On Food Security of the Northern and Arctic Regions of Russia (Using the Example of the Republic of Sakha (Yakutia))

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Abstract. The food security of a country or region is the main focus of agrarian policy and the specific characteristics of agricultural production explain the increased attention of most countries to the agrarian sector of the economy. From the perspective of the northern and Arctic regions with complex climatic conditions, food security is a complex multifactorial problem and consists of domestic opportunities for agricultural production and the import of food from other regions and even countries. Regions with low agricultural potential are characterized by problems such as small volumes of local food production and the lack of a competitive market, the high cost of goods sold and non-compliance with medical nutrition standards. Most such regions are characterized by long distances, the complexity of the terrain (lakes, rivers) and the lack of transport infrastructure. In this regard, vital food is imported using the so-called "northern delivery" system.

The purpose of the study was to identify the problems of the food supply system of the northern and Arctic regions and to develop proposals for changing the negative situation. The object of the study was economic and organizational approaches to the food supply of the population of hard-to-reach regions. Research methods: comparative and economic analysis, statistical.

The following tasks are solved:
- characterize key indicators of regional food security;
- analyse the state of food security in the northern and Arctic regions;
- identify problems and propose solutions at the national (state) and local levels. The purpose of the study was to identify the problems of the food supply system of the northern and Arctic regions and to develop proposals for changing the negative situation. The scientific novelty of the study lies in the proposals developed by the author on the main directions of state policy in the field of food supply in the northern and Arctic regions.

1. Introduction

The concept of regional food security in Russia currently does not exist. At the same time, it is generally accepted that the level of self-sufficiency is a key regional indicator. This is also set in the Food Security Doctrine of the Russian Federation, approved in 2020.

Food security is a multi-level hierarchy consisting of seven levels and each of these levels is represented by a subject who independently solves the food problem.

Due to the natural conditions and the remoteness of the territory, the provision of food to the population in Yakutia is carried out in two areas: through the production of agricultural and food products by the regional agro-industrial complex and the import of food from outside the republic.
Other northern and Arctic regions face similar problems. This leads to the relevance of this study and the need to solve the noted problems.

The article is aimed at solving the problems of food supply of regions with hard-to-reach and remote territories and low agricultural potential.

In Russia as a whole, the level of food supply to the population due to its own production is not sufficient. For example, for dairy and meat products, it ranges from scientifically based consumption standards from about 50 to 70%, which does not correspond to the necessary rational nutrition when living especially in harsh Arctic conditions [1]. The Republic of Sakha (Yakutia) also does not provide itself with the necessary level of food products (fig. 1).

![Figure 1. Level of self-sufficiency of basic agricultural products, %.

Yakutia belongs to regions with difficult natural and climatic conditions, being a zone of risky agriculture. Agriculture of Yakutia is unique. There are no more regions in the world where intensive production of agricultural products is carried out in the permafrost zone, but the volume of production of agricultural products actually produced is not enough to fully meet the needs of the population.

According to the results for 2020, agricultural products worth 26.2 billion rubles were produced in the Republic of Sakha (Yakutia). The largest volume of production was produced by personal subsidiary farms of the population for their own consumption in the household - 47%. Agricultural enterprises and peasant (farm) farms account for 27% and 26%, respectively. In general, the state of agriculture can be described as not stable.

The indicators for the number of agricultural animals and the production of agricultural products clearly demonstrate this (fig. 2 and 3).
In the north and in the Arctic zone, where the Republic of Sakha (Yakutia) belongs, there are practically no conditions for growing crop products, and this, due to the lack of feed, in turn, makes the development of cattle breeding impossible [2].

Food Shortage Problem in the republic is decided by importing food from abroad. Vital goods intended for residents of the Arctic and northern uluses of Yakutia are imported using the so-called Northern Supply system.

This system is aimed at resolving the issue of delivering not only food, but also medicines, industrial goods, fuel to inaccessible and remote territories of Yakutia, which remain in winter due to difficult climatic conditions for several months without the supply of vital goods. But these are not all problems that complicate the delivery of goods to the republic. The low level of self-sufficiency is complemented by the complex transport pattern of food delivery and the lack of systems in its delivery. [3] In this regard, food security in hard-to-reach and remote areas is a multifactorial problem regarding the availability, accessibility and use of food in nutrition.

**Figure 3.** Agricultural production in the Republic of Sakha (Yakutia).

**Figure 4.** Hard-to-reach and remote settlements of the Republic of Sakha (Yakutia) to which food is delivered.
2. Northern Supply Food Supply System: problems and regional solution

Of the 641 settlements in the Republic of Sakha (Yakutia), 486 are inaccessible and remote settlements, which is 75.8%. At the same time, they do not have a year-round transport scheme - 242 or 33% (fig. 4). The Northern Supply system is aimed at resolving the issue of delivering not only food, but also medicines, industrial goods, fuel to inaccessible and remote territories of Yakutia, which in the winter due to difficult climatic conditions for several months remain without the supply of vital goods. But these are not all problems that complicate the delivery of goods to the republic. The low level of self-sufficiency is complemented by the complex transport pattern of food delivery and the lack of systems in its delivery. [3] In this regard, food security in hard-to-reach and remote areas is a multifactorial problem regarding the availability, accessibility and use of food in nutrition.

Therefore another problem of the northern territories is the seasonality of transport infrastructure [4]. In a short period of navigation (4-5 months), it is necessary to timely deliver the annual volume of cargo for the life of the population with an average turnover in the republic from 220 to 240 days, and in certain inaccessible Arctic territories – 1.5-2 years (fig. 5).

![Diagram of the "northern delivery" of cargo to remote and inaccessible territories of the Republic of Sakha (Yakutia).](image)

Food security, in accordance with the Doctrine, is a state of social and economic development of the country in which the country's food independence is ensured and the physical and economic accessibility of food products to every citizen is guaranteed, and compliance with sustainable consumption standards is a mandatory requirement. Today, the Republic of Sakha (Yakutia) independently decides the issue of providing 12 items of food. The list of these goods, as well as settlements of the Republic of Sakha (Yakutia), provided by socially significant food products with state support, was approved by Decree of the Government of the Republic of Sakha (Yakutia) of December 27, 2012 No. 604 "On Measures to Improve the System for Providing Food Products to Difficult, Remote Settlements of the Republic of Sakha (Yakutia)" (tab. 1).
But that's not enough. For example, in 2019, the volume of sold food products per capita on average in the republic exceeds the same figure for the Arctic zone by almost \( \frac{1}{4} \) or 22.3\% (tab.2).

The distance of the regions of the Republic of Saza (Yakutia) from industrial centers leads to large runs of imported goods from suppliers to direct consumers. So, the average cargo mileage to the republic by rail is 3990 km, and by sea - 6450 km. Transport distances are also significant on intrarepublican communications. From Yakutsk to regional centers, distances range from 70 to 4500 km, including along land routes from 800 to 3200 km, water from 2000 to 4500 km and air lines from 840 to 2000 km.

Food security is characterized mainly by actual average per capita consumption compared to the recommended physiological norms, which in the Republic of Sakha (Yakutia) are presented in table 3.

| N | Name of goods                                                                 |
|---|-----------------------------------------------------------------------------|
| 1 | Flour                                                                        |
| 2 | Pasta                                                                        |
| 3 | Vegetable oil and other fats                                                |
| 4 | Cereals (rice, buckwheat cereal, semolina, oatmeal, pearl cereal, millet, barley cereal, peas) |
| 5 | Tea                                                                          |
| 6 | Salt                                                                         |
| 7 | Sugar                                                                        |
| 8 | Processed and canned meat products                                          |
| 9 | Processed and canned fish products                                          |
| 10| Powdered milk                                                                |
| 11| Condensed milk                                                               |
| 12| Fruits and vegetables processed and canned                                  |

3. Similar problems are one solution

Inaccessible and remote territories are not only in Yakutia. Similar problems have Magadan region, Khanty-Mansi Autonomous Okrug, Chukchi Autonomous Okrug, Evenki Autonomous Okrug, Yamal-Nenets Autonomous Okrug and others, the total number of which is more than 20 [5].
In market conditions, despite some independence and stability of the regions, it is impossible to completely solve the issue of the food problem and remove it from the agenda. Many regions lack their own capacity. Without economic, financial support, legal protection for agricultural producers, it is impossible to overcome regional differences in food supply. At the same time, the development of the northern and Arctic territories, which include the regions of the Far North and the Arctic, is the most important component of the state policy of the Russian Federation [6]. The North of Russia occupies key positions in the economy, national security and geopolitical situation of the country. How complex its potential will be used will depend on the future of Russia [7].

Life support of the northern territories is one of the main tasks of national security of Russia [8]. Among the especially significant projects for the country implemented in Yakutia, the Strategy for the Development of the Arctic Zone of the Russian Federation until 2035 identified the construction of energy and transport infrastructure, the development of the mineral resource base of the solid minerals of the Yan Basin, including the Kyuchus gold deposit, the Forecast silver deposit, Deputatskoye and Tirekhty tin ore deposits, as well as a number of other not less important projects. Similar projects are available in other northern and arctic regions of Russia. This necessitates a uniform approach to addressing food security at the expense of regional agribusiness. Development of agrarian and industrial complex of regions with remote territories and the difficult scheme of delivery has to be aimed first of all at food supply of territories due to implementation of new technologies for reproduction, maintenance, processing in the traditional industries, such as reindeer breeding, tabunny horse breeding, hunting and fishery as less labor-consuming. This will create additional jobs and increase the profitability of indigenous people, ensure infrastructure development, improve the level and quality of life of indigenous people.

4. Conclusion
The results of the study showed that, being a resource pantry, hard-to-reach and remote territories of Russia will continue to develop intensively in the future. The implementation of large industrial projects involves an increase in the population in these territories, and extreme climate conditions require adequate nutrition, respectively. Food security is determined by the level of efficiency of the entire economy, and in this regard, the role of the agribusiness is changing, which becomes the guarantor of the political and economic independence of the state.

In order to increase the effectiveness of agribusiness and create conditions for improving food security through regional production, it is necessary to radically review approaches to state support for agricultural producers and create conditions for their innovative development.

Investments in new technologies and the purchase of high-performance equipment and equipment can contribute to the growth of agricultural products. To do this, you need to resolve the issue of reimbursing the federal budget for part of the costs of their purchase and implementation. This is particularly the case with regard to the creation of additional conditions for the development of traditional economic sectors, such as reindeer and herd herding, hunting and fishing, which are less labour-intensive.

Taking into account that the development of the agro-industrial complex is a long process, it is necessary to solve the issue of improving the system of "northern delivery." To do this, you need to return to the question of creating the Federal Fund for Agricultural Products, Raw Materials and Food to provide areas of the Far North and areas equated to them, and at the expense of it resolve the issue of partial reimbursement of the costs of delivering socially significant food.

5. References
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