

## Systematic Approach to Sustainable Development in Agricultural and Food Systems – Example of Republic of Sakha (Yakutia) and the Arctic Zone

### Systematyczne podejście do zrównoważonego rozwoju systemów rolno-spożywczych – przykład Republiki Sacha (Jakucja) i Arktyki

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#### Abstract

The relevance of the study is conditioned by the need to apply a systematic approach to the investigation of agricultural production features as a complex dynamic structure that functions in an unstable market environment and depends on the influence of natural changes. In this regard, this study aims to identify socio-economic, natural, and environmental factors that affect the sustainable development of agricultural sectors, as well as predict the impact of material, technological, and climatic factors on the health and stability of the entire system. The leading method for studying this problem is the method of a systematic approach, which allows investigating agricultural production as a complex dynamic structure that functions in an unstable market environment and depends on the influence of natural factors. In addition, this study involved the following research methods: the method of structural analysis, comparative, statistical, and deduction methods, classification method. The study presents the factors directly or indirectly influencing the development of northern agriculture, predicts the impact of these factors on the stability of the system, and shows possible ways to overcome the negative impact. The regional management system directly affected the level of food self-sufficiency of the Sakha Republic. To improve the current situation, it is necessary to review the mechanisms of interaction between state institutions and agricultural producers. Furthermore, there is an entire list of factors that negatively affect the functioning of the agricultural sector of Yakutia. The situation requires an immediate design of a policy for the development of rural areas through the socio-economic development of villages in the region. The research materials are of practical value for the governing bodies of the agro-industrial complex of the Republic of Sakha (Yakutia), as well as teachers and students studying the issues of sustainable development of agriculture.

**Key words:** agro-industrial complex, development factors, employment level, rural areas, the Arctic

**Słowa kluczowe:** kompleks rolno-przemysłowy, czynniki rozwoju, poziom zatrudnienia, obszary rolnicze, Arktyka

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## Introduction

Agriculture constitutes a branch of the economy that provides the population with food, as well as supplies raw materials for industrial sectors. Agriculture forms a crucial part of the global economy, and one in eight people on the planet works in agriculture. Sciences such as land reclamation, agronomy, crop production and botany, forestry and many others are used for the successful functioning of agricultural activities. Such a complex of knowledge and techniques directly ensures the food security of the state. On average, the governments of developed countries allocate 32-35% of the value of gross agricultural output to agricultural subsidies, which substantially affects food independence from other countries. It is the national security causes that lie at the heart of this economically irrational decision, since it would be much cheaper to import products from less developed countries. Apart from the food blockade prevention, the policy of maximum support and development of domestic agricultural production leads to an improvement in the standard of living of the population engaged in agricultural work, the influx of new labour power in the perspectively depressed regions, as well as economic growth in interrelated areas: processing industry, mechanical engineering, mining and chemicals, enterprises of procurement, transportation, storage, sale of food, etc. (Rodnina, 2019).

Russia's centuries-old interest in the Far North and the Arctic territories is connected to the natural wealth of these lands. The development of the natural resources available in these territories and the use of economic and location conditions for economic activities in the interests of national security can lead to the economic and social development of the entire country (Hevchuk & Christoffers, 2021). In addition to Russia, over the past 30 years, the Arctic has attracted the interest of many states, and not only those bordering it. Countries that have never before claimed to be a subject of international relations in the Arctic region have begun to create scientific centres for the study and development of recommendations for solving Arctic problems. Such interest is explained by the fact that the ice cover of the Arctic Ocean is rapidly decreasing, which leads to the prospects for the development of economic activity in the Arctic zone (Kravchuk, 2019). However, the current situation in the food markets of the northern regions suggests that market self-regulation does not contribute to the required amount of development of agricultural production. To date, large-scale work is ongoing in the Arctic zone of the Russian Federation for the organisation and development of the main bases of the agro-industrial complex within the framework of the adopted Development Strategies of Russia and the regions. These Strategies are developed up to 2030-2035, and include investment projects in the field of exploration and extraction of minerals, financing the construction of transport, energy and housing infrastructure, as well as a set of measures to ensure the food security of the district (Strategy for the development..., 2008; Decree of the President..., 2020; Denisov et al., 2020).

Residents of the Republic of Sakha (Yakutia) (RS (Ya)) are engaged in conventional agriculture and cattle breeding; however, in a sharply continental climate, their crafts acquire an extreme nature. Therefore, winter-grazing horse herding and northern domestic reindeer herding are practised next to the usual types of agriculture in this region. Severe natural conditions in the form of permafrost and a high level of seasonality, as well as the current state of the agro-industrial complex of Yakutia, require a more thoughtful medium-term strategy for the development of the industry and a qualitative assessment of its potential. State regulation should also be applied to overcome problems in areas related to agriculture. Low population density, large territory, and poorly developed transport communication jeopardise the production of processing, storage, and marketing of agricultural products (Neustroyev et al., 2016; Dayanova et al., 2018).

80% of the lands of the Far Eastern Federal District are located in permafrost areas with a negative average annual temperature. This means that the natural and climatic conditions for farming in this region are unfavourable and even extreme. After the start of the reforms, the amount of productive agricultural land began to decline rapidly (Federal Law..., 2006). Nowadays, the total area of land occupied for agricultural purposes is only 81.3% compared to the period prior to the reforms. The area of arable land was reduced to 80.4%. The authors of this study consider the return and attraction of new land suitable for cultivation into economic circulation to be a promising task for the development of the agro-industry of the Far Eastern Federal District. The same can be said about agricultural organisations. From 2003 to 2006, their number decreased from 1.234 to 873. Such changes occurred due to the tendency to change the specialisation of land resources under the control of agricultural organisations (management enterprises) and a decrease in the number of agricultural industries. To date, the situation has stabilised – the number of agricultural organisations has returned to the previous level. However, the research of the potential lost due to the reforms was not carried out by scientists (Reimer et al., 2016).

Notably, the experience of agricultural enterprises in the Soviet Union bears evidence to collective farms and state farms providing employment for the rural population and contributing to the development of public infrastructure. However, in the future, being in the conditions of a planned economy focused on the privatisation of land and property of agro-industrial complexes, new economic entities began to focus exclusively on achieving economic indicators. Therewith, the state ignored other needs of the population, which resulted in an increase in unemployment among the local population, a drop in income, and the neglect of local infrastructure (not in demand in the agro-industrial complex).

After the collapse of the Soviet Union, the hopes that local residents who lost their jobs in collective farms and state farms would start doing business did not justify themselves. Just as there was no change in the rural economy according to the territorial model of rural development. The few entrepreneurial locals who started trading, brokering, and providing services were unable to generate the required number of jobs. It is unlikely that any enterprise other than an agricultural one would be able to provide the required number of recruitment opportunities in rural areas. Even before the beginning of the new millennium, rural settlements began to deteriorate inexorably. To survive, local residents began to move en masse to large industrial centres and economically developed cities, where all family members had the opportunity to find work. Thus, when assessing the potential of rural areas, it is necessary to assess the dynamics of changes in the structure of the agricultural sector in order to fully understand the processes occurring in it and their causes (Tikhonov, 2017).

## Materials and Methods

The primary method of this study is a systematic approach to the investigation of agricultural production features as a complex dynamic structure that functions in an unstable market environment and depends on the influence of natural changes. In addition, this study involved the following research methods: the method of structural analysis, comparative, statistical, and deduction methods, classification method. The system approach was used for a detailed consideration of the object of study as a system with many interrelated and interacting elements. A comparative method is a method by which two or more objects are compared to each other. The objects of comparison can be phenomena, ideas, and results of research; using the comparative method, common and different in the objects under study is distinguished for the purpose of subsequent classification and typology. In this paper, the comparative method was used to compare the results of studies of quantitative agricultural indicators for different time periods. The statistical method is a set of interrelated methods of studying mass objects and phenomena in order to obtain quantitative characteristics and identify general patterns by eliminating random features of individual observations. It was used to describe phenomena and processes in quantitative terms.

The method of structural analysis constitutes a methodological variation of the system approach. Structural analysis involves the study of a system using its graphical model representation, which begins with a general overview and then becomes detailed, acquiring a hierarchical structure with an increasing number of levels. The method of structural analysis was used in this study to systematise information about the factors affecting sustainable development in agricultural and food systems. The synthesis method is a way of collecting the whole from the functional parts. In combination with the method of analysis, the synthesis method allows getting an idea of the relations between the components of the study subject. The synthesis method was used to organise information about the influence development factors on each other. Deduction is a method of research where knowledge about processes and phenomena is developed during the transition from general statements to particular and individual judgments. Deduction is characterised by an ascent from the abstract to the concrete. The classification method is a general scientific method of systematisation of knowledge, which is aimed at organising a certain set of studied objects of various fields, knowledge, and activities into a system of subordinate groups, according to which these objects are distributed based on their similarity in certain essential properties. In this paper, the classification method was used to distinguish growth and degradation factors in the category.

The research also included a theoretical analysis of recent scientific publications. Researchers and scientists in the field of agricultural production and regional economy often consider and study issues related to the prospects for the development of the Far Eastern Federal District. In recent years, scientists from all over the world have been exploring problems and ways to improve food self-sufficiency in extreme climatic conditions and the development of local agricultural infrastructure.

## Results

Many countries prioritise assistance to agricultural producers in their agricultural policies. For advanced economies, this figure starts at \$150/ha (Table 1).

Table 1. The level of agriculture financing

Country	\$/ha
European Union	300
Japan	473
USA	324
Canada	188
Russia	10

Understanding the importance of agriculture as a factor of state security, economically developed countries guarantee budget support for local food producers. Apart from financial state support, the sustainable development of

the agro-industrial complex depends on a number of factors that determine its positive change. These are the following socio-economic and natural-ecological factors:

- dynamic and efficient development of agro-industrial sectors;
- specific features that are manifested in a strong dependence on natural conditions, seasonality and features of the reproductive process;
- transformation of family farms into agro-industrial and commercial enterprises;
- reducing tension in the agricultural labour market;
- efficiency of the use of labour resources.

At present, the importance of a comprehensive analysis of the sustainability of the agricultural sector is increasing, aimed at positioning its constituent features based on complete and reliable information about the processes taking place in the agro-industrial complex. The conditions for effective and sustainable development of agriculture are created through the coordination, integrated approach, and impact on the interrelated processes of food, socio-ecological systems, and human activity systems. For rural regions of the Sakha Republic, at present, the problem of unemployment and the outflow of the skilled part of the population to large cities is typical. Thus, a vicious circle is formed, where the weak infrastructure and social development of rural regions stops the population from developing agriculture, which is a vital and system-forming industry for the region's economy. One worker in the field of agriculture requires eight more jobs in other enterprises (processing, industry, trade, etc.). Such demographic trends hinder the development of the agricultural sector, as well as lead to the degradation of villages. Over the past two decades, the number of rural populations in the republic has decreased by 11.5 thousand people, and the number of people employed in agriculture has decreased by almost the same number. During the same period, according to SakhaYakutiyaStat (Federal State Statistics Service, 2021), the number of people employed in agriculture decreased by almost a third (10.9% to 7.1%).

The lack of a comprehensive and long-term approach to the development of territories in Russia leads to the fact that the specific features of particular regions are not taken into account and, accordingly, the maximum benefit is not extracted from it. In addition, the *optimization* policy leads only to the elimination of social institutions, which is even more pronounced in rural areas. The negative consequences in the form of an outflow of the population to the cities, a substantial decrease in the levels of education and healthcare, and the desolation of entire settlements were not long in coming. The situation is also complicated by the low productivity of the agro-industrial complex, which is directly interrelated with municipal processes. By developing the agricultural industry, it is possible to substantially improve the situation not only in the Sakha Republic, but also to increase the level of self-sufficiency in food throughout Russia (Table 2). This can be done by developing and forming new economic relations, creating methods for regulating processes in the agro-industrial complex, as well as in its components, and investing in the development of rural regions (Trusova et al., 2021). Such a policy should be positioned not only as the protection of national security, but also as a socio-economic one, which will hold not only the state authorities, but also representatives of local government, businessmen, scientists, and the rural population accountable for its success and ensuring a high quality of life for people.

Table 2. The level of self-sufficiency in basic agricultural products in the Republic of Sakha (Yakutia), %, source: Federal State Statistics Service, 2021.

Products/Years	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Meat	29.5	27.8	28.5	28.5	26.5	26.6	26.1	26.1	25.1	26.4
Milk	62.8	62.1	59.6	58.1	58.2	57.9	58.1	58.7	58.6	56.7
Eggs	55.6	55.7	58.3	60.8	61.1	60.8	54.9	54.7	53.9	57.5
Potato	60.5	58.0	60.8	62.3	61.5	58.2	63.0	62.5	66.1	67.1
Gourds	44.6	42.2	43.4	47.5	46.7	44.5	46.6	45.4	39.3	38.0

At the beginning of this millennium, the state allowed the agricultural market to self-regulate. The state administration initiated a policy of a targeted approach because a full and successful transition to market relations failed to occur. Within its framework, the implementation of such programmes was launched:

1. *Presidential programme of socio-economic development of the village of the Republic of Sakha (Yakutia) for 2002-2006* dated 2002;
2. *Socio-economic development of the village of the Republic of Sakha (Yakutia) for 2007-2011* dated 2007;
3. *Development of agriculture and regulation of markets for agricultural products, raw materials and food for 2012-2020* dated 2012;
4. *Draft Strategy for the socio-economic development of the Republic of Sakha (Yakutia) for the period up to 2030 with the definition of the target vision up to 2050* dated 2016 (Electronic fund..., 2021).

These programmes set both the levels of agricultural production and the planned increase in self-sufficiency of the population with agricultural products. Despite the work of state programmes, the value of agricultural products produced in the Sakha Republic has decreased by 7.3% (adjusted for inflation) since 2000, while the same indicator has increased by 35.8% throughout Russia. The cost of livestock products fell by 14.3% between 2000 and 2017.

However, looking at the levels of agricultural production before the innovations of the 1990s, it can be seen that productivity remained at a higher level compared to current indicators (Table 3).

Table 3. Production of the main types of agricultural products in the RS(Ya) on average for the period 1986-1990 and 1995-2019, thousand tonnes.

Types of products	1986-1990 (average)	1995	2000	2005	2010	2015	2019	2019 to 1986-1990 (average), %
Meat	67.2	60.9	32.1	39.7	42.5	35.4	36.8	54.7
Milk	258.3	202.2	164.3	197.3	191.6	164.5	161.5	62.5
Cereals	30.7	17.1	30.3	15.6	11.1	8.6	10.5	34.2
Potato	80.6	66.5	74.6	88.5	71.5	71.9	81.4	100.9
Vegetables	28.5	24.1	37.1	36.9	34	35.2	26.7	93.6

Table 3 demonstrates that the only increase in production during the period under review occurred in the field of crop production (1.3 times). At the same time, the decline in the amount of grain grown continues to progress. Such processes in the agriculture of the Sakha Republic can be explained by a sharp reduction in the number of target areas by 61.5%. Therewith, prior to the reform, agricultural activities were also carried out in extreme natural and climatic conditions. However, neither permafrost, nor low population density, nor infertile soil have become obstacles to the successful production of agricultural products. This suggests that unfavourable conditions associated with the climate cannot be the reason for the decline in production levels. Considering the situation with the number of animals for 1985-2019, the following figures can be brought up:

1. The number of cattle decreased by 61.8%;
2. The number of horses decreased by 11.2%;
3. The number of deer increased by 62.5%.

Such an impressive reduction in the number of livestock was caused by the reorganisation of state farms into personal subsidiary farms. After the collapse of the Soviet Union and the suspension of state financing of state farms, their property and land were transferred for privatisation to former employees. However, it was not possible to maintain the previous production volumes without benefits and cash injections from the state; therefore, the new owners of farms were forced to reduce the number of livestock and reduce the area of cultivated land, which led to a drop in the level of all agricultural production. When the number of main farm animals decreased by a third in 2000, the State Programme for the Development of the Family Economy was established (Electronic fund..., 2021). It resulted in commodity and cash loans to support local farms. The leading producers of agricultural goods for 1985 in Yakutia were 116 government-run cooperatives and 199 enterprises of the agro-industrial complex. On average, these enterprises had a total of 53.8 thousand employees per year, and their salary was 320 roubles, which is 54 roubles lower than the average salary in the republic. This situation has developed due to the low profitability of agricultural production. And only due to the increase in purchase prices and subsidising unprofitable state farms, it was possible to achieve a positive marginality of production. Profitability of agricultural production for 1985:

1. Milk – 16.9%.
2. Meat – 10.9%.
3. Crop production – 10-31%.

Today, Yakutia is actively developing farm enterprises and cooperation between personal subsidiary farms and agricultural enterprises. State support is also provided to some organisations. Apart from the fact that Yakutia occupies one of the leading places in the development of agriculture, the number of people employed in farming in the region is the largest in the country – 9 people per 1,000 rural population. As a result, the volume of agricultural production by large organisations dropped from 78% in 1990 to 27% in 2010 and has not reached the same level to this day (Table 4). Therewith, the increase in the level of production by households and farms does not cover the overall reduction in production volumes (Table 4).

Table 4. Structure of agricultural production in the RS(Ya) in 1980-2019 by farm categories, %

Categories of farms	1980	1990	1995	2000	2005	2010	2015	2019
Agricultural organisations	79.5	78	50.2	20.8	19.8	27	28.2	27.3
Households of the population	20.5	22	39.5	67.5	57.9	47.5	46.8	46.9
Farms	-	-	10.3	11.7	22.3	25.5	25	25.8

For future sustainable development, the Republic of Sakha has a number of advantages that can determine the line and pace of further changes in the agro-industrial complex of the region. To achieve the best result, the goal should be full self-sufficiency of agricultural products in the entire internal market.

Advantages:

1. The resources of the republic in the form of forage lands and large areas of deer pastures.

2. The predominant development of conventional branches of agriculture – herd horse breeding and northern domestic reindeer herding.
3. The largest number of cattle among all the northern regions of Russia, the active development of cattle breeding.
4. A large number of cattle and horses.
5. Relatively environmentally friendly dairy, meat, fish, and other products.
6. Strong demand for local agricultural products.
7. Development of the trade brand of natural food products of local production *Made in Yakutia*.

To achieve the goal, it will be necessary to overcome the following negative factors:

1. The need to conduct agriculture in extreme climatic conditions, a strong dependence on them.
2. Poor infrastructure and a low prospect of financial investments in it in the near future.
3. Low natural soil fertility.
4. Low crop yields and animal productivity compared to more southern regions.
5. There are no implemented working innovations, weak scientific and technical equipment of the agro-industrial complex.
6. Outdated production facilities, incomplete utilisation of production capacities.
7. Lack of established internal end markets for products, weak quality control system.
8. Financial instability of agricultural enterprises.

Apart from the already existing factors that have a positive and negative impact on agricultural and food development in the Sakha Republic, there are also opportunities and risks that need to be factored in.

Opportunities:

1. Reconstruction and modernisation of capabilities of the agro-industrial complex.
2. Use of modern technologies and launch of new production facilities.
3. Development of seed farms, increasing the share of local zoned seeds of agricultural crops.
4. Increase in the gross harvest of agricultural crops due to the simultaneous increase in yield and acreage.
5. Development of selection and breeding work in order to increase the productive and improve the reproductive qualities of farm animals.
6. Development of veterinary medicine to reduce the level of morbidity and mortality of farm animals.
7. Increase in the level of processing of agricultural and food production, taking into account the resource potential, consumer demand, and the logistics system.
8. Establishment and development of organic production, certification system of food quality control.

Risks:

1. Permafrost and a short growing season.
2. Natural disasters in the form of droughts, floods, and forest fires.
3. Diseases of farm animals, damage to agricultural plants by diseases and pests.
4. Increase in the level of inflation, tariffs, and prices for material resources (fixed assets, seeds, energy carriers, fertilisers, protective equipment, etc.).
5. The urbanisation of the population, the outflow of personnel from the agro-industrial complex.
6. Reduction in the level of state support.

After analysing the results obtained, it is possible to determine the factors that hinder development and methods for overcoming them (Table 5).

Table 5. Factors hindering sustainable development and ways to overcome them

Inhibitory factors	Ways of sustainable development of agriculture
Problems of rural social and industrial infrastructure development	A systematic approach to investing in rural infrastructure
Disparity in prices for agricultural and industrial products	Subsidising of costs for purchasing labour resources
Low innovation activity of agricultural enterprises	Encouragement of the introduction of new technologies into production
Lack of human resources	Programmes for attracting personnel to villages. Educational policy
Low material and technical equipment	Logistical support measures
Low level of reclamation	Conducting land reclamation works
Low fertility and efficiency of agricultural land use	Measures to improve agricultural land and attract them to work
Lack of financial state support	Implementation of financial state support
Imperfection of existing forms of management	Development of cooperatives, clusters
Lack or imperfection of strategic plans	The need to create development strategies
Low financial stability	Financial recovery measures
Inefficiency of forms of state support	Design of development programmes with various forms of state support (co-financing from the federal budget, subsidies in various areas), the provision of grants. Development of public-private partnerships. Project financing. The territory of advanced development.

## Discussion

In the first paper considered, N. Rodnina (2018) explores the problems and their solutions in the field of domestic food aid in Russia. In her work, the author argues that the regions of Russia need not only to analyse the agro-industrial complex (agribusiness) and the food market, but also to assess the production opportunities in the agribusiness sectors, to determine and justify the areas for the development of a competitive agribusiness in the long term. Therefore, it is necessary to add an assessment of the self-sufficiency of food in the region to the main criterion for assessing the level of food supply, taking into account the physiological needs of the population in food. Therewith, not only indicators are of great importance, but also their threshold values, limit values, non-compliance with which prevents the normal development of expanded reproduction, leads to the development of negative, destructive trends in the field of healthcare and social security of the population. As for the regions themselves, the future growth of the agricultural sector depends entirely on the success of the regional national policy, its adaptation to rapidly changing economic conditions (Rodnina, 2018).

In the next paper reviewed, L. Danilova and N. Vasilyev (2018) considered organic agriculture as a new area of development of the agro-industrial complex in the Sakha Republic. The authors point out that organic agriculture can help achieve new strategic objectives of the republic, referring to the Decree of the Head of the Republic of Sakha *On strategic areas of socio-economic development of the Republic of Sakha (Yakutia)* dated 2018 (Electronic fund..., 2021). This decree instructs to guarantee the development of non-resource export-oriented industries with high added value and to ensure the development of competitive sectors in the agro-industrial complex, the share of exports of which, by 2024, would be at least 20% of the products produced. Since the current level of self-sufficiency of the republic has barely exceeded 50%, the authors see this task as poorly feasible. However, if one considers Yakutia not as a region of production of a large number of agricultural products and does not demand unattainable results, setting as an example other subjects of the Russian Federation or agricultural countries, it turns out that Yakutia can become a supplier of high-quality and unique products of folk crafts. When entering foreign markets, it is necessary to focus on products that will have a competitive advantage over their counterparts. For example, the products in the field of herd horse breeding, reindeer husbandry, collection of wild berries, plants, etc. To ensure the competitiveness of Yakut products, organic certification is necessary, without which it will be impossible to interest consumers in the foreign market. At the moment, given the low indicators of industrial agriculture, organic agriculture can contribute to the socio-economic development of the republic. Admittedly, organic agriculture will not be able to fully replace intensive agriculture, but striking a stable balance between economic well-being and the preservation of a prosperous habitat can lead to a sustainable development vector (Danilova & Vasilyev, 2018).

In the study of trends in the development of the agro-industrial complex of the Far Eastern Federal District, scientists V. Reimer et al. (2016) identify the critical level of technological development of the main part of the economic entities of the agricultural sector of the Far Eastern Federal District economy as a condition for the introduction of both radical and improving innovations. Evidently, the financial capabilities of agricultural producers will be a determining factor in choosing the area and scale of implementation of innovative technologies. The payback period for modernisation projects will also play an important role. However, the focus solely on improving innovations cannot fundamentally change the vector of development of the agro-industrial complex of the Far East. But apart from the use of radical innovations, an adequate mechanism is required to activate the process of reproduction of the agro-industrial complex on an innovative basis, ensuring synchronisation of innovation activities both vertically and horizontally, as well as generating prerequisites for the development of informal economic cluster-type structures (Khodakovskiy et al., 2020).

The study by A. Danilova investigates the state support of agriculture in difficult natural conditions. In her study, the author argues that for most developed countries, the successful functioning of the agro-industrial complex and agriculture in particular is largely conditioned upon state support. The Republic of Sakha, which is in severe climatic conditions, also needs such support. The agro-industrial complex of the republic develops and operates in extreme conditions, a zone of risky agriculture due to extremely low temperatures in winter, large annual, seasonal, and daily fluctuations in air temperatures, which is extremely unfavourable for the cultivation of grain and most types of vegetable crops. Because of this, in the agriculture of the republic, for the production of the same volume of goods, as in regions more favourable from a climatic standpoint, 25-30% more oil products are spent, and the cost of servicing equipment increases by 30-35%. Due to the vastness of the territory, the radius of cargo transportation increases by 2-3 times compared to the average indicators for the Russian Federation (Danilova, 2020). In the last study reviewed, E. Tikhonov notes that the small size of settlements and district centres, as well as the large distances between them, in tandem with weak transport infrastructure, stop businessmen from installing productive and processing capacities in such regions. There is an obvious division of territories into industrial clusters, agricultural areas, and depressed areas with a high level of unemployment. Small entrepreneurs also do not receive adequate support for small businesses in the regions. These barriers become insurmountable for local residents, especially for those who would like to engage in non-agricultural production: logging, woodworking, fishing, hunting, gathering wild plants, etc. (Tikhonov, 2017).

## Conclusions

Agriculture will develop efficiently and sustainably under conditions of full provision of the domestic market with high-quality products, rationalisation and modernisation of production facilities, improving the standard of living of rural residents and combatting unemployment. For the harmonious development of northern agriculture, it is necessary to maintain a balance between the industrial development of natural resources and the preservation of traditional crafts of indigenous peoples and their way of life. This approach will prevent demographic desertification of the Arctic territories and preserve the unique landscapes. In addition, the opportunity for the extraction of rare delicacies by indigenous peoples should not be missed: fish, game, venison, valuable pharmacological raw materials. These industries will help preserve human capital, which will have a beneficial effect on the regulation of employment and the labour market optimisation, and prevent the concentration of production in certain territories. The protracted organisational and economic crisis in the agricultural sector of the economy also requires a solution. To overcome this crisis, it is necessary to develop realistic and effective state strategies for the development of the social and industrial infrastructure of the region.

The regional management system directly affected the level of food self-sufficiency of the Sakha Republic. To improve the current situation, it is necessary to review the mechanisms of interaction between state institutions and agricultural producers. Furthermore, there is an entire list of factors that negatively affect the functioning of the agricultural sector of Yakutia. This includes a low level of material and technical support of production; unfavourable climatic conditions, infertile land, poor forage land; low population density, which entails the point nature of farming, logistics costs, the predominance of one type of production in each of the district regions, which is why the demand for goods of local producers remains at an extremely low level; general poverty of the population, unemployment. To overcome these problems, it is necessary to take a fresh look at the issue of rural population outflow to metropolitan cities. The situation requires an immediate design of a policy for the development of rural areas through the socio-economic development of villages in the region. In particular, this refers to the areas of education, medicine, transport infrastructure and logistics of local industries for the production of new jobs.

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