

**A Review on the Contribution of Local Foods to Self-Sufficiency in the
Arctic Russian North Population:
Case Study from the Komi Republic**

*Anna Shcherbakova**

Abstract

The problem of food security both on national and world levels is discussed. In this article, physical availability of food (defined by the existence of both locally produced and store-bought (often imported) foods) that provides satisfaction for all social groups of the population is considered. The importance of food self-sufficiency for the population of the North and the Arctic is reflected in the quantity and quality of fresh food, which defines the quality of life of the local population. Therefore, a research on the development of agriculture in the north is strongly required. The dynamics of agricultural production and food self-sufficiency in the north of Russia, the Komi Republic as a case study, are analysed in this paper. We suggest that self-reliance in food is especially urgent for regions with adverse social, economic and severe climate conditions. Concrete actions that will ensure self-sufficiency are considered. The necessary actions to increase self-

* Shcherbakova (Ponomareva) Anna Sergeevna, PhD in economics, Senior Researcher of the Laboratory of Environmental Economics, Federal Research Center Institute of Socio-Economic and Power Problems of the North, Komi scientific center, Ural branch, Russian Academy of Sciences

reliance on local foods and guarantee development of rural farms and the territory of the North as a whole are offered.

Keywords: self-sufficiency, agriculture, food security, Komi republic, North

The Komi Republic is a subject of the Russian Federation at the North-East of the European part of the state. The Komi Republic lies west by the Northern, Subpolar and Polar Ural Mountains, in valleys of the rivers Pechora and Vychegda. The north of the republic lies within the Arctic circle, where the town of Vorkuta with a population of 58 thousand persons resides. The Republic is 415.900 square kilometres. The population on January, 1, 2017, is made up by 855.000 belonging to approximately 130 different nationalities. The climate is temperate-continental. The main economic industries are mining (coal, oil, gas), refining and processing, timber and pulp and paper industries. The leading branch of agriculture is husbandry. Reindeer herding is successfully exercised in the North.

As of today, the Komi Republic is regrettably not able to provide itself with basic foodstuff. It entails a lot of socio-economic problems and apparently demands solutions. Fresh and quality food are essential in complex health promotion and disease prevention and allow increasing human lifespan. It is especially significant in the northern climate.

It increasingly becomes obvious that the problem of food self-sufficiency is actual and important to study, and necessary measures need to be proposed. For this purpose one needs to study the features of functioning and

development of the northern territories and northern agriculture, to learn the specifics of way of life of inhabitants there and their traditions. Providing the local population with necessary food products should also become a priority policy for the local and regional authorities. At the international level, the issue of food and food quality justly becomes a relevant topic for a lot of states and interstate unions.

Relevance of the research

A lot of domestic and foreign researchers were and still are interested in the subject of food security. It is mainly justified by the challenges of the world development. Occasionally occurring food shortages, rapid population growth and interstate tensions promote that interest. However, at the global level this problem became notable only in the mid-twentieth century.

Issues of food supply and safety remain urgent and significant throughout. Food security appear to be one of the major global problems in the 21st century. More than 1 billion people now suffer from hunger. According to the forecast of the Food and Agriculture Organization of the United Nations, demand for food in the world by 2050 will double. It will be caused by increase in population, growth of middle class and decrease in a share of the inhabitants who are living below the poverty line.¹ This situation generates a number of problems in humanitarian, social and economic, and political aspects, with different countries, international organisations, scientists and economists involved in efforts to find out acceptable solutions.

¹ FAO, *The State of Food Insecurity in the World*, 65.

Although food security occupies a special place in scientific study, yet the problem is multidimensional as it affects different areas: socio-economic, informational, managerial, demographic, biological and many others.

Basic and applied scientific research in the field of productive food-providing is conducted both in developed and emerging economies, including the countries of the Commonwealth of Independent States (Republic of Belarus, Kazakhstan, Kyrgyzstan, Ukraine). The United States, the leader in world food trade, achieved considerable progress in development of farming and now have high level of food security.

Food security – the term officially accepted in the world practice. It is used for the characteristic of a condition of the food market. However, the term "food security" has ambiguous meaning both in scientific literature and official documents. Many provisions of the theory of food security remain debatable. The problem of food security is complex and multilevel. Therefore the concept "food security" is approached in a cross-disciplinary way.

According to the United Nations, food security is achieved if import of food in a total amount of its consumption make up no more than 20%².

The market of organic food is now expanding in many developed economies [3,4,5]^{3,4,5}. Production of ecologically safe food is the most important

² Canada, *Annual Report on Organic Farming*, 38.

³ McBride, *Organic Dairy Sector Evolves to Meet Changing Demand*, 28-33.

⁴ Scialabba, *Organic Agriculture, Environment and, Food Security*.

⁵ *Strategy for Sustainable Development of Rural Territories of the Russian Federation for*

component of food security. Organic cultures today occupy an area of more than 35 million hectares globally, while in Russia – less than 100 thousand hectares⁶.

Recognition of the importance of food security problem have led to it being considered as one of the targets of state regulation in the appropriate field in some countries. In Russia it is reflected in the Food Security Doctrine for the period until the year 2020 as well as in other documents⁷. Noteworthy measures of providing the low-income population with food are undertaken in the USA and Canada⁸. Food programs might be relevant in Russia either.

Problems of food security in Russia with special emphasis on certain regions were investigated at A.A. Nikonov's All-Russian Institute Of Agrarian Problems And Informatics [9]⁹, All-Russian Scientific Research Institute Of Rural Economics^{10,11}. Institute of Agrarian Problems Of the Russian Academy of Sciences¹², Institute of Economy of the Russian Academy of Sciences¹³, some other scientific institutions^{14,15,16}. However, no

The Period till 2030.

⁶ USDA Budget Summary and Annual Performance, 176.

⁷ Battalova, *Development of a Toolkit for sustainable development of food sector economic security*. (Diss., Moscow, 2016). 217.

⁸ "Encyclopedia of Russian villages", 109-111.

⁹ Ushachev, *Food Safety of Russia in the Conditions of Global Partnership*, 329.

¹⁰ Ushachev, *Problems of Ensuring National and Collective Food Security of The EAU*, 3-15

¹¹ *Socio-Economic Priority in Ensuring Food Security in Russia*, 17-25.

¹² *The Formation of the Study Strategic Priorities and Integrated Development of the Arctic Territories of the Russian Federation*. 374.

¹³ Patsiorkovski, *Insurance Link among Food Security*, 304-307.

¹⁴ Shagaida, *Food Security in Russia: Monitoring, Trends, Threats*, 110.

¹⁵ Semin, *Food Safety in Russia*, 5

¹⁶ Ivanov, *Influence of Market Reforms on Agricultural Development and Food Self-Sufficiency in the Northern Region*, 170-186.

comprehensive scientific research was conducted on food security of the population in the North and in the Arctic.

Nowadays Russia is on the list of countries which are not providing food security by own production capacities according to medical norms of food consumption. From 1990 to 2013 the coefficient of food independence had positive dynamics only on grain, vegetables and melons. The threshold of food security is exceeded on dairy and meat products. The share of import of cheeses, animal oil, powdered milk and cream, beef and pork is especially high.

The significant role in ensuring food sovereignty is associated with trade. Local agrarian production and the local trade economy in the North is aimed at providing the population with meat, milk, river and lake fish, eggs, potatoes, greenhouse vegetables, wild plants. Products of traditional industries (reindeer herding, fishing, hunting, wild mushrooms and berries) are competitive not only on the regional but on the national and even international markets ¹⁷. At the same time these traditional foods are indispensable in a balanced diet of the inhabitants of the North, while also being used as medications.

The system of food security of the country contains food security subsystems of its regions. The posture of regional food security reflects the set of agrarian problems, the situation on the domestic food market, its interaction with the world market, and also tasks of social policy. If food security of the country

¹⁷ Salicin, *Physiological and Hygienic Assessment of the Adequacy of Nutrition of Servicemen*, 5.

is based on the concept of food independence, then food security of a subject of the federation is determined by a rational combination of consumption of local and brought-in products according to evidence-based norms of consumption. Justification of regional food security policy is necessary to be proceeded from the following principle: self-sufficiency of the region need not be full.

Regional food self-sufficiency is possible only by those sort of food production of which are economically rational given bioclimatic, land and manpower potentials. Self-sufficiency is apparently impracticable for the regions with adverse climate conditions.

The Doctrine of food security of Russia claims the share of domestically-grown goods in the total amount of a commodity to be not less than 95% for grain and potatoes, 80% for sugar, vegetable oil and fish production, and 85% for meat and meat products¹⁸. Even those targets being achieved, Russian economy will not reach food self-sufficiency anyway.

Food security is also defined by safety of food in terms of health issues, with people living in northern regions of a country are even more vulnerable. Decline in quality of food frankly becomes one of the burning issues and threats to food security. The tendency of quality decline of domestic foodstuff occurs in numerous ways, covert substitution of input components for reduction of cost being one of them. Natural meat disappears in meat products, whole milk – in dairy ones; forbidden substances and medicines for various purposes are used; use of dangerous processing methods is applied;

¹⁸ Belozerov, *Place and importance of Economic Security in National Security of Russia*, 94-100.

emergence of genetically modified products occur. In the latter case safety of such products for human health is still disputable although no scientific exploration so far claimed this method of production harmful. Cases of poor sanitary conditions are recorded frequently, with the Russian state standards (produced by Rosstandart, Russian federal agency) often being neglected.

Specifics of food security in the arctic and subarctic territories of Russia

Before coming up with a solution to the problem of food security of the territories under consideration, it is necessary to examine the specific features of providing the population with foodstuff. The most significant of them are:

- limited opportunities of local production owing to adverse climate conditions, and associated with that dependence of providing the population with food from import;
- low resource security and quality of agro and rural infrastructure;
- lack of stable relationship with the territories (southern) of food production;
- focal nature of settlement with long-range distances both making transportation quite difficult.

The population of northern territories is not fully capable of providing itself with home-grown food. The basis of food supply there is import from abroad as well as other regions of the country. That being said, food security in the North implies both physical and economic availability of food, not mentioning its safety to consumers. Physical availability of food is defined by existence of both locally produced and store-bought (often imported) foods

available to all social groups of the population according to evidence-based norms of consumption. Economic inaccessibility of food to the low-income population, especially rural, remains a genuine problem and becomes a real threat in terms of food security.

In 2010 the Institute of physiology (Komi Scientific Center, Ural branch of the Russian Academy of Sciences)¹⁹ found that most of the observed units (living people) cope with unsatisfactory provision with vitamins attributed to both inadequate nutrition due to the lack of vitamins in food and increased demand of the body while in the harsh climatic conditions. This is only one among many of the studies of this Institute's where use of fresh and quality food proves to be really important in meeting all scientific standards and requirements for healthy living in harsh climate conditions. Support of agriculture and development of local food production through various state programs is evidently justified to be listed as a policy priority.²⁰

While analysing the current and future states of food self-sufficiency in the North and the Arctic, first of all, it is necessary to proceed from natural and resource potential. In comparison with Russia as a whole, sufficiency of biological resources there in the North is much lower (except for livestock of deer per capita). Low supply of biological resources, adverse climate conditions for agriculture (lack of heat, short vegetative period, poor soils, excess moisture) in the North and the Arctic constrain local food self-sufficiency. In terms of developing agrarian production in the long term,

¹⁹ *The Rome Declaration on World Food Security and Plan of Action on Food*. Rome, 2.

²⁰ *Declaration of The World Summit On Food Security*, 7.

emphasis is necessary to be placed on municipalities of southern and central regions where climate conditions are more favourable.

In the Arctic region of Russia imported products completely prevail nowadays. Numerous economic problems, including food supply, have led to essential decrease in the population of these territories. Previous level of providing the population with fresh and qualitative food if being achieved, improvement of living conditions could be promoted.

Essence of food security

The UN was first to introduce the concept of "food security" at the international level at the world conference in Rome in 1974 after a severe grain crisis in 1972-1973, sharp rise in global grain prices, and shortage of world food resources thereafter. One of the most important UN bodies – the Food and Agriculture Organization (FAO) –developed the international strategy for food security. Initially, the world food security was seen as "preserving stability in the food markets and providing access to basic food for all countries." However, in the 1980s some changes in the understanding of food security occurred.²¹

Let's give the definition of the concept of food security according to the official documents. In materials of the World conference on food problems (Rome, November, 1996) food security is understood as ensuring physical and economic access for the population to safe high-calorie food for the

²¹ *The Food Security Doctrine of the Russian Federation*. 2001.

purpose of satisfaction of needs and maintenance of an active and healthy lifestyle. The declaration contains the following components of food security:

- physical availability of safe and nutritious food;
- economic availability by all social groups of the population;
- independence of national food system (national food independence);
- reliability, that is ability of a national food system to minimise influence of seasonal, weather and other factors on providing for population of all regions;
- stability, that is expanded reproduction of a national food system.²²

The Declaration of the World summit on food security (November, 2009) holds the following definition of the concept of food security: all people should always have physical, social and economic access to safely enough and nutritious food in order to satisfy the dietary requirements and food preferences, and also maintain active and healthy life. The bases of food security are: existence, access, use and stability.²³

In the Doctrine of food security of the Russian Federation food security is treated as a state of the national economy at which food independence is provided, physical and economic availability of foodstuff by each citizen of the country is confirmed, taking into account rational norms of consumption necessary for an active and healthy lifestyle.²⁴

In all the specified official documents elements of food security are: food independence; physical and economic availability of food; safety of the

²² *Sustainable development of rural territories for 2014-2017 and till 2020*, 2013.

²³ *The Komi Republic State program*, 2012.

²⁴ Ivanov, *Food Security: The Arctic Specificity*, 152-173.

foodstuff for consumers. These requirements form a methodological basis for further analysing the concepts of national and regional food security.

According to the United Nations, ensuring food security in a country means that import of food as a total amount of its consumption is made up of no more than 20%. Therefore, food sovereignty is guaranteed by annual production at the level of not less than 80% of an annual requirement according to physiological norms.

The estimates of food security of a region are substantially estimates of:

- economic availability of food to the population;
- quality of food;
- creation of optimum food stocks;
- stability of development of the regional food sector;
- level, dynamics and sufficiency of consumption of main types of food.

The following indicators are used:

- the level of food independence (self-reliance) determined by the relation of volumes of production to internal consumption;
- the coefficient of physical availability of food estimated by an amount of food product per capita in the territory of the country (region);
- the coefficient of economic availability determined by a ratio of cost of a food basket to the average monthly income per capita.

Economic availability of food depends on three components:

- food prices;
- cost of "nutritious food basket" (structure of the bunch of food with necessary quantity for a normal activity of a person);
- level of income of a consumer.

Interaction of a national economy and the world food market is important part in the understanding of food security. The degree of food security worldwide can be divided into four groups:

1. independent – completely providing inhabitants with the main food products of own production, creating some sort of reserve on the unforeseen circumstances;
2. rather independent – making the main bunch by itself with small volumes of food import;
3. partially dependent – a certain quantity of food is delivered from other economies;
4. completely dependent – when an economy not capable of making enough food products for inhabitants independently.

Today only some industrially developed countries make much more food products than required by the inhabitants. For example, in Canada, New Zealand, the USA, France and some other countries production of own food considerably exceeds the needs (according to medical norms) of its own population. Germany, Italy, Spain and many other developed economies don't produce anything less than 80-90% of domestic food products.

In the conditions of gradual exhaustion of natural resources, its negative impact on sustainability perspective and growing number of the planet population a search of additional sources of receiving biologically full-value food from local facilities is much needed, including there in the north. Here in the northern zone of Russia requirements and priorities of food supply of the population address the conditions of extreme climate and demographic factors.

Importance of self-sufficiency by fresh qualitative food of the population in the North

Social and economic stability in the North is defined by the quality of life of its inhabitants, and their satisfaction of daily life. The crucial role in the course of social and economic development in the north and increase in the rural people's standard of living belongs to providing the population with fresh and qualitative food mainly created by local production.

Production of foodstuff is among basic activities to make up living conditions for every person and mankind in general. Deficiency of food appear to be making senseless all other economic and social human activities.

Development of agriculture in the North and the Arctic is itself in many respects defined by the quality of life of local population and social stability of a community. The status of local agriculture seems to be itself influenced by a degree of satisfaction of domestic living conditions, including the use of fresh and qualitative food.

Agriculture in a Russian village, especially in the north, is the primary «city»-forming branch of a local economy and an economic basis of the life tenor which can function successfully only on the basis of a certain standard of living of country people, state of the environment and production potential. Agriculture not only vital as it is, but also provides around social and cultural life of society. Therefore it is very important to think up such directions in the course of agriculture development which could promote the necessary level of food security.

Local agricultural production and trade in the North is obviously shaped by the needs of providing the population with food of acceptable quality and in necessary quantity. Nevertheless it is also a part of spiritual internal essence of rural territories which is represented by village and rural way of life. Today it encounters with sensible economic logic of making rural activities – hunting, fishing etc., – effective from the economic standpoint at the current historical moment of development. With that regard the reindeer breeding is stood out as a primer of activity able to provide the population with dietary meat, while also ensuring preservation of traditions and the tenor of life of the northern people. The North, with the example of the Komi Republic, have all the necessary resources for producing qualitative agricultural goods.

The concept of food security of the North suggests an increase in production of local agrarian outputs, creation of enterprises for food processing, storage and realisation, formation of rear food bases in nearby agricultural zones, and also transportation of food from agricultural (southern) regions of Russia. Growth in own local agrarian production, creation of food bases, transfer of food from other regions will allow to minimise the dependence of the North on import food while possibly increasing food quality.

Agriculture in the Komi Republic

Let's consider what the agriculture in the Komi Republic is and why it matters. Adverse climate, poor soils, outstretched distances occupied with wood, along with small density contribute to low agricultural development of the

Komi Republic. The share of agricultural grounds makes up 0,96%, arable land share – only 0,3% of the total area. Natural haymaking and pastures prevail; fodder grounds are 2,7 times more than the arable land. In the north considerable territories are occupied by corvine pastures. And only 40% of the arable land is employed on the average.

The agrarian sector of the Republic is characterised by:

- focal nature of settlement combined with weak relatedness with the processing and supplying industries;
- spatial change of specialisation from the south to the north: crop and livestock production (the south) and solely livestock production (the north);
- large agricultural businesses are concentrated around populous towns, especially capital Syktyvkar (around the capital 57% of all the agricultural goods are produced);
- small agricultural organizations prevail.

For 2004-2013 there was a reduction of production resources in the agriculture. The number of workers decreased by more than 27% in all the municipalities. Technical equipment of organizations worsened followed by extremely low labour productivity. Power capacities were reduced by 12%, the tractor park – 19, plows – 16%, harrows –20%, cultivators – 17%, sowing machines – 29%, potato harvesters – by 6%. Arable land load per tractor increased by 23% and exceeds the load in western countries by 2,2–6,5 times.

A larger share of cattle is concentrated in agricultural organizations – 56%; private households have 26% and farmers – only 18%. In 2010 cattle consisted of 38.661 heads, in 2014 – 35.050, with the livestock of cows

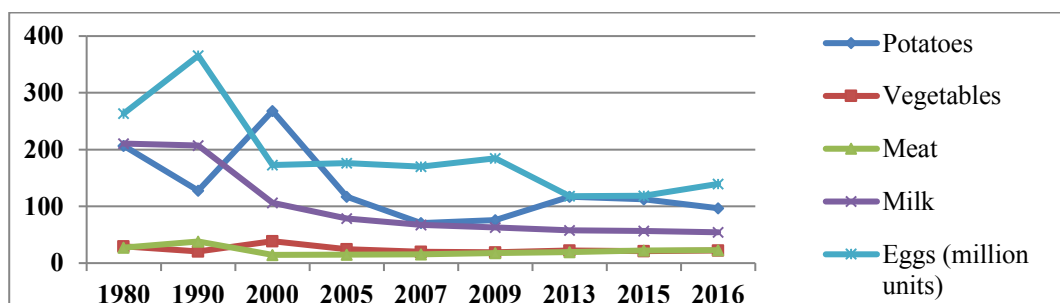
reduced by 2700 heads. The greatest reduction in numbers of cattle and cows happened in municipalities with major share of rural households. The livestock of pigs was reduced by 6% mostly in towns and neighbouring areas districts (by 77%) and in municipalities with large part of country housekeepers (72,7%).

Dairy efficiency of cows is insufficient, the highest efficiency held by town districts (4,5 tons) and entirely (3,6 tons) or partly (3,1 tons) rural territories. The lowest efficiency is recorded in the territories with focal areas of country people (3 tons).

Calculated in physical units, negative tendencies appear. However, in monetary terms positive ones are observed due to increase in prices. For 2010-2014 the volume of gross output of agriculture grew by 32,1%, or for 2371,3 million rubles.

Decrease in crop production and husbandry in the Komi Republic is due to the fact that there was a reduction both of acreage and livestock. Over the period 1980-2016, the acreage of crops has decreased by 41,9%; potatoes – 52,3; vegetables – by 50%. The number of cattle in farms of all categories was decreased by 79,4%; cows – 79,6; pigs – 61,2; birds – by 31,2%. At the same time milk yield per 1 cow increased by 20%, the average capacity of 1 hen – by 13, average daily gain of pigs – 87, but average daily gain of cattle decreased by 12%. The production of potatoes decreased by 53,2%; vegetables – 25,6; meat – 16,1; milk – 74,2; eggs – by 52,9 (figure 1).

For the same period (in the condition of the reduction of population by 23%) milk production per 1 inhabitant has decreased by 39%, beef – 20.5, eggs – by 49%, but the production of poultry meat increased by 205% due to cost-effective production from JSC "Zelenetskaya Poultry Farm", the firm turning a leader of processing and sale of poultry meat in the Republic.



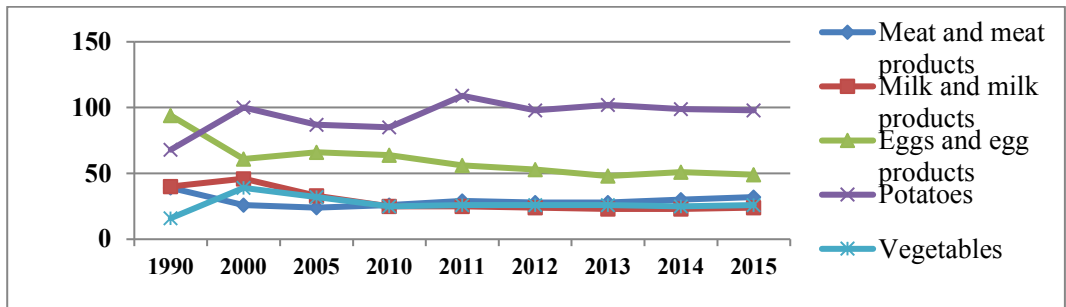
Source: The Statistics Agency of the Komi Republic (Komistat).

Figure 1. Dynamics of production of main types of agricultural products in all categories of farms in the Komi Republic, 1990-2015, thousand tonnes

Today, the Komi Republic is unable to provide itself with the main agricultural food products, as evidenced by figure 2. The reason is the reduction of production of major agricultural food products due to the reduction of acreage and livestock (cattle, pigs and poultry). Self-sufficiency ratio over the period 1990-2015 decreased at the field of meat and meat products – from 39 to 32%; milk and dairy products – 40 to 24; eggs and egg products – 94 to 49%. The ratio increased only in potatoes and vegetables from 68 to 98 and 16 to 26% respectively.

The Komi Republic has no favourable climatic environment for sustainable and effective development of agriculture, so agriculture support through state

programs is very important for the government to implement. It will allow agricultural enterprises to achieve a required level of profitability. It will be followed by expanded production, material and technical upgrade, decent wages, some sort of innovation in manufacturing, and, most importantly, fresh food at locals' disposal. Demand for local agricultural products truly exists, but a buyer is not willing to pay a high price, and is forced out to purchase imported products at a lower price but possibly with a loss in quality. As a result, local agricultural organizations and farmers go bankrupt. In the harsh climate without some sort of financial support and investment from the state funds an agriculture business is not going to survive.



Source: The Statistics Agency of the Komi Republic (Komistat).

Figure 2. Level of self-sufficiency in main food, Komi Republic during 1990-2014, %

Consider the consumption of basic food products in the Komi Republic (Table 1).

Table 1. Consumption of basic food products in the Komi Republic during 2011-2014, kilogram per person

	Medical standard	2011	2012	2013	2014
Meat and meat products	70-75	80	81	80	80
Milk and milk products	320-340	270	276	271	269
Eggs and egg products	260	276	271	267	265
Fish	18-22	22.1	22.7
Sugar	24-28	39	40	38	38
Vegetable oil	10-12	13.6	13.8	13.6	13.4
Potatoes	95-100	56	56	55	56
Vegetables	120-140	94	96	96	88
Fruits and berries	90-100	53	56	58	59
Bread products	95-105	116	113	111	110

Source: The Statistics Agency of the Komi Republic (Komistat).

Demography and infrastructure in rural areas

Analysis of the number of country people in the Komi Republic shows the reduction in numbers (by 65 thousand persons for recent 15 years), whereas the number of elderly people in rural areas have increased. The other observed features are:

- decrease of agricultural and forest production (by volume);
- poor transformation and ineffective use of the available resources (capital and labour);
- labour resources drawn from productive application (sometimes by augmented budgetary sphere);
- extension of rotational basis jobs in remote areas;

- low level of social services (education, health care);
- deterioration or the lack of transport services (bridges demand repair, ferries gone, no small aircraft, bus traffic becoming rarer and rarer);
- worn-out infrastructure;
- housing construction is not enough while with low level of comfort.

These negative processes are conjugated with severe climate conditions of work and ordinary life of country people, low level of payment, lack of general infrastructure. As a result, development of agriculture is remarkably low.

No wonder the demographic situation in the rural areas of the Komi Republic is bad and some measures have even sharply worsened recently. From 1990 for 2015, there were considerable changes in the indicators of birth rate, mortality and natural population growth of country people. Over these years, the general coefficient of birth rate increased in many areas with entirely country people (it grew in the Republic on the average from 13,6 to 14,2‰): in Syktyvdinsk district – from 12,6 to 18‰, Sysolsk district – 15,1 to 18,2, Priluzsky district – 14,5 to 16,1, Kortkerossk district – 13,9 to 19,7, Ust-Kulomsk district – 13,9 to 22,6, in Izhma district – 20,5 to 21,3‰. In territories partly occupied by rural population the coefficient increased only in Ust-Vymsk district from 12,7 to 14,4‰ and in Knyazhpogostsk district – from 12 to 13,5‰.

Adverse impact on the country demographics is exerted by increase in mortality. Throughout historical development death rate of country people was higher than that of town population. The general mortality rate in the rural part of the Komi Republic increased from 9,5 up to 17‰ for 1990-2015, and

urban population – from 6,8 up to 10,9%. Increase in death rate in a village is generally connected with the adverse situation of medical care (notably worse in comparison with a town's), larger fraction of drinking population, and major number of death from accidents and suicides. Regions (within the Komi Republic) with entirely country population were steadier with regard to sustaining demographic potential.

The number of country population are reducing quicker than town's. The former as of 2010 totalled 228.000, in 2016 – only 189.000. Only for the last decade due to migration and mortality the number of country people decreased by 18,9%, while decrease in the number of town residents was only 8,6%.

The rural part of the Komi Republic is characterised by low population density and focal nature of settlement with long-range distances between. Owing to a considerable reduction in the population number, the average density for 1990-2010 in the Republic as a whole decreased from 3,0 to 2,3 people by 1 square meter, while in the countryside – from 1,3 to 1,0.

According to the census of 2010, the Republic consists of 10 cities, 26 settlements of town type and 684 rural settlements, the latter contain 23% of the population. The main types of rural settlements by population number are from 201 to 500 persons (153 units) and from 501 to 1000, with the population share in each type making up 22% of a total number of rural population in the Republic.

Low level and quality of rural life (low personal income, adverse housing conditions, high unemployment) affect migratory processes. For 2007-2014 the rural areas were left by 28,6 thousand persons. Two thirds of the left made young having gone to cities for education and working purposes and dreamt of sticking there. As a result, villages are deserted. From economic perspective it leads to agricultural grounds being withdrawn from economic circulation.

Despite growth in earnings, the real average monthly personal income of an employee in agriculture business remains almost twice as lower as the average level of all fields of the economy combined and 3,5 times as lower as in oil-related industries. In rural areas it spanned only 2,2 living wages. Economically low and socially unfair compensation does not provide country people with socially acceptable level of income and hardens solution of housing problems. In 2013 the average monthly salary of employees of the agricultural organizations located closer to the capital city of Syktyvkar (for example, Syktyvdinsky district) was 20,7 thousand rubles, while in Knyazhpogostsk and Ust-Vymsk districts – only 4,5, Udorsk district – 6,3, Kortkeross district – 7,0 thousand rubles.

According to The Statistics Agency of the Komi Republic, in the first half of the year 2016 the average monthly payroll in the organizations, including small business, were 43,7, while workers in agriculture businesses got only 26,3 thousand rubles. In 1989 the cumulative earnings of a rural family were 82,5% a level of a city family's, the average cumulative income of a rural worker was 72,4% a town worker's, while the average payroll in agriculture – 80% a payroll in the regional economy on the average. At the present time, low wages evidently do not ensure reproduction of manpower in agriculture.

Increase in the level of food security in the Komi Republic requires reduction of poverty of country people. With that regard, it is especially noticeable that the average income per capita in the rural subarctic areas of Komi is twice as lower as in city's as well as the average measure in the Komi Republic, and is 3,3 times as lower as in oil-related industries. In Izhma and Ust-Tsilemsky districts an average worker makes a little more than 70% of the subsistence minimum.

In the Komi Republic only 27% of settlements with agricultural production are provided with the centralised power supply and effective heat supply (where tariffs are lower than the marginal level).

Among the areas with predominantly country people, provided with the centralised power supply are only 7% of units, in municipalities with the number of country people referred as “mainly” – 31%, in municipalities with some areas of country territories – 59%, in town districts – 77%. 7% of settlements involved in agricultural production have no electricity supply. The level of providing settlements with gas is low: 14% of settlements in which the agricultural organizations and farmers are located, with the municipalities with entirely country people – 2%. 85% of settlements with agricultural production and country people have energy provision, but lack stable providing with heat. Areas with “mainly” country people amount 56%, municipalities with some areas of country territories – 33%. In general, the level of infrastructure security of municipalities with entirely country people is the lowest.

Infrastructure arrangement (in particular, transport availability) is a major factor of agrarian investments in administrative centres. Indeed, up to 90% of settlements in which projects will soon be placed have year-round highways with asphalt (49%) and intermediate (31%) covering, and only 10% have unpaved roads.

Thus, agricultural producers are faced with the problems of sufficiency with highways, centralised system of providing with gas and electric power, and stability in heat-providing. Autonomous sources of electricity and heat supply are developing extremely slowly, including renewable alternative sources of energy.

Infrastructure of agriculture production not only has the low level of development in all the municipalities (except for Syktyvkar and Sysolsky district) but its current level and functionality are also partially compatible with the arrangement of agrarian businesses and general requirements of modern development of agro-industrial complex. On the one hand, the low level of infrastructure development increases expenses of agricultural producers and slows down modernization processes, on the other hand – does not allow agricultural producers to favourably sell the products, establish integration cooperation, thereby reducing revenues.²⁵

²⁵ Ponomareva, *Peculiarities and mechanisms of modernization of the agricultural sector in the peripheral rural areas of the Northern regions*, 204.

Assessment of state programs on agriculture development in the Komi Republic

The list of state programs of the Komi Republic under implementation nowadays include:

- "The Development of Agriculture and Market Regulation, The Development of the Fishery Industry in The Komi Republic for 2013-2020, ²³
- "Development of Dairy Cattle Breeding in the Agricultural Organizations in the Komi Republic (2014 - 2017)",
- "Development of Protected Vegetable Growing in the Komi Republic on Resource-saving Technologies (2014-2017)",
- "Development of Open-Ground Production of Potatoes and Vegetables in the Komi Republic (2015-2017)",
- "Development of Production and Processing of Reindeer Breeding in the Komi Republic (2015-2017)".

The general goals of the programs are reduction of technical and technological lag in agriculture (including processing activities), lifting the restrictions for access to the market producers are faced with, improvement of infrastructure and agricultural cooperation, social development of rural territories and growth of rural employment. The implementation is planned to make the overall rate of home-grown products on a local's table to increase, including potatoes – up to 64,2%, meat and meat products – to 30%, milk and dairy products – to 27%. The index of production in farms of all categories in 2020 is expected to be 116,8% as of 2016; index of production of the food industry – 124,8%. Investment into fixed capital is believed to increase by 42,3%.

Components of the State program (the first one on the list above) are sub-programs: "Development of livestock production", "Development of crop production", "Support of small businesses", "Development of production and market regulation", "Development of cultivation of fishes in local reservoirs", "Reindeer breeding support", "Sustainable development of rural territories", with each program aimed at developing agricultural infrastructure. The two programs – "Ensuring veterinary well-being in the Komi Republic" and general "Ensuring implementation of the Program", – are specifically aimed at infrastructure development.

The State program enacts seven main infrastructure-related areas:

- development of agriculture infrastructure – in livestock production (creation of feed plants, a breeding and artificial insemination centre, improvement of veterinary service), crop production (land reclamation, inclusion of an arable land with low efficiency, assistance in property registration, acquisition of elite seeds and transfer to northern territories), fish breeding and reindeer breeding;
- improvement of marketing infrastructure (integration communications; support of agricultural consumer cooperatives; development of the all-republican market; various exhibitions and day-off market events; assistance to construction of vegetable storehouses; logistics; creation of wholesale distribution centres; realisation of the project "Choose Our Production");
- development of agricultural insurance system;
- training of heads and specialists of the organizations in agro-industrial complex;
- development of infrastructure providing for small business (compensation for expenditures on modernisation, grants on farm creation, also

compensation of cost associated with construction of roads, power lines, systems of water- and gas-providing, means of communication);

- information and consulting service (improvement of information, analytical and consulting support; participation in national and regional congresses, conferences, meetings, fairs, exhibitions etc.);

- social development, including nonrecurring sum on household arrangement of the beginners; assistance in providing resources to reindeer-breeding trade settlements; training, education, other types of support of reindeer breeders' children, etc.

The long-term federal program "Sustainable Development of Rural Territories in 2014 - 2017 and till 2020"²² is also being implemented. It aims to promote preservation and development of agriculture activities and also encourage inhabitants to stay. The following areas are touched upon:

- improvement of living conditions of residents, including young families and young specialists;
- development of social and engineering infrastructure;
- support of construction and improvement of rural settlements (within specified priority projects);
- scientific back-up of program realization.

This program is at the same time a part of the State program of the Komi Republic "The Development of Agriculture and Market Regulation, The Development of the Fishery Industry in The Komi Republic".²⁴ It spans the period 2013-2020. Its tasks are state support of improvement of living conditions of residents, young families and young specialists and assistance in infrastructure development in rural settlements.

The implementation of this program in 2014-2016 cost 598 million rubles.

For the whole period 2014-2020 among the orienting points are:

- 667 citizens (including young families and young specialists) living in rural areas are planned to improve their living conditions;
- 42.000 square meters of housing will be constructed or acquired in the market;
- share of gas-covered apartments will rise from 6,8% to 7,7% by the end of 2020;
- 19,9 kilometres of pipes carrying water will be constructed;
- put into operation: educational facilities capable of accommodating 500 students, sports constructions with a total area of 9.000 square meters; objects for rest to fit 450 persons simultaneously;
- 32 projects of local initiatives from citizens living in the area through grant system funded by the state budget.

The analysis of the State program "The Development of Agriculture and Market Regulation, The Development of the Fishery Industry in The Komi Republic for 2013-2020" as well as various regional programs reveals the measures aimed at the development of market and innovative infrastructure are poorly presented, although some actions of innovative character are planned. Actions regarding infrastructure development have no specific goals in the form of plans to be pursued and are not represented in required scale. But at the same time thanks to these programs the agriculture has begun to develop at small rates and bring perceptible positive results.

Measures to increase self-sufficiency with local foods

Food security of the northern territories depends on development of its own agrarian complex. Increase in food self-sufficiency will demand acceleration

of modernisation of the agrarian sector, overcoming poverty and improvement of living conditions of rural population, formation of an effective organizational and economic mechanism, creation of food bases in adjacent, favourable agrarian areas, development of agrarian consultation etc.

Primary measures towards availability of main foodstuff for all the groups of the population in the Komi Republic include:

- decrease in the level of poverty, ensuring priority support of those in need the most;
- growth in competition in all production segments and chains.

Development of reindeer breeding through intensification of production and increase in a livestock of deer in the taiga zone of the Komi Republic is promising, including the territories of Ust-Tsilemsk, Izhma, Pechora, Vuktyl, Sosnogorsk, Ukhta, Troitsk and Pechora districts and north by Ust-Kulomsk, Knyazhpogostsk and Udorsk districts. Here more than 5.000 deer heads could graze for a year, even only on boggy sites.

The most important conditions of development of the local agricultural complex are:

- transition from central to local management of own food sector of each municipality;
- innovative modernisation of the production process;
- ensuring realization of agrarian production;
- formation of the effective organizational and economic mechanism.

The state programs listed above are a primer. Today the local government has no necessary financial base for sustainable rural production and development.

In order to encourage domestic demand, regional and municipal authorities need to adjust the procuring contract system prescribing a priority when purchasing production into public storages and other cases of providing the population with biologically full-fledged food, namely as free food for children and school students or through special coupons for low-income families. Procuring, intermediate and processing operations need to be freed from monopoly component.

In ensuring food security in the North a vital role will be played by formation of the storage and processing centres placed in the southern regions of the Komi Republic in adjacent agrarian zones of the Kirov, Arkhangelsk and Vologda regions. These territories offer good transport availability (automobile and railroad).

Course of storage and processing centres creation can be various:

- organization of new enterprises;
- subsidizing existing organizations dealing with agrarian production and processing;
- creation of agrarian holdings in the Arctic and subarctic territories including local enterprises involved in purchasing and realisation of food, and organizations in other regions (production of potatoes, vegetables, rough forages, feedstuff for young cattle, pigs, and also processing of agricultural production).

Transportation of food and agrarian raw materials from storage and processing bases will demand creation of logistics schemes, as well as

participation from state and municipal governing bodies in the organization of these facilities.

Use of diverse types of innovation (selection and genetics, technical and technological, organizational and economic, social, ecological etc.) will allow to create so-called the fifth and sixth technological level in the agrarian sector. Innovations ought to be carried out not only in collective and country farms, but also in rural households, the latter keeping important place in ceaselessly uncertain economic environment and being more susceptible (in comparison with large enterprises) to the use of innovations.

Improvement of specialisation within the agrarian sector plays a significant role in boosting the level of self-sufficiency. Among perspective segments in the Arctic zone (the town of Vorkuta and the neighbouring territory) are development of reindeer breeding, restoration of production of milk and greenhouse vegetables. In order to provide children with fresh dairy products it is offered to create there several new agricultural organizations including dairy farms and facilities engaged in milk processing and production of veal and beef. The organization of greenhouse facilities based on utilisation of heat made by compressor stations pumping natural gas, power and thermal plants seems to be quite promising.

It is important to coordinate improvement of accommodation and specialisation of the agrarian production with the development of other spheres of the agrarian sector. Closed cycle of production, processing and realisation of agricultural products is required to be created through regional retail chain stores.

Implementation of technical and technological and socio-economic development of the agrarian sector of the North and Arctic will require considerable financial resources, including state investments. The role of the state funds is of great importance – private investors are discouraged to invest due to low profitability and long payback period.

Conclusions

The issue of rational use of food resources in the Arctic and northern territories is highly significant and caused not only by the state strategy of the Russian North and the Arctic development, but also the growing concern in finding the solution of the world food problem.

The basis of food security of the North and the Arctic is both physical and economic availability of safe food for stable providing all social groups of the population according to evidence-based norms of consumption. Historical experience shows agriculture can demonstrate good dynamics and carrying out a role of social factor of development of new territories, while also being profitable from economic point of view.

The case study of the Komi Republic shows development of cattle breeding, reindeer breeding, poultry farming, and also production of organic goods are promising.

According to a sociological survey conducted from May to August of 2017 (together with the Ministry of agriculture and food market of the Komi Republic), organic products are indeed demanded by the local population, and the average person is even willing to pay for it more than for conventional products. People tend to believe organic products have a positive impact on their health. Quality products are the basis for the protection of healthful human life in northern climate. Achievements of scientific and technical progress are able to provide the population with such opportunities, as well as an increase in the standard of living in the rural sector, formation of a new type of agrarian system in an economical and geographical link "the North – the South".

Risks and threats of current level of self-sufficiency in biologically full-fledged food are combined with unsatisfactory condition of material and technical resources in the agro-food sphere, dependence of process production on import technologies, reduction of biological resources, low-qualified level of labours and no higher quality of life of local residents, adverse external environment, inefficient mechanisms of state support, inaccessibility of soft loan.

Increase in self-sufficiency demands modernisation of the agrarian sector, improvement of living conditions, overcoming poverty of local residents, promotion of sales, formation of the effective organizational and economic mechanism, creation of the storage and processing centres in adjacent zones, development of agrarian consultation.

Food consumption for inhabitants of the North and the Arctic is of great

importance and relevance, not only for a person, but also for social and economic development of a region and country in general. Agriculture development is a basis of life for local rural population in the northern territories and therefore demands considerable financial resources and support from the state funds. The purpose of food self-sufficiency should be part of a state program aimed at complex socio-economic development of the North and Arctic.

References

1. *The State of Food Insecurity in the World 2012*. UN FAO: Rome, 2012.
2. *Annual Report on Organic Farming*. Ottawa: Agriculture and Agri-Food Canada, 2003.
3. McBride W., Greene C. *Organic Dairy Sector Evolves to Meet Changing Demand*. Amber Waves, no. 8 (2014): 28-33
4. Scialabba N., Hattam C. *Organic Agriculture, Environment and Food Security*. Food & Agriculture Org., 2002.
5. *Strategy for Sustainable Development of Rural Territories of the Russian Federation for The Period till 2030*. APK: Jekonomika, Upravlenie. 2015, no 6.
6. *USDA Budget Summary and Annual Performance*, 2013.
7. Battalova A. R. *Development of a Toolkit for sustainable development of food sector economic security*. Ph.D. Moscow, 2016.
8. *Theoretical and Methodological Problems in The Measurement Prediction and Control of Food Safety Of Russia*. Moscow, "Encyclopedia of Russian villages" Series, 2014.
9. Ushachev I.G. *Food Safety of Russia in the Conditions of Global Partnership*. Moscow, 2013.
10. Ushachev I., Serkov A., Paptsov A. *Problems of Ensuring National and Collective Food Security of The EAU*. APK: Jekonomika, Upravlenie, no. 10 (2014): 3-15.
11. *Socio-Economic Priority in Ensuring Food Security in Russia*. Saratov: Saratov source publ., 2012.

12. *The Formation of the Study Strategic Priorities and Integrated Development of the Arctic Territories of the Russian Federation*. Ekaterinburg: Institute of Economy, 2013.
13. Patsiorkovski V.V. *Family Services – Insurance Link among Food Security, Nutrition and People Well-Being*. Future food system of Russia (in the estimates of the expert community). Moscow, 2014.
14. *Food Security in Russia: Monitoring, Trends, Threats*. RANEPА, 2015.
15. Semin A.N., Karpov V.K. *Food Safety in Russia: Contemporary Challenges and Opportunities*. *Agroprodovol'stvennaja politika Rossii*, no. 6 (2014): 5-8.
16. Ivanov V. A. *Influence of Market Reforms on Agricultural Development and Food Self-Sufficiency in the Northern Region*. *Jekonomicheskie i social'nye peremeny: fakty, tendencii, prognoz*, no. 1(43) (2016):170-186.
17. Salicin Y.G. et al. *Physiological and Hygienic Assessment of the Adequacy of Nutrition of Servicemen*. *Voenno-Medicinskij Zhurnal*, no. 1 (2010): 5.
18. Belozеров I.P. *Place and importance of Economic Security in National Security of Russia*. *Bulletin of Omsk University: Series "Economy"*, no.3 (2009): 94-100.
19. The Rome Declaration on World Food Security and Plan of Action on Food. Rome, 1996, accessed May 23, 2016, <http://www/g20civil/com/ru/documents/205/577/>.
20. Declaration of The World Summit On Food Security. Rome, 2009, accessed June 3, 2016, <http://www.un.org/ru/documents/declconv/declarations/pdf/summit2009declaration.pdf>.
21. *The Food Security Doctrine of the Russian Federation*. Approved, no. 120 (January, 30, 2001).

22. *Sustainable development of rural territories for 2014-2017 and till 2020*. The Russian federal program. Approved, no. 598 (July, 15, 2013).
23. *The Development of Agriculture and Market Regulation, The Development of the Fishery Industry in The Komi Republic*. The Komi Republic State program. Approved, no. 424 (September, 28, 2012).
24. Ivanov V. A. *Food Security: The Arctic Specificity*. Corporate governance and innovative development of economy of the North (Syktyvkar State University), no. 2 (2015): 152-173.
25. Ponomareva A.S., Ivanov V.A. *Peculiarities and mechanisms of modernization of the agricultural sector in the peripheral rural areas of the Northern regions*: Monograph. Syktyvkar: Komi Scientific Center of Ural branch of Russian Academy of Sciences, 2014.