

DOI: <https://doi.org/10.23649/jae.2021.4.20.8>

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Received: 13.10.2021; Accepted: 26.10.2021; Published: 15.12.2021

FEATURES, RISKS, AND THREATS TO FOOD SECURITY POPULATION OF THE RUSSIAN ARCTIC

Research article

Abstract

In the context of an increasing demand for food with limited agricultural resources, the search for additional sources of biologically valuable local food products is everywhere. The Arctic specificity of ensuring food security identified, including unfavorable natural conditions for agriculture, low provision of biological resources, a decrease in the level of self-sufficiency of the population with agricultural products, and a high dependence of food supply on imports. Risks and threats to food security and measures to overcome them are considered.

Keywords: agriculture, food security, self-sufficiency, population, local food.

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Получена: 13.10.2021; Доработана: 26.10.2021; Опубликована: 15.12.2021

СОСОБЕННОСТИ, РИСКИ И УГРОЗЫ ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ НАСЕЛЕНИЯ АРКТИКИ РОССИИ

Научная статья

Аннотация

В условиях возрастающего спроса на продовольствие при ограниченных сельскохозяйственных ресурсах повсеместно идет поиск дополнительных источников получения биологически полноценных местных продуктов питания. Выявлена арктическая специфика обеспечения продовольственной безопасности, включающая неблагоприятные природные условия для земледелия, низкую обеспеченность биологическими ресурсами, снижение уровня самообеспечения населения продукцией сельского хозяйства, высокую зависимость продовольственного обеспечения от ввоза. Рассмотрены риски и угрозы обеспечения продовольственной безопасности и меры по их преодолению.

Ключевые слова: сельское хозяйство, продовольственная безопасность, уровень самообеспечения, население, местные продукты питания.

1. Introduction

Ensuring world food security is the most important problem of humanity in the XXI century. According to the FAO forecast, the demand for food in the world will double by 2050 [1]. In this regard, Russia must determine its place in solving the problems of ensuring world food security.

The northern and Arctic territories can significantly contribute to ensuring national and global food security. The share of the North and Arctic zone in fish catch and seafood production is 66%. There are over 1.7 million domesticated deer or about 2/3 of the world's domesticated reindeer.

The northern and arctic territories have the potential to increase the level of self-sufficiency in food: the availability of natural and labor resources; competitiveness of products of traditional industries; the possibility of producing organic products; the industrial nature of the economy, allows you to direct significant financial resources for the technical and technological

modernization of the agricultural sector and the comprehensive development of rural areas; developed potential of agricultural science.

Certain aspects of food supply for the population of the Arctic regions of Russia and foreign countries are considered in a number of publications [2], [3], [4]. However, there is no coherent system of views on ensuring the population's food security in the Arctic zone. It is from the standpoint of the specifics of ensuring food security that the authors consider this problem.

The agro-industrial economy aimed at providing the population with meat, milk, sea, river and lake fish, eggs, greenhouse vegetables, and wild plants. These food products are indispensable in the rational nutrition of the inhabitants of the Arctic. Local food products directly support the livelihoods of 2.5 million people living in the Arctic zone of the Russian Federation [5]. They provide the increased need of the population for vitamins, fats, and proteins, being at the same time drugs.

Agriculture and fishing in the Arctic have a long history. It developed along with the development of the territory. Its specialization formed under the influence of natural conditions, geographical location, historical and socio-economic factors in the production of low-transportable and perishable products, as well as products of traditional industries. Agriculture, hunting, and fishing are inherently a way of life for small and other indigenous peoples.

According to A.N. Pilyasov, this can be considered as social entrepreneurship [6].

2. Research methods

To achieve this goal in the study, the authors used theoretical, empirical, and mathematical research methods. The theoretical method analyzed data on the level of self-sufficiency, the share of the rural population, and the availability of agricultural resources in the context of the subjects of the North and the Arctic according to a certain nomenclature. The empirical method compared foreign and domestic approaches to the definition and essence of food security in the region and the country. The mathematical methods used a statistical analysis of the relevant data from 2001-2019.

2.1 Features of self-sufficiency in food

The food security of the region is a subsystem of the country's food security. Regional food security reflects the totality of agricultural problems, the state of the domestic food market, its interaction with the world market, as well as the tasks of social policy. If the country's food security is based on the concept of food independence, then the food security of a constituent entity of the Federation is determined by a rational combination of consumption by the population of local and imported products according to rational consumption rates. Self-sufficiency of the region is possible only with those food products for the production of which there are a high bioclimatic potential, land, and labor resources. Self-sufficiency in food is impracticable for regions with unfavorable conditions for the development of agriculture, primarily in the Arctic. The food security of these territories is understood as the ability of the state to guarantee the population physical and economic accessibility for all social groups of the population, of safe food products at rational consumption rates. Achieving food security is associated with both an increase in domestic food production and the import of food.

When developing specific approaches and methods for solving the problem of food security of the population of the Arctic territories, it is necessary to take into account their specific features.

Local agricultural production, due to unfavorable extreme conditions for development, is not able to provide the population of these territories with their own food. In 2019, the ratio of the level of consumption of domestic production of potatoes per capita to rational consumption rates in the Arctic zone was 2.4%, vegetables - 0.4, meat - 8, milk - 4.7, eggs - 1.8%. These indicators are significantly lower in comparison with the North zone (*table 1*).

Table 1 – Level of self-sufficiency in agricultural products in the North and Arctic zones in 2019, %

Region	Potatoes	Vegetables	Meat	Milk	Eggs
Arctic zone	2,4	0,4	8,0	4,7	1,8
Murmansk region	3,4	0,4	2,2	2,9	1,9
Nenets Autonomous District	8,3	0,6	42,6	22,7	0,0
Yamalo-Nenets Autonomous District	0,8	0,1	12,2	1,2	0,3
Chukotka Autonomous district	1,3	1,7	14,6	0,2	19,3
Areas of the Far North and equivalent areas	33,3	14,0	17,4	20,0	20,3

Note: calculated according to [8]

The decline in agricultural production in the Arctic zone during the period of market reforms led to a decrease in the provision of the population with local food products. 1990-2019 the level of self-sufficiency of the population in accordance with rational consumption rates for vegetables decreased by 2.4 percentage points, for meat - 21.5, milk - 11.4, and eggs - by 53.6 percentage points.

The basis of food supply for the population of the Arctic was formed by the import of food products from other regions and from abroad. Analysis of food imports showed that the share of imports of food of animal origin from the size of own production significantly exceeds this indicator in 1990.

A low rural population characterizes the Arctic territories. If, in Russia as a whole, the share of the rural population is 25%, then in the regions of the Far North and equivalent areas - 21, and in the Arctic zone - only 10% (*table 2*).

Table 2 – The share of the rural population as of January 1, %

Country, region	2001	2006	2011	2016	2017	2018	2019	2020
Russia	27	27	26	26	26	26	25	25
Areas of the Far North and equivalent areas	23	23	22	21	21	21	21	21
Arctic zone *	12	11	12	12	12	12	12	10

Note. * Data given for the Murmansk Oblast, Nenets, Chukotka and Yamalo-Nenets Autonomous Districts, the territories of which are entirely part of the Russian Arctic.

Calculated according to [8]

Analyzing the current and future state of food self-sufficiency in the Arctic, one should first proceed from their natural and resource potential. Here, in comparison with Russia, as well as with the zone of the North, the provision of biological resources is significantly lower, with the exception of the number of deer per capita (table 3).

In the Arctic zone, in comparison with the Russian Federation, the per capita supply of potato crops is 22.5 times lower, vegetables - 100, cattle - 17.7, pigs - 28.7 times. Moreover, with a decrease in the population for 2000-2019 the 11% decrease in the cultivated area of potatoes was 7.5 times, the number of cattle - 4.2, pigs - 6.3 times.

Table 3 – Availability of agricultural resources (per 100 people) in 2019

Country, region	Sown area, ha			Cattle, heads	Including cows	Pigs, heads	Reindeer, heads
	Cereals	Potatoes	Vegetables				
Russia	31,8	0,9	0,4	12,4	5,4	17,2	1,2
Areas of the Far North and equivalent areas	0,7	0,5	0,1	6,9	3,0	2,2	17,6
Arctic zone	-	0,04	0,004	0,7	0,3	0,6	89,9

Note: calculated according to [8]

Agriculture is also characterized by other restrictions. The main of which are: during the years of reforms, due to a sharp decline in investment, the material and technical base of agricultural production was destroyed; limited access of small and medium-sized forms of the agricultural economy to markets for products, material, technical, financial resources and information and consulting services; low wages in the industry; desertification of rural areas; deterioration of the demographic situation in the countryside and human resources in the agricultural sector; underdevelopment and degradation of rural infrastructure facilities.

2.2. Food security risks and threats

The key risks of agriculture include the destruction of the material and technical base due to insufficient investment. In the Arctic zone in the 1990s, capital investments in the industry fell by 3 times. Over the past 18 years, there has been no sustainable investment growth, which has led to an increase in the depreciation of fixed assets. In rural areas, fixed assets worn out by 60-80%.

An extremely insignificant share of agricultural producers applies innovations. The results of the All-Russian Agricultural Census of 2016 showed that the system of individual feeding of livestock was used by only 5.7% of agricultural organizations and 4.5% of peasant farms and individual entrepreneurs. The method of cell-free keeping of poultry - 0.6 and 3.8%, respectively, treatment facilities on livestock farms, had only 1.3% of agricultural forms of management. At the same time, in the Arctic zone, the use of innovative technologies is much lower in comparison with Russia.

The main factors hindering the use of innovative technologies are insufficient level and ineffective mechanisms of financial support for agricultural producers, inaccessibility of preferential credit resources. Almost half (46%) of small agricultural enterprises did not receive budget support, less than half of the farms did not use subsidies. Loans were available only to 3.5% of agricultural enterprises. The share of farms and individual entrepreneurs using credit funds amounted to 5.8%.

Agriculture suffers from a shortage of qualified personnel. According to the 2016 agricultural census, the share of managers in large and medium-sized agricultural organizations with higher education was 56.3% (in Russia 87%), with a secondary vocational education - 28.2%, in small enterprises - 61.5%, and 23, 1% respectively. A particularly low level of higher professional education among the heads of peasant farms and individual entrepreneurs. 43.5% of heads of these categories of farms do not have higher or secondary vocational education.

In rural areas, the population is aging. In Komi, for example, the share of the population under the working age decreased from 28.9% in 1989 to 21.7% in 2019, in the working age, respectively, from 57.2 and 50.6, and the share of people over working age increased from 13.9% to 27.7%.

The risk of a decrease in labor potential associated with a reduction in the number and aging of the rural population will become a factor limiting the development of the agricultural sector and other sectors of the rural economy. If the existing

negative demographic situation in the countryside continues, in the future, only agriculture in the suburban areas will remain, and the procurement of fodder and the cultivation of crops in remote areas will be carried out on a rotational basis.

There are risks of high concentration of production in large agricultural enterprises in urban and suburban areas. The concentration of agricultural production at industrial enterprises is associated with the inability to produce organic products, the appearance of negative effects on the environment, and on the health of food consumers.

Small forms of agriculture that carry out social protection of the rural population are associated with the solution of the tasks of strengthening food security and removing threats to human health from suppliers of low-quality products. The production of organic agricultural products is extremely necessary and can be organized precisely in small and medium-sized forms of farming.

Coping with social threats to food security will require making rural lifestyles more attractive. The rural areas of the Arctic territories are characterized by underdeveloped transport, engineering, social, production, information, and consulting infrastructure and infrastructure of the food market. 2000-2019 the number of feldsher-obstetric points decreased in the Yamalo-Nenets Autonomous District by 10 times, in the Nenets Autonomous District - 7, in the Murmansk Region 1.7 times. In general, in the North Zone, this indicator decreased by 31%.

During the years of market reforms in rural areas, the construction of rural roads was stopped, and the construction of houses, preschool institutions, educational schools, and institutions of cultural and leisure type was significantly reduced. Most of the inhabitants of rural settlements are deprived of basic amenities.

It should also be noted such a threat to food security is the economic inaccessibility of food for the population with low incomes, especially rural. The high differentiation in the level of income in agriculture and other spheres of activity that has developed in the Arctic zone, as well as the unreasonable rise in food prices, lead to the fact that a significant part of rural citizens are unable to ensure the consumption of milk and dairy products, meat and meat products, fish and fish products, vegetables and fruits in accordance with established rational nutritional standards. In the Komi Republic, for example, the level of wages in organizations in the agricultural sector is only 38% of wages in the mining industries and slightly more than half in financial activities, transportation, and storage.

The dynamics of real disposable incomes of the population and the prices of foodstuffs affect the demand for food. Analysis of these indicators for the Komi Republic for 2000-2019. Figure 1 showed that growth in real incomes tended to decline while food prices rose.

During the period under review, the food price index increased significantly. In 2020, amid the COVID-19 coronavirus infection pandemic, the real disposable income of the population fell while prices rose significantly. Their growth for sugar and flour was twofold.

Ensuring food security is associated with overcoming the threats associated with the high dependence of agriculture on imported seeds, genetic material in animal husbandry, veterinary drugs, plant protection products, machinery and equipment, software, feed components, and food ingredients. With the threshold value of providing seeds of the main agricultural crops of domestic selection of at least 75%, provided for in the new Doctrine of Food Security of the Russian Federation (2020). Now this share for wheat is 80-90%, spring barley - 63, corn - 46, vegetables crops - 43, soybeans - 42, spring rape - 32, sunflower - 27, potatoes - 10, sugar beet - about 1% [7]. The new version of the Doctrine does not say anything about the self-sufficiency of animal husbandry with genetic material, veterinary drugs, and the agri-food sector with domestic machinery, equipment, and technologies.

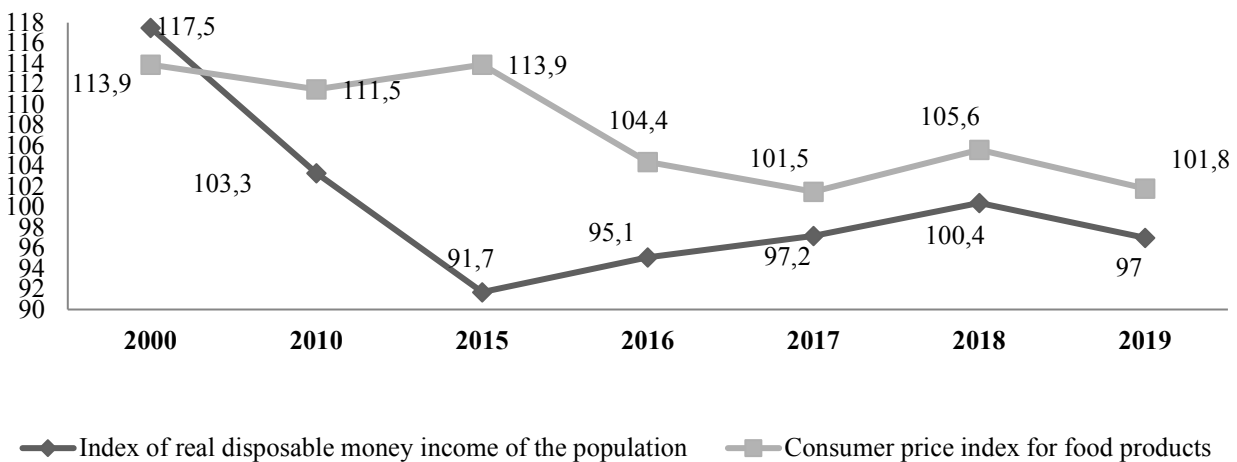


Figure 1 – Dynamics of real disposable income of the population and the consumer price index for food products in the Komi Republic, in% to the previous year

2.3. Measures to address risks and threats to food security

To overcome the risks and threats to food security, the subjects of the executive and legislative power of the Arctic territories must:

- improve legal regulation in the field of food safety;
- to ensure the improvement of the demographic situation, improvement of transport, engineering, social, information, consulting, and market infrastructure in rural areas;

- create conditions for sustainable development of agriculture and fisheries;
 - effectively use the mechanisms and tools for the development of the agro-industrial economy;
 - stimulate the production of organic agricultural products;
 - to implement measures to overcome the low level of investment and innovation activity in the agricultural sector, decrease in fertility and degradation of agricultural lands;
 - in order to increase the economic and physical accessibility of food, carry out measures to reduce the poverty level of the rural population, develop interregional cooperation and integration in the field of food supply of the population;
 - increase the transport accessibility of remote areas for guaranteed food supply to their population;
 - take measures to develop trade infrastructure in the field of food products sale;
 - to form the necessary stocks and reserves of food in the regions;
 - develop agrarian science; implement measures aimed at attracting and retaining scientific workers.
- All of the above measures should be addressed in a comprehensive manner to achieve the result of food security for the population of the North and the Arctic of Russia.

3. Conclusions

The main features of ensuring food security for the population of the Arctic zone are:

- low food self-sufficiency due to limited opportunities for production in extreme natural conditions and the dependence of food supply for the population on imports;
- high rates of decline in the rural population and poor availability of agricultural resources;
- underdevelopment of the agri-food sector and rural infrastructure;
- low transport accessibility of remote areas of guaranteed and relatively uniform food supply for their population;
- lack of stable links with food production areas;
- focal settlement and seasonal delivery of food to remote areas.

Ensuring food security in areas with extreme natural conditions will require overcoming the trend of destruction of the material and technical base of agriculture due to investment shortages, the outflow of qualified personnel from the industry, the concentration of production in large agricultural enterprises; reducing the attractiveness of the rural way of life; unreasonable rise in food prices; insufficient level of development of the food market infrastructure.

It is advisable to take the obtained research results into account when forming and adjusting the state programs for the development of the agri-food sector and the integrated development of the Arctic rural areas.

Funding

The work was carried out on the topic of research "Sustainable resource use of the northern region: factors and models"(State registration number 121021800128-8)".

Conflict of Interest

None declared.

Конфликт интересов

Не указан.

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