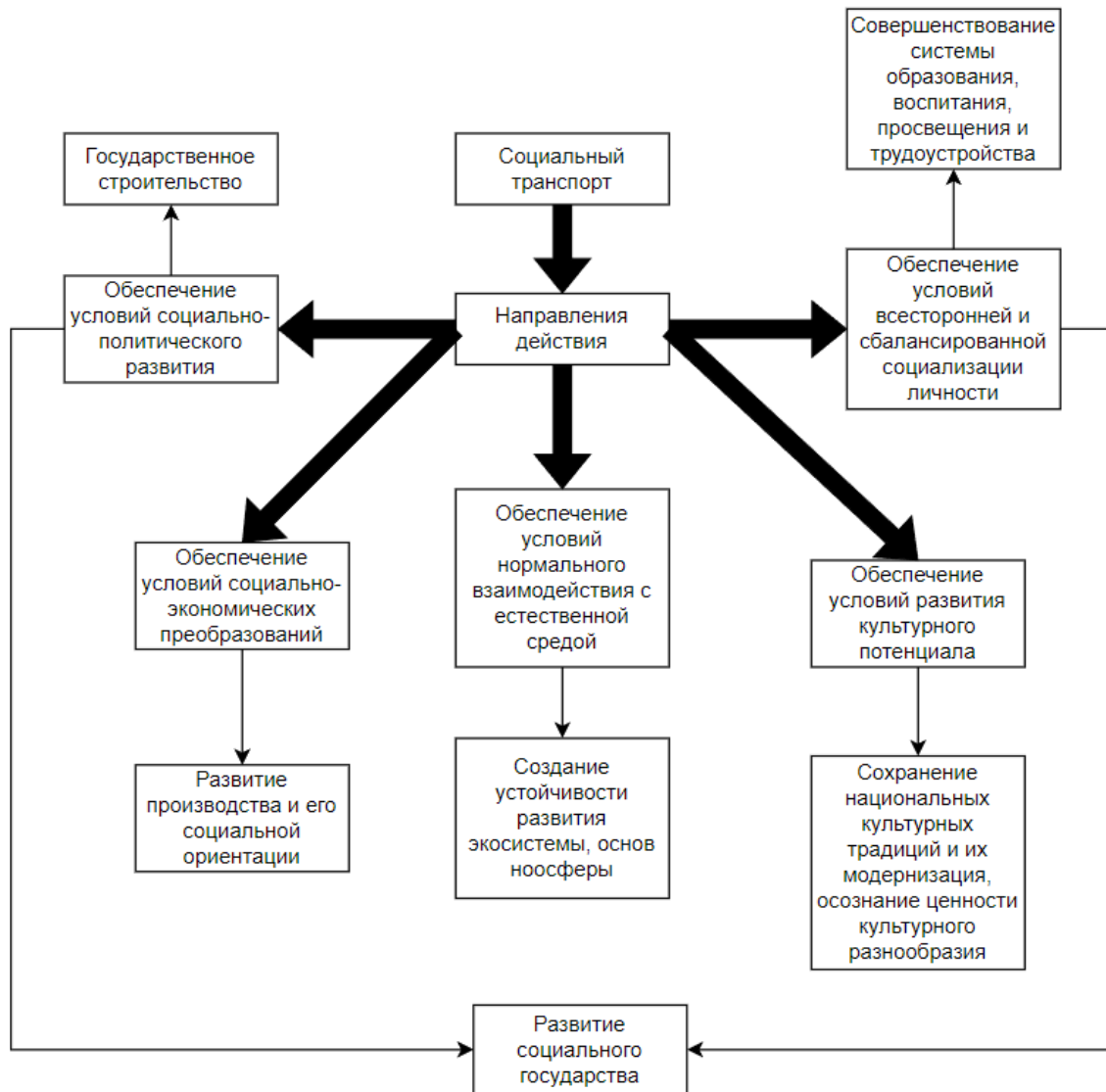


Figure 3. Main directions and products of social transport.

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Transport is essentially unitary. Its natural and social differences are autonomous solely as phenomena of a single essence. The type of transport is conditional, the essence is absolute. At the turn of the second and third millennia, multi-transport centers developed, linking together the work of various types and specializations of public transport. The synergistic effect of such centers consistently manifests itself in general and in particular.

In the diagram, we again want to draw attention to the specifics of the mechanism of action of transport in social construction: transport participates in social development by providing necessary and sufficient conditions for the action of social reorganization, that is, indirectly. The specificity of the mechanism of action of social transport is determined by the place of transport in the movement of matter, part of which is the practical activity of man. Transport is a tool of movement. The work is carried out by movement, transport prepares and provides traffic conditions. The absence of an argument function for a separate fact has already been noted. Facts taken individually can neither refute nor prove. But based on facts, you can build a concept. And in this case, when it is possible to obtain from its consequences the predicted facts in sufficient quantity and variety, both the concept itself and the facts will acquire true meaning.

Russia was preceded by Rus'. It is believed that Rus' became Russia, becoming an empire under Peter I. Peter I was recognized as the Great for the scale and quality of transformations in society. From the very beginning, Peter the Great linked the reconstruction of his fatherland with the development of transport. He had little choice - to find a rational relationship between water and land means. The emperor saw advantages in water, especially sea transport. With its help, it was possible to increase trade, causing an increase in the production of goods, and expand the borders of the state, and when necessary, protect it. The strengthening of Rus' occurred with the growth of cities; all the historical cities of Rus' and Russia grew on the banks of rivers and seas. The land movement followed the water movement. Steam and electric propulsion were also tried on water for the first time. Civilization undoubtedly found its manifestation in transport creativity, but the continuity of social progress depended even more on transport construction. All Russian cities with a population of a million people or more are pressed, both to the Urals and beyond the Urals in the vastness of Siberia, to the banks of great rivers and their tributaries. They became millionaires thanks to the development of railways. The history of the world's most famous Siberian city, Novosibirsk, is connected with the Great Siberian Railway. Before Novosibirsk, Chicago was considered the fastest growing city in the world. Novosibirsk as a city will turn 119 years old in 2022. On January 21, 1904, the Tomsk governor received a notification that the Emperor, on the 28th day of

December last year, in accordance with the regulations of the Committee of Ministers, "Deigned to command the highest: the settlement of Novo-Nikolaevskoye of the Tomsk districts and provinces should be raised to a degree without a district city of the same name." The history of the settlement of Novo-Nikolaevsky itself turned out to be fleeting, it was less than 10 years old. In 1893, in its place there was taiga. N.G. Garin - Mikhailovsky, who carried out the assignment with his survey party to present options for the construction of a railway bridge across the Ob River, wrote: "Here Ermak, with superhuman efforts, paved his way to glory. Centuries have passed, and now we have come to finish the great work. By building the road, we will make these vast lands a real asset to the Russian land." On the eve of the transformation of Novo-Nikolaevsk from a village into a city, Tomsk Governor Major General A. A. Lomachevsky reported to the Council of Ministers: "As Your Excellency knows, the village of Novo-Nikolaevsky owes its emergence to the Central Siberian railway. d. When the construction of bridge structures across the Ob River began and the workshops were equipped, a mass of workers and employees appeared in various branches of railway administration and construction, and at the same time, to meet the needs of the above persons, a mass of trade and industrial people also poured into Novo-Nikolaevsk for sales of their works and trade transactions. Today, the number of residents continues to grow progressively, trade and industry of the village residents are diversifying, due to its particularly advantageous position on the banks of the Ob. Such a privileged position of the village of Novo-Nikolaevsky gives capitalists complete opportunity to develop their commercial enterprises here, and therefore now the main grain traders - Kolyvan merchants - have moved their operations to Novo-Nikolaevsk, and Tomsk industrialists have opened their offices here and operate with millions of rubles; All these circumstances did not remain without influence on the development of the lives of ordinary people." After 100 years, the city of Novosibirsk, born in the taiga forests on the banks of the majestic Ob, already had one and a half million inhabitants, its area is 506.67 km². Novosibirsk is recognized as the cultural, scientific and social capital of Siberia, it is the largest multi-transport center beyond the Urals with a huge railway station, a modern international airport named after A.I. Pokryshkin, and a network of roads. The successes of Novosibirsk scientists, creative theater and musical groups are world famous. There are over twenty universities in the city that train specialists in various fields, SB RAS. The history of Novosibirsk not only confirms the conceptuality of the statement about the growing role of transport in social progress, but also demonstrates another significant idea: optimization of transport construction accelerates social development. The last conclusion is

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clearly underestimated. Modernization of national development is always associated with important changes, some of which the country's population does not consider inevitable costs of social progress. These, in particular, include the undeserved fate of many settlements of different formats and ages, which have become small homelands for people. Their roots are here and they don't want to turn into tumbleweeds. Megacities with their specific lifestyle are not suitable for everyone. There is a growing tendency to return to places where nature and people are in a natural, and not "corralled" state. Society, which is frantically searching at the global level for a solution to the problem of growing tension in the ecosystem, also benefits from such unity. The policy of building super-cities is a simple solution, driven by economic profitability and statistical data that does not reflect the essence of settlement. Such simplicity simplifies a person to a "person-unit." The conditions for personal development in the modern understanding of socialization are one-sidedly reduced to the intensity of the external manifestation of communication. Education is showing itself less and less as a tool that shapes the student's interest in the rationality of individual thinking, replacing the work of the subject's consciousness with the acquisition of psychological skills - the dynamism of changing attention, memorization, orientation towards consumption and the capabilities of technical means of support. The danger of empiricism and standardization in thinking, the dependence of consciousness on technical equipment is not so obvious "here and now." It has a delayed effect of action, which has been demonstrated more than once in modern times, forcing us to return to the educational ideas of great humanists and real teachers. For a person to harmoniously develop into a personality, he must realize in the process of formation his main potential inherent in his dual nature. We are able to abstract ourselves from nature in knowledge, but we will never be able to live and enjoy life outside of nature. Nature is capable of developing without us; it is limitless and eternal. A person faces Hamlet's question: "To be or not to be"? The wealth of the past is no guarantee of the future. In multi-transport centers there is a real opportunity to optimize transport potential for the harmonious development of the social order, to minimize the cataclysms of irrational urban planning policies. Such centers are ready to organize the systematic work of various transport from mainline and interregional to local, uniting motor transport, water transport, railway and aviation with a common concept. With a professional approach, free from the commercialization of social projects, there is always a way out that will be approved by all parties involved in solving problems. The economy, like society, whose progress is based on economic activity, develops naturally. Economic booms and crises are

caused not so much by objective factors as by insufficient professionalism of management. The mentioned S.Yu. Witte was dealing with an empty treasury and growing debts, however, in what seemed to be a hopeless situation, he found a way out and successfully reformed finances. After the Revolution and Civil War, the Bolsheviks, in conditions of socio-economic chaos and wild inflation, also coped with the task of stabilizing the financial market. Russian reformers of the 1990s, with the active assistance of Western consultants, led Russia to default in 1998. When there was a change in power and the political, socio-economic course was balanced, society quickly managed to cope with the consequences of "shock therapy". The economy should not be anything other than one whose goal is to ensure human well-being. The desire to measure the well-being of the population by the number of goods is partly fair, but it is, as a rule, conditional, because it deals with consumption statistics, which are specified, at best, at the regional level. This is convenient for the authorities, but in such calculations, as a rule, there is no face of truly real citizens, separated by physical space even within the boundaries of a district, region, republic. Statistics are something like a mirror, sufficient for the authorities to see themselves and, in general, the socio-economic mosaic. Real life mostly happens through the looking glass. This life is very different, as is the attitude of those living towards it. Those dissatisfied with life were always and everywhere, even among those enjoying life. There are many of them, but they do not form the majority. The bulk of the population is patiently waiting in the wings, firmly hoping for the professionalism of politicians. She needs a job with decent pay, social and cultural support for life. Most of all, they need satisfaction with the systematically organized and accessible work of transport, so as not to be depressing by the feeling of "abandonment". A traditionally educated citizen of any country feels his responsibility to the state and order in proportion to the care that he feels for himself. The state has three distinctive signs: the flag, the coat of arms and the anthem, but there are two more important signs of statehood - the territory and its socio-cultural structure, the space within which all citizens should have the guaranteed right to move freely to solve their own and generally significant problems.

Conclusion

It should be borne in mind that the authors of the study do not encroach on the achieved knowledge about transport, they strive to give it a systemic position, to explain where the "shelves" along which transport is distributed in its modern presentation came from. First of all, social transport fell under the "section", since modern ideas reduced the understanding of transport and its purpose to it. At the same time, from changing the definition of transport,

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it is social transport that will “win” first of all, because its development has been the most intensive, revealing the functional values of transport. It is the history of social transport that confirms the poly functionality of transport and its creative role. Even in its modern form, social transport shows strategic potential, its ability, namely:

- to be an instrument for the structural organization of the space of human life, to expand the horizons of its implementation;
- use time rationally, increasing its intensity as a factor in improving human life;
- serve as a means of scientific knowledge of the world and its philosophical and religious understanding;

- solve large-scale problems in the entire range of human life from its interaction with natural production conditions to sociocultural reality. We are talking about personal freedoms - freedom of creativity, choice of place of residence, employment, movement;

- making a more optimistic outlook for the planet and life on Earth, which is finite. Only the development of transport in its social form can remove the problem of the finitude of the concrete reality of existence, forming sustainable social and economic development in the regions of the Russian Federation.

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Article



Dilorom Abdusamiyevna Kholmatova

Ferghana Polytechnic Institute

Doctor of Philosophy in Philological Sciences (PhD),

senior lecturer of the Department

Uzbek language and language learning

Ferghana, Uzbekistan

MODERN EDUCATION IN HIGHER EDUCATION

Abstract: The article is devoted to the analysis of modern trends in the system of higher education. The author examines the main features, which include the introduction of new technologies, changes in teaching methods and assessment of students' knowledge. Particular attention is paid to the quality of education, its accessibility and compliance with the requirements of modern labor market conditions. The author also discusses the prospects for the development of higher education and suggests possible ways to modernize it.

Key words: modernization, higher school, interactive methods, skills, abilities, competencies, the ability to choose, multi-level system, successful activity

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СОВРЕМЕННОЕ ОБРАЗОВАНИЕ В ВЫСШЕЙ ШКОЛЕ

Аннотация: Статья посвящена анализу современных тенденций в системе высшего образования. Автор рассматривает основные черты, которые включают внедрение новых технологий, изменение методики к обучению и оценивание знаний студентов. Особое внимание уделяется вопросам качества образования, его доступности и соответствия требованиям современной конъюнктуры рынка труда. Автор также обсуждает перспективы развития высшего образования и предлагают возможные пути его модернизации.

Ключевые слова: модернизация, высшая школа, интерактивные методы, навыки, умения, компетенции, возможность выбирать, многоуровневая система, успешная деятельность.

Введение

Современное обучение в высшей школе является сложной и многоуровневой системой, включающей в себя не только обмен и применение полученных знаний, но и усовершенствование мастерства, квалификации, компетенций, необходимых для результативной и удачной высокопрофессиональной и безупречной деятельности.

Высшее профессиональное образование в современном мире стоит перед рядом вызовов, которые обусловлены быстрыми темпами развития технологий, изменением потребностей рынка труда, а также увеличением доступности

информации и знаний. В связи с этим, перспективы развития высшего образования связаны с необходимостью его модернизации и адаптации к новым условиям. Основные черты современного образования в высшей школе:

1. Индивидуализация обучения: студенты имеют возможность выбирать курсы и дисциплины в соответствии со своими интересами и целями.

Индивидуализация обучения – это подход, при котором учебный план адаптируется под индивидуальные потребности и интересы каждого студента. Это может включать в себя выбор курсов и дисциплин, которые студент хочет

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изучать, а также темп и методы обучения. Однако стоит отметить, что индивидуализация обучения требует от учебных заведений и преподавателей большего уровня гибкости и адаптивности, а также может потребовать больше ресурсов для поддержания разнообразия курсов и программ.

2. **Интерактивность:** преподаватели стараются привлечь обучающихся в систему обучения, используя для этого различные интерактивные методы.

В современном модульном образовании студенты становятся активными участниками процесса обучения, вместо того чтобы только прослушивать лекции или прочитывать тексты. Это может включать в себя обсуждения в аудитории, групповые проекты, кейс-стади, ролевые игры, эксперименты и другие виды активностей. Кредитная система позволяет студентам самостоятельно выбирать модули, которые они хотят изучать, и составлять свое индивидуальное учебное расписание.

3. **Ориентация на практику:** студентам предлагаются стажировки, практики, участие в реальных проектах.

Стажировки и практика могут быть особенно полезными для студентов, поскольку они предлагают возможность применить академические знания в практической деятельности, узнать больше о своей отрасли и установить профессиональные связи. Это также может помочь студентам определиться с тем, что именно они хотят делать после окончания университета. Во время стажировки или практики студенты могут работать под руководством опытных профессионалов, которые могут дать им ценные советы и рекомендации. Важное место в работе со студентами занимает фиксация вещественных материалов, которая включает: а) описание предметов; б) их графическую зарисовку, что также является немаловажным при изучении русского языка на основе текстов. Это также может способствовать в развитии профессиональных навыков, которые они не смогли бы получить только в аудитории, такие навыки как командная работа, решение проблем и управление временем. Профессиональное обучение требует овладения соответствующим подязыком, основу которого составляет такая лексика. В некоторых отраслях, таких как медицина, инженерия или юриспруденция, стажировки или практика могут быть обязательными для получения лицензии или сертификата. Кроме того, многие работодатели смотрят на стажировки и практику как на важный фактор при найме новых сотрудников. Они могут считать, что студенты, которые имели практический опыт работы в своей области, более подготовлены к рабочей среде и могут быстрее адаптироваться к новой роли. В целом,

стажировки и практика могут быть очень полезными для подготовки студентов к карьере, и студентам следует использовать эти возможности, чтобы максимально расширить свои навыки и знания.

4. **Междисциплинарность:** в образовательные программы все чаще включаются курсы, которые сочетают знания из разных областей.

5. **Международная интеграция:** студенты имеют возможность обучаться за рубежом, принимать участие в международных проектах, изучать иностранные языки.

6. **Непрерывное образование:** вузы предлагают различные формы послевузовского образования (второе высшее, магистратура, аспирантура, дополнительные курсы и программы повышения квалификации).

7. **Оценка качества образования:** проводится регулярная аккредитация вузов, мониторинг качества образовательных программ, оценка удовлетворенности студентов.

8. **Развитие социальных и гражданских компетенций:** в образовательные программы включаются курсы по этике, культуре, истории, праву и т.д.

Сегодняшние технологии позволяют получить высшее образование даже находясь на большом расстоянии от учебного заведения. Онлайн-образование стало реальностью для многих людей по всему миру. С помощью интернета студенты могут учиться в любом университете, независимо от того, где они находятся. Это особенно полезно для тех, кто живет в отдаленных или сельских районах, где доступ к высшему образованию может быть ограничен.

Онлайн-курсы предлагают гибкость, которую трудно найти в традиционном образовании. Студенты могут учиться в свое удобное время и темпе, что позволяет совмещать учебу с работой или домашними обязанностями. Кроме того, онлайн-образование может быть общедоступным в экономическом и бюджетном плане. Многочисленные онлайн-курсы предлагаются бесплатно или за небольшую плату, что делает образование доступным для максимального количества людей. Но тем не менее необходимо учитывать, что онлайн-образование требует самодисциплины и организации. Без физического присутствия в аудитории студентам нужно самостоятельно управлять своим временем и учебной нагрузкой. В целом, доступность онлайн-образования открывает новые возможности для тех, кто хочет получить высшее образование, но по определенным причинам не имеет возможности это осуществить в традиционной форме образования.

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Также высшие учебные заведения предоставляют возможность обучения по большому количеству специальностей, что позволяет студентам выбрать наиболее интересующую их область:

– во-первых, это позволяет студентам исследовать действительно интересующее их направление, что приводит к более высокой мотивации и уровню удовлетворенности;

– во-вторых, это также позволяет студентам получить узконаправленное образование, которое наверняка будет полезно при поиске работы после окончания учебы;

– в-третьих, широкий выбор специальностей также означает, что студенты могут выбирать из множества различных курсов и программ, что может помочь им получить более широкий образовательный опыт.

Наконец, это также может помочь студентам развить свои навыки и знания в различных областях, что может быть полезно в их будущей карьере. Например, студент, изучающий бизнес, может также взять курсы по психологии, чтобы лучше понимать поведение потребителей, или курсы по информационным технологиям, чтобы улучшить свои навыки в области цифровых технологий.

Но многие университеты предлагают гибкие программы обучения, которые позволяют студентам сочетать учебу с профессиональной деятельностью или другими сторонними обязанностями. Примерами данных программ являются вечерние или заочные курсы, которые обычно проводятся в выходные или после традиционного рабочего дня. Это позволяет студентам, которые работают в течение дня, закончить обучение в удобное для них время. Некоторые университеты также предлагают программы с частичной занятостью, которые позволяют студентам брать меньше курсов в

семестр, что дает больше времени на работу или другие обязательства.

Но есть и свои плюсы у студентов развивается навык критического мышления. Высшее образование обычно включает в себя исследовательскую работу, которая помогает студентам развивать навыки критического мышления и анализа. Критическое мышление – это способность анализировать информацию и делать на ее основе обоснованные выводы. Это важный навык, который необходим во многих областях жизнедеятельности, от научных изысканий до принятия повседневных решений. В высшем образовании развитие критического мышления часто происходит через исследовательскую работу. Студенты учатся собирать данные, анализировать их, выявлять связи и делать выводы. Они также учатся оценивать источники информации на предмет их надежности и объективности. Учёными подчеркивается роль учебных заведений как тех частей учебных и исследовательских учреждений, где проблемы языка в образовании могут быть решены наиболее легко и постоянно.

Вывод

Таким образом современное образование в высшей школе сильно отличается от образования в обычной школе. В данное время у студентов есть очень много возможностей и естественно право выбора. Они могут выбирать не только специальность, но и форму обучения, учебное заведение, страну и город для обучения. Все это позволяет им получать знания и навыки, которые максимально соотносятся с их интересами и требованиями. В целом, современное образование в высшей школе направлено на то, чтобы подготовить специалистов, способных адаптироваться к быстро меняющемуся миру, готовых к непрерывному обучению и развитию.

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Article



Murat Kamolovich Najmiddinov
Navoi State Pedagogical Institute
Researcher

FORMATION OF STUDENTS' SUBJECT COMPETENCIES IN THE FIELD OF PHYSICS WITH THE HELP OF VIRTUAL LABORATORY WORK

Abstract: This article analyzes the practical and theoretical significance of virtual laboratory work in the formation of students' competencies in physics. The need to improve the methodology of using virtual laboratory work in physics lessons based on modern requirements is methodologically justified.

Key words: physics course, unified physical image of the world, scientific worldview, virtual laboratory work, competencies, physical phenomena, photoelectric effect, process modeling.

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Introduction

The physics course taught in academic lyceums is the main component of the natural sciences. It makes a great contribution to solving the problems of general education, ensures the formation of a unified physical image of the world, a scientific worldview, the development of intellectual and creative abilities, instilling values of the direction, preparation for life in modern society. Physics as the science of the most general laws of nature, acting as an academic subject in academic lyceums, makes a significant contribution to the system of knowledge about the surrounding world. In academic lyceums, the physics course is a system-forming one for natural science subjects, since physical laws underlie the content of chemistry, biology, geography and astronomy courses.

The study of physics is necessary not only for mastering the basics of one of the natural sciences, which is a component of modern culture. Without knowledge of physics in its historical development, a person will not understand the history of the formation of other components of modern culture. In order to solve the problems of forming the foundations of a scientific worldview, the development of intellectual abilities and cognitive interests of academic lyceums

in the process of studying physics, the main attention should be paid not to the transfer of the sum of ready-made knowledge, but to familiarity with the methods of scientific knowledge of the surrounding world, the formulation of problems requiring students to actively independently solve them.

Currently, computer information systems are of great interest in such fields of activity as education, science, technology and technology. Moreover, the continuous development of science, technology and technology leads to the emergence of new information systems, as well as to the development and improvement of existing ones. As for education, the introduction of new technologies, as well as comprehensive modernization are the main issues that are given special attention not only in Uzbekistan, but also around the world. It should be borne in mind that the introduction of information technologies into the educational process will be justified if they effectively complement existing learning technologies or have additional advantages over traditional forms of education. For example, the use of virtual laboratory work in teaching physics allows you to make laboratory work more lively and interesting, while improving the quality of education.

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Main part.

Since physics is the basis of scientific and technological progress, the importance of physical knowledge and the role of physics are continuously increasing. Methods and means of physical cognition are in demand in almost all areas of human activity. The application of physical knowledge and skills is necessary for every person to solve practical problems of everyday life.

Virtual laboratory work - advantages and disadvantages.

Virtual laboratory work is a software and hardware complex that allows conducting experiments without direct contact with a real installation or in its complete absence [3].

At the same time, such concepts as "virtual laboratory" and "virtual remote laboratory" should be distinguished. The basis of a virtual laboratory is a computer program or a related set of programs that perform computer modeling of certain processes [4]. A virtual remote laboratory is a network organizational structure of several groups of scientists who belong to various scientific centers and are interconnected by mutually beneficial cooperation relations, thanks to the Internet [5].

Compared to traditional laboratory work, virtual laboratory work has a number of advantages.

Firstly, there is no need to buy expensive equipment and dangerous radioactive materials. For example, specially equipped laboratories are required for laboratory work on quantum or atomic or nuclear physics. Virtual laboratory work allows us to study such phenomena as the photoelectric effect, Rutherford's experience in scattering alpha particles, determination of the crystal lattice period by electron diffraction, the study of gas laws, nuclear reactors, etc.

Secondly, it becomes possible to simulate processes that are not available in the laboratory. In particular, most of the classical laboratory works on molecular physics and thermodynamics are closed systems, at the output of which a certain set of electrical quantities is measured, from which the desired quantities are then calculated using the equations of electrodynamics and thermodynamics. All molecular kinetic and thermodynamic processes occurring in the experiment remain inaccessible to observation. In the course of performing virtual laboratory work on these sections of physics, students can use animated models to observe dynamic illustrations of the studied physical and chemical phenomena and processes that are not available for observation in a real experiment, while simultaneously observing the graphical construction of the corresponding dependences of physical quantities.

Thirdly, virtual laboratory work has a more visual visualization of physical or chemical processes compared to traditional laboratory work. For example, it becomes possible to study in more detail and

visually such physical processes as the movement of charged particles that create an electric current or the principle of operation of the p-p junction. It is also possible to penetrate into processes that occur in fractions of a second or last for several years, for example, the study of the movement of planets in the gravitational field of the central body.

Another advantage of virtual laboratory work in comparison with traditional ones is security. In particular, the use of virtual laboratory work in cases where there is work with high voltage or dangerous chemical reagents.

However, virtual laboratory work also has disadvantages. The main one is the absence of direct contact with the object of study, instruments, equipment. It is absolutely impossible to train a specialist who has seen a technical object only on a computer screen. Or are there likely to be people willing to go to a surgeon who previously practiced only on a computer. Therefore, the most reasonable solution is to combine the introduction of traditional and virtual laboratory work in the educational process, taking into account their advantages and disadvantages.

The use of virtual laboratory work in the study of physics.

Deep assimilation of physics is possible by studying the theory and in the process of its application to solve various computational, qualitative and experimental problems. If the reader gets acquainted with theoretical issues in lecture classes, then theory is also applied in laboratory classes, and, in addition, practical skills and abilities are formed in carrying out physical measurements, in processing and presenting results.

High-quality performance and successful protection of the results of laboratory work by readers are impossible without independent preliminary preparation for laboratory classes. In the process of preparing for the next lesson, first of all, it is necessary to study the description of the work performed according to this manual. However, it is impossible to limit ourselves only to this, since a theoretical introduction to each work cannot be considered as a sufficient minimum for a deep understanding of the physical foundations of the work. Therefore, it is necessary to read the material corresponding to the topic of the work according to the textbook for each work. It is impossible to start work without mastering its basic theoretical provisions, without realizing the logic of the measurement procedure, without knowing how to use measuring instruments related to this work. When starting work, the reader should firmly understand the purpose of this work, the general work plan, i.e. the sequence of actions during measurements. This is the main reason for returning to work when interviewing a teacher at the beginning of a lesson.

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The virtual computer laboratory contains instructions and methodological guidelines for the performance of works constructed uniformly in the following form: the purpose of the work, theoretical material, experimental setup, the procedure for performing the work, report. In addition, each laboratory work contains a test that includes an assessment of the basic knowledge necessary for the successful completion of the work, and a final test that aims to control the residual knowledge based on the results of laboratory work.

You can use virtualabs both on-line and off-line. Let's briefly focus on some of them:

1. Virtulab.Net This is one of the developed specialized portals dedicated to virtual educational laboratories. The site offers educational interactive works that allow students to conduct virtual experiments in physics, chemistry, biology, ecology and other subjects. This is a free on-line resource.

2. Virtual physics laboratory for schoolchildren. The virtual laboratory contains a set of programs for the school physics course and is intended for use by teachers in physics lessons, as well as by students to perform tasks using computers in the classroom and at home, and can also be used in preparation for the UNT. This is a paid resource.

3. Interactive laboratory work on physics and other subjects, the resource is located on the website of the Unified Collection of Data Centers. This

educational resource can be used both on-line and off-line. This is a free resource.

4. A series of discs released by the publishing house "Bustard": Laboratory work in physics for grades 7-11.

Moreover, the work of students with computer models is extremely useful, since students can set up numerous virtual experiments and even conduct small studies.

But virtual laboratory work also has undeniable advantages, since it allows conducting computer laboratory experiments in physics for cases when setting up a real experiment is difficult or it is necessary to instantly process the results obtained.

Conclusion.

I have presented you a small list of virtual educational resources. It should be noted that computer laboratory installations in virtual laboratories, as a rule, are a computer model of a real experimental installation. The performance of experimental studies is a direct analogue of an experiment on a real physical installation.

Summing up all of the above, we can say that virtual laboratories can be used both in the classroom and in self-preparation for classes, they allow you to deeper understand the laws of physics and penetrate into the essence of physical phenomena. We must not forget that in most cases this is a clearly programmed process.

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Contents

	p.
14. Kreinin, V. S., Obukhov, P. S., Blagorodov, A. A., Prokhorov, V. T., & Volkova, G. Yu. Education of the indigenous population is a guarantee of sustainable social and economic development of the regions of the Arctic Zone.	101-113
15. Eliseeva, M. S., Blagorodov, A. A., Belysheva, V. S., Prokhorov, V. T., & Volkova, G. Yu. RAIPON is an association of indigenous peoples of the North, Siberia and the Far East, providing them with legal protection.	114-152
16. Yudakova, A. A., Zolotova, A. A., Blagorodov, A. A., Prokhorov, V. T., & Volkova, G. Yu. Possibilities of the shift as a reserve of demographic problems of indigenous peoples for solving their migration processes.	153-165
17. Matvienko, A. A., Prokudina, A. V., Blagorodov, A. A., Prokhorov, V. T., & Volkova, G. Yu. On the importance of the social basis of transport for the social and economic development of regions of the Russian Federation.	166-184
18. Kholmatova, D. A. Modern education in higher education.	185-188
19. Najmiddinov, M. K. Formation of students' subject competencies in the field of physics with the help of virtual laboratory work.	189-191

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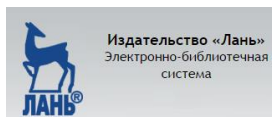
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