УДК 338.439.02(470.1)
JEL Classification: D23; C5; L22

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FOOD SECURITY: NORTH-ARCTIC SPECIFICATIONS

DOI: 10.32620/cher.2021.2.08

Formulation of the problem. In the context of increasing demand for food with limited agricultural resources, there is a widespread search for additional sources of biologically full-fledged local food. This also applies to the northern and Arctic territories. *The purpose of the article* is to consider the features of ensuring food security of the population of the northern and Arctic territories. *The subject of the study* is the process of food security management. The research methods used were analytical, historical, statistical, logical, and comparative. *The research hypothesis.* Regulation of the production of local agricultural products, the creation of enterprises for its processing, storage and sale of food, the formation of rear food bases in adjacent, favorable agricultural zones, the delivery of food from other regions of the country will eliminate the dependence of the population of the northern and Arctic territories on imported food, reduce losses and improve its quality. *Summary of the main material*. The content of food security is considered. Its main elements, including food independence, physical and economic accessibility of food for all social groups of the population, and food safety for consumers, are established. The current state of food independence is characterized. The northern and Arctic specifics of ensuring food security are revealed. The analysis of self-sufficiency of the population of the North and the Arctic with agricultural products is given. The risks and threats to food security have been identified. Measures to overcome them are considered. *Practical value.* The recommendations and suggestions can be used in the development and adjustment of State programs for the development of the agri-food sector and rural areas by the subjects of the Northern and Arctic zones, as well as in the further research work of the author. *Conclusions of the study*. The study of the specifics of the food supply of the population in extreme natural conditions will allow state and local authorities to effectively manage food security.

Key words:
food security, food independence, features of food security in the northern and Arctic territories, risks and threats to food security, the North, the Arctic.

ПРОДОВОЛЬЧА БЕЗПЕКА: ПІВНІЧНО-АРКТИЧНА СПЕЦИФІКА

Постановка проблеми. В умовах зростаючого попиту на продовольство при обмежених сільськогосподарських ресурсах повсюдно йде пошук додаткових джерел отримання біологічно повноцінних місцевих продуктів харчування. Це ставитися і до північних і арктичним територіям. *Метою статті* є розгляд особливостей забезпечення продовольчої безпеки населення північних і арктичних територій. *Предмет дослідження* – процес управління продовольчої безпеки. В якості *методів дослідження* застосовувалися аналітичний, історичний, статистичний, логічний, порівняльний. *Гіпотеза дослідження*. На регулювання виробництва локальної аграрної продукції, створення підприємств з її переробки, зберігання і реалізації продуктів харчування, формування тилових продовольчих баз в прилеглих, сприятливих сільськогосподарських зонах, завезення продуктів харчування з інших регіонів країни дозволять ліквідувати залежність населення північних і арктичних територій від імпортного продовольства, зменшити втрати і підвищити його якість. *Виклад основного матеріалу*. Розглянуто зміст продовольчої безпеки. Встановлено основні її елементи, що включають продовольчу незалежність, фізичну і економічну доступність продовольства для всіх соціальних груп населення, безпеку продуктів харчування для споживачів. Охарактеризовано сучасний стан продовольчої незалежності. Виявлено північна і арктична специфіка забезпечення продовольчої безпеки. Дан аналіз самозабезпечення населення зони Півночі і Арктики продукцією сільського господарства. Виявлено ризики і загрози забезпечення продовольчої безпеки. Розглянуто заходи щодо їх подолання. *Оригінальність і практичне значення*. Рекомендації та пропозиції можуть бути використані при розробці та коригуванні державних програм розвитку агропродовольчого сектору та сільських територій суб'єктами зони Півночі і Арктики, а також у подальшій науково-дослідній роботі автора. *Висновки дослідження і перспективи подальших досліджень*. Вивчення специфіки продовольчого забезпечення населення в екстремальних природних умовах дозволить державним і місцевим органам влади ефективно управляти продовольчою безпекою.

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Ключові слова:
продовольча безпека, продовольча незалежність, особливості продовольчої безпеки північних і арктичних територій, ризики і загрози забезпечення продовольчої безпеки, Північ, Арктика.

ПРОДОВОЛЬСТВЕННАЯ БЕЗОПАСНОСТЬ: СЕВЕРО-АРКТИЧЕСКАЯ СПЕЦИФИКА

Постановка проблемы. В условиях возрастающего спроса на продовольствие при ограниченных сельскохозяйственных ресурсах повсеместно идет поиск дополнительных источников получения биологически полноценных местных продуктов питания. Это относиться и к северным и арктическим территориям. *Целью статьи* является рассмотрение особенностей обеспечения продовольственной безопасности населения северных и арктических территорий. *Предмет исследования* – процесс управления продовольственной безопасности. В качестве *методов исследования* применялись аналитический, исторический, статистический, логический, сравнительный. *Гипотеза исследования.* На регулирование производства местной аграрной продукции, создание предприятий по ее переработке, хранению и реализации продуктов питания, формирование тыловых продовольственных баз в прилегающих, благоприятных сельскохозяйственных зонах, завоз продуктов питания из других регионов страны позволят ликвидировать зависимость населения северных и арктических территорий от импортного продовольствия, уменьшить потери и повысить его качество. *Изложение основного материала.* Рассмотрено содержание продовольственной безопасности. Установлены основные ее элементы, включающие продовольственную независимость, физическую и экономическую доступность продовольствия для всех социальных групп населения, безопасность продуктов питания для потребителей. Охарактеризовано современное состояние продовольственной независимости. Выявлена северная и арктическая специфика обеспечения продовольственной безопасности. Дан анализ самообеспечения населения зоны Севера и Арктики продукцией сельского хозяйства. Выявлены риски и угрозы обеспечения продовольственной безопасности. Рассмотрены меры по их преодолению. *Оригинальность и практическое значение.* Рекомендации и предложения могут быть использованы при разработке и корректировке Государственных программ развития агропродовольственного сектора и сельских территорий субъектами зоны Севера и Арктики, а также в дальнейшей научно-исследовательской работе автора. *Выводы исследования и перспективы дальнейших исследований.* Изучение специфики продовольственного обеспечения населения в экстремальных природных условиях позволит государственным и местным органам власти эффективно управлять продовольственной безопасностью.

Ключевые слова:
продовольственная безопасность, продовольственная независимость, особенности продовольственной безопасности северных и арктических территорий, риски и угрозы обеспечения продовольственной безопасности, Север, Арктика.

Formulation of the problem. Food security is an integral part of the national security of any state, preserving its sovereignty, improving the quality of life of its citizens through sufficient provision of high-quality and safe products. Ensuring world food security is the most important problem of humanity in the XXI century. According to the FAO (Food and Agriculture Organization of the United Nations) forecast, the demand for food in the world by 2050, caused by population growth by 40%, the growth of the middle class, with a decrease in the proportion of people living below the poverty line, will double [1]. In this regard, Russia must determine its place in solving the problems of ensuring world food security.

The northern zone can make a significant contribution to ensuring the country's food security. The regions of the Far North and equivalent areas occupy almost 70% of the territory of the Russian Federation. It includes 24 constituent entities of the Federation, the territories of 13 regions are completely included in the North zone. The northern territories are of particular importance in the socio-economic development of the country. Here, on average for 2017-2019. oil production amounted to 240 million tons, gas - 676 million cubic meters. m. There are also significant reserves of coal, chromium, manganese, gold and diamonds, vermiculite, nickel, copper and other rare metals. The share of the North zone in the catch of fish and seafood is 56%. In the northern and arctic territories, there are over 1.7 million heads of domesticated reindeer, or about 2/3 of the world population of domesticated reindeer.

Among the factors that determine the effectiveness of the development of the mineral resource potential, it is important to provide the population of the northern and arctic territories with fresh biological safe food. Local foodstuffs - milk, meat, eggs, fish, potatoes, vegetables, wild plants - can satisfy the increased need of the population living in extreme climates for vitamins, proteins and fats. Economically justified production of products, mainly low-transportable and perishable, for which there are favorable conditions, frees the national economy of other regions of Russia from the need to procure, process and transport an equivalent amount of it. At the same time, savings in investment in transport are achieved, product losses are reduced, and its quality is improved. Agriculture of the North and Arctic zone not only provides the population with fresh biological nutritious food, but also stimulates

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the development of the food industry, stabilizes employment, prevents the monopolization of local food markets by individual suppliers of products, restrains the prices of food imported from outside the region, performs the functions of traditional the way of life of the rural population, contributes to the improvement of the demographic situation, the system of settlement of people, the preservation of the environment and natural landscape. It should also be borne in mind that agricultural enterprises and peasant farms are often the city-forming and the only employers in the countryside. With their liquidation, the inhabitants of many villages are left without work, and most of the land will go out of agricultural use.

The factor determining the solution to the problem of food security is directly related to the participation of indigenous ethnic groups, the way of life, traditions and culture of which are based on traditional types of farming – reindeer husbandry, marine hunting, hunting and fishing. Predominantly small peoples are employed in the agricultural sector.

Analysis of recent research and publications. In our country, over the past two decades, a significant number of scientific works devoted to solving the problems of food security of the state and its regions have appeared [2; 3; 4; 5; 8; 9]. The study of scientific publications has shown that many provisions of the theory of food security remain controversial. There is no clear understanding of the essence of food security at the state and regional level, of the indicators of its assessment. There is no comprehensive scientific substantiation of the food security of the population in the North and Arctic zone, where agricultural production operates in difficult and unfavorable extreme conditions.

The purpose of the article is to consider the features of ensuring food security of the population of the northern and Arctic territories.

Presentation of the main material. In recent years, the situation in the agricultural sector has changed significantly in the country; it has been possible to significantly improve the supply of the population with domestic food products. This required the adoption of a new edition of the Food Security Doctrine. The new document clarifies the concept, the goal of food security, gives a new definition of food independence.

In the new version of the Doctrine, the threshold values of food independence have been changed towards an increase in sugar, vegetable oil, fish and fish products. The list of products was supplemented, for which threshold values of food independence are calculated. It includes vegetables and melons, fruits and berries, as well as seeds of the main agricultural crops of domestic selection (Table 1).

Table 1: Threshold values for food independence in the Food Security Doctrine, %

Product type	Doctrine 2010	Doctrine 2020
Corn	95	95
Sugar	80	90
Vegetable oil	80	90
Meat and meat products	85	85
Milk and dairy products	90	90
Fish and fish products	80	85
Potatoes	95	95
Vegetables and melons	-	90
Fruits and berries	-	60
Seeds of the main agricultural crops of domestic selection	-	75
Edible salt	85	85

Source: generated by the author

The constituent elements of food security adopted in official documents - food independence, physical availability of food, economic accessibility of food, food safety for consumers - are the basis for food security management.

So, the food security of the state is the ability of the agri-food system to ensure food independence, to guarantee the physical and economic accessibility of safe food for all social groups of the population at rational consumption rates. Achieving food security is associated with the sustainable development of the agri-food sector of the country and its regions, overcoming the dependence of the food market on imports, and increasing the population's ability to pay.

At the present stage, in food security issues, the emphasis is on healthy nutrition. Every third inhabitant of the planet suffers from malnutrition [16]. In this regard, the demand for organic agricultural products is increasing.

FAO defines organic agriculture as a unique production management system that ensures and improves the health of the agro-ecosystem, including biodiversity, biological cycles and soil biological activity, and this is achieved through the use of agricultural agronomic, biological and mechanical methods and the elimination of all synthetic non-agricultural impacts [17]. The organic farming system is based on crop rotations, the use of plant residues, manure and composts, legumes and plant fertilizers, and non-agricultural organic waste. the use of mechanical tillage and biological agents [18].

Foreign experience in ensuring food security. Understanding food security is associated with the interaction of the national economy and the world food market. According to the degree of food security and security, the countries of the world can be divided into four groups: independent - fully providing residents with basic food products of their own production, taking into account current consumption and creating a certain reserve for unforeseen goals and circumstances; relatively independent - produce the bulk of food products, and import small amounts of food; partially dependent - a certain amount of food is imported from other countries; completely dependent - unable to produce enough food for residents on their own in accordance with the recommended norms. In modern conditions, only some industrially developed countries produce significantly more food products than is required by the living population.

For example, in Canada, New Zealand, the United States, France and some other countries, the production of their own food significantly exceeds the needs of residents in accordance with medical standards. Germany, Italy, Spain and many other developed countries produce at least 80-90% of domestic food products [19].

The first group of countries that, through their own agricultural production, provides full satisfaction of domestic needs, especially in livestock products, and a high export potential, is the Republic of Belarus, a member of the Eurasian Economic Union. The level of food independence of the Republic of Belarus for grain is 106%, potatoes - 100, vegetables - 97, sugar - 94, meat and meat products - 246 and eggs - 130% [20, p.9].

The Chinese experience in ensuring food security is very interesting and deserves close study. According to experts, China reached 80% of the level of self-sufficiency in all major groups of food products by the beginning of 2000, and to this day maintains this level. The increase in production for all main types of food was 2 times on average over 25 years, while consumption increased on average 2.5 times [9, p. 28].

The Chinese experience in ensuring food security is unique in that the country, possessing 7% of the world's arable land, managed to self-sufficiency for 18% of the world's population.

Representatives of the protectionist approach are Japan, Norway, Switzerland, South Korea, etc. The level of state support for agriculture to the value of products sold in 2005-2014. in Japan it was 47%, Korea – 52, Iceland – 53, Switzerland – 58, Norway – 61% [9, p. 11].

The protectionist approach is used by countries with limited agricultural resources. To protect the domestic market and achieve the required level of food independence, these states use a number of mechanisms aimed at protecting domestic production.

The food export-oriented approach is typical for countries with high agricultural and economic potential. These include the USA, Canada, Argentina, Brazil, Austria, New Zealand.

A mixed approach based on the principles of protectionist policies and food export orientation is used by the countries of the European Union and China.

All developed countries provide impressive financial support for agriculture and rural development [20]. Thanks to state support for agriculture, states with high agricultural and economic potential ensure food security and export a significant part of their products to the world market.

Consider changes in the volume of import and export of food resources is cyclical and depends on the development of agriculture. After the collapse of the USSR, the import of grain sharply decreased, with an increase in meat and dairy products. Grain imports decreased from 16.9 million tons in 1990 to 0.3 million tons in 2019.The volume of imports of meat and meat products increased from 1.5 million tons in 1990 to 2.9 million tons in 2010, then there was a decrease to 0.8 million tons in 2019. An increase in imports of milk and dairy products has been observed since 2000. the import of dairy products doubled, and in subsequent years there is a slight decrease. Since the beginning of the 2000s. grain export begins to grow. The volume of grain exports increased from 1.3 million tons in 2000 to 30.7 million in 2015, to 54.8 million in 2018 and 39.3 million tons in 2019 (Table 2).

The increase in the export of food products, primarily grain, made it possible to increase the flow of foreign exchange earnings and significantly reduce the negative balance of foreign trade in food. In 2019, exports amounted to $ 24.8 billion, imports - $ 30.0 billion. The negative balance of foreign trade in agricultural products decreased from $ 27.6 billion in 2010 to $ 5.2 billion in 2019.

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Table 2: Export and import of food resources in Russia, thousand tons

Продукция	1990	2000	2010	2013	2015	2016	2017	2018	2019
Export									
Grain, million tons	2,0	1,3	13,9	19,0	30,7	33,9	43,3	54,8	39,3
Potatoes	329	26	85	74	207	292	246	268	464
Vegetables and melons	261	169	85	…	…	369	248	282	323
Meat and meat products	60	35	97	117	143	236	307	355	415
Milk and dairy products	335	507	460	628	606	645	608	576	611
Egg and egg products, million pieces	210	326	244	400	354	452	747	677	693
Import									
Grain, million tons	16,9	4,7	0,4	1,5	0,8	1,0	0,7	0,4	0,3
Potatoes	1056	566	1122	764	928	973	1344	1267	760
Vegetables and melons	2911	2273	3084	2817	2636	2357	2670	2485	2436
Meat and meat products	1535	2095	2855	2480	1360	1246	1085	880	772
Milk and dairy products	8043	4718	8159	9445	7917	7579	6997	6493	6728
Egg and egg products, million pieces	1589	1168	881	1206	1236	1241	1680	1701	2134

Source: generated by the author

Strengthening financial support for agriculture, the introduction of an embargo on food imports in response to Western sanctions made it possible to ensure a steady growth in production. For 2014-2019 the average annual growth index of agricultural production in comparable prices was 3%, which made it possible to increase the level of self-sufficiency for all basic food products.

As can be seen from the data presented, by 2015 it was possible to achieve the threshold values of the 2010 Food Security Doctrine for the main agricultural products (excluding milk and dairy products).

When developing specific approaches and ways to solve the problem of food security of the population of the northern and 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 own potato production per capita to rational consumption rates in the Far North and equivalent areas was 33.3%, vegetables - 14.0, meat - 17.4, milk - 20.0. eggs - 20.3%. The level of self-sufficiency is especially low in the Arctic zone of the Russian Federation (AZRF). Now these indicators are respectively 2.4%, 0.4%, 0.8%, 4.7%, 1.8% (Table 3).

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

Table 3: Self-sufficiency in agricultural products in the North and Arctic zones in 2019, %

Region	Potatoes	Vegetables	Meat	Milk	Egg
Areas of the Far North and areas directed to them	33,3	14,0	17,4	20,0	20,3
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

Source: developed by the author

The North zone, especially the Arctic territories, is characterized by a low rural population. If in Russia as a whole the share of the rural population is 2.5%, then in the regions of the Far North and equivalent areas - 21, and in the Arctic zone - only 10%. With a small share of the rural population, its size in the North zone for 2000-2019. decreased by 430.8 thousand people.

Ensuring food security is fraught with risks and threats. Food security of the population of the

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North and the Arctic largely depends on the effective functioning of the agri-food sector and its leading link - agriculture.

The agrarian sphere of the North zone is characterized by a tendency of destruction of the material and technical base due to investment insufficiency. In the 1990s. capital investments in agriculture fell 2.5 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.

An extremely insignificant share of agricultural producers apply innovations. The results of the All-Russian Agricultural Census of 2016 showed that the drip irrigation system was used only by 0.4% of agricultural organizations and 1.3% of farms and individual entrepreneurs, biological methods of protecting plants from pests and diseases - respectively 1.8 and 4.2% of the system. individual feeding of livestock - 3.6 and 4.2%, the method of cell-free keeping of poultry - 0.5 and 1.9%, treatment facilities on farms were available in 2.2% of agricultural enterprises and 1.4% of peasant farms and individual entrepreneurs, wastewater disposal and industrial wastewater treatment systems - 4.2 and 3.2%.

Agriculture suffers from a shortage of qualified personnel. The share of managers with higher education in large and medium-sized agricultural organizations was 63% (in Russia - 87%), including 33% with higher agricultural education, 25 with secondary vocational education, in small enterprises - 65 and 22%, respectively. The level of higher professional education is especially low among the heads of peasant farms and individual entrepreneurs (25%). 35% of managers of this form of management do not have higher or secondary vocational education.

During the period of transformation processes, the depopulation of rural areas accelerated. Over the past 20 years (2000-2019), the average annual rate of decline in the rural population due to outflow and natural decline amounted to 1%. In the countryside, the mortality rate is growing, which exceeds the birth rate. The risk of a decrease in labor potential associated with a decrease in the number and aging of the rural population will become an insurmountable obstacle to the development of the agricultural sector and other sectors of the rural economy. If the existing negative demographic situation in the countryside persists, 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.

It should also be noted such a threat to food security as the economic availability of food. The high differentiation of the urban and rural population in terms of income, as well as the unreasonable rise in food prices in the North and Arctic zone, 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.

Ensuring the physical availability of food is associated with the development of trade infrastructure in the sale of food products (accessible off-chain mechanisms, various markets, fairs, non-stationary and mobile shopping facilities).

For the population of remote northern and arctic territories, the problem of a guaranteed relatively uniform food supply is very urgent. This is due to the need to form the necessary food supplies and reserves for the population of these places.

Ensuring the food security of the country and its regions is associated with overcoming the threats associated with the dependence of agriculture on imported seeds, genetic material in animal husbandry, veterinary drugs and 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, now this share for wheat is 80-90%, spring barley - 63, corn – 46, vegetables – 43, soybeans – 42, spring rape – 32, sunflower – 27, potatoes – 10, sugar beets – about 1% [8, p. 7]. The new version of the Doctrine does not say anything about the self-sufficiency of livestock breeding with genetic material, veterinary drugs, the agri-food sector with machinery, equipment and technologies.

To overcome the risks and threats to food security, the subjects of the executive and legislative power of the northern and arctic territories need to:

• 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;

• stimulate the production of organic agricultural products;

• implement measures to overcome the low level of investment and innovation activity in the agricultural sector, reduce fertility and degradation of agricultural land;

• in order to increase the economic and physical accessibility of food, carry out measures to reduce the poverty level of the rural population,

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develop interregional cooperation and integration in the field of food supply of the population;

• to 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 agricultural science, take measures aimed at attracting and retaining scientific workers

Conclusions and prospects for further research. The study of the content of food security, the state of food independence of the country, the specifics of ensuring food security of the population of the North and the Arctic allows us to draw the following conclusions and recommendations.

1. Food security of the state is the ability of the agri-food system to ensure food independence, to guarantee the physical and economic accessibility of safe food for all social groups of the population at rational consumption rates. The constituent elements of food security are food independence, physical availability of food, economic accessibility of food, food safety for the consumer.

2. Assessment of the level of food independence showed that the Russian Federation lags significantly behind in terms of self-sufficiency of the population in vegetables and melons, milk and dairy products. A serious threat and problem is the dependence of agriculture on imports of seeds, genetic material in animal husbandry, veterinary drugs, plant protection products, many types of machinery, equipment and technologies.

3. The northern and arctic territories, which have significant agricultural potential, good opportunities for the production of organic agricultural products, can make a significant contribution to the country's food independence. In the future, with the achievement of rational norms of food consumption by Russia through its own production, the great potential of the North zone can be used to provide the growing world population with organic food.

4. The main features of ensuring food security of the population of the North and Arctic zones 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 provision of agricultural resources;

• underdevelopment of the agri-food sector and rural infrastructure;

• focal settlement and seasonal delivery of food to remote areas.

5. 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 shortage, the outflow of qualified personnel from the industry, 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.

6. The obtained research results should be taken into account when forming and adjusting the State programs for the development of the agri-food sector and the integrated development of rural areas of the subjects of the North and the Arctic.

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Стаття надійшла до редакції : 25.02.2021 р.

Стаття прийнята до друку: 30.06.2021 р.

Бібліографічний опис для цитування :

Ivanov V. Food security: north-arctic specifications / V. Ivanov // Часопис економічних реформ. – 2021. – № 2 (42). – С. 62–69.

ЧАСОПИС ЕКОНОМІЧНИХ РЕФОРМ № 2(42)/2021 ISSN 2221-8440