

Mini Review

Perspectives on development of organic agriculture in Russia

Anna Sergeevna Shcherbakova¹ 

1 PhD in Economics, Institute of Socio-Economic and Power Problems of the North, Komi scientific center, Ural branch, Academy of Sciences, Russia

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Abstract

The article is dedicated to the development of organic agriculture in Russia, which will comply with all the principles and objectives of organic production that meet international requirements to ensure the competitiveness of organic products produced by domestic agricultural enterprises. The concept of organic agriculture is defined. The importance of organic food production as well as ensuring country food security is proved by the fact that the consumption of environmentally friendly products is the basis of a man's life and helps restore a body after exposure to low-quality food and the adverse factors of environment. The demand for organic products among the population in a lot of countries is increasing every year. Today, about 160 countries are engaged in organic agriculture. The findings of foreign and domestic scientists on the development of organic agriculture has been displayed. Countries where organic agriculture is developing successfully in response to high demand for organic food are shown (Europe and the United States). The example of Germany shows what factors contributed to the significant and rapid development of organic agriculture. In Russian theoretical studies and on practice the development of organic agriculture is not fully investigated. The current draft law, regulatory acts and standards of organic products manufacture in Russia are studied. The procedure of certification for Russian producers of organic products is presented, as well as the difficulties and financial costs it entails in the process. The study used scientific methods such as synthesis, analysis, and statistical approaches. The study assesses the current state of development of organic agriculture and the organic products market in Russia. A sociological survey was conducted in the Komi Republic on the demand for organic food among local residents. The assessment of soil quality of agricultural lands of the Komi Republic is presented. The factors and conditions which constrain development of organic agriculture in Russia are revealed. The factors that determine the distinctive features of organic agriculture are summarized. The proposals and recommendations on the development of organic agriculture aimed at improving the competitiveness of Russian organic agricultural products, as well as ensuring domestic food security are formulated.

Key-words: Organic Agriculture, Ecological Products, Health, Certification, Competitiveness, Legislative Base, Komi Republic

Introduction

World population growing on a steady rate, the mankind need to keep the balance between agricultural production and the state of environment to improve the sustainability of agriculture. In the sphere of sustainable agriculture, organic agriculture is a major area that has the ability to provide the population with quality food. The use of environmentally friendly products helps the human

body recover from the negative effects of substandard products. Healthy nutrition is the basis of normal human life and makes it possible to increase life expectancy (Ecology, 2016).

One of the sustainable development goals (SDG) of Food and agriculture organization of the United Nations (Food and Agriculture Organization, FAO) is a goal (the second) formulated as "eliminating hunger, ensuring food security and

improving nutrition and promoting sustainable agriculture" (United Nations General Assembly, 2015).

In the SDG-2 food security is regarded as one of the most daunting challenges facing the world. It means to have enough quality food for growing human population to meet nutritional needs (a need of maintaining a healthy lifestyle). Human population, according to forecasts, is expected to reach nearly 10 billion by 2050. The goal is complicated by increasing water and land scarcity, soil degradation, declining biodiversity and increasingly frequent extreme weather events. According to FAO, the planet produces more than enough food to feed everyone, yet nearly 815 million people are chronically undernourished, and malnutrition affects every third inhabitant of our planet (FAO, 2017).

These problems have found their obstacles in form of production of high-quality and environmentally friendly food around the world. The world market of environmentally friendly products is very dynamic and actively developing all over the world, especially in the last two decades.

Currently, the population's demand for organic products is growing rapidly, including here in Russia. The interest from Russian agricultural producers in entering new markets for organic products is growing, but there is a number of constraints. As a result, the expansion of scientific research on the basis of the development and methods of organic agriculture, increase of the competitiveness of domestic agricultural producers becomes relevant in Russia. The author makes an attempt to supplement the existing theoretical and practical knowledge on the development and management of organic agriculture in Russia, taking into account the experience of foreign countries.

The aim of the work is to study the peculiarities of the functioning of organic agriculture, methods and principles of management; to identify the prerequisites for the development of organic agriculture in Russia, which will ensure the competitiveness of domestic agricultural producers of organic products.

To achieve this goal, it is necessary to perform the following tasks: to define the concept of organic agriculture; to analyze the experience of foreign countries in the development of organic agriculture; to assess the state of organic agriculture in Russia at

the present time and the conditions that constrain its development; to identify the factors that determine the peculiarities of organic agriculture on a whole; to find out whether there is a demand for organic products among the population (for example, in the Komi Republic); to assess the quality of the soils of the region of interest and to justify the recommendations of the need for the development of organic products in Russia.

The scientific novelty of the research consists of the identification of the limiting factors that do not allow expanding the production of organic products and ensuring the competitiveness of Russian agricultural producers, thus improving the food security of the country, and recommendations to accelerate the development of organic agriculture in Russia, where priority is given to the creation of an effective regulatory framework.

For the first time, the concept of organic agriculture was used in 1940 by V. Northbourne in the work "Look to the Land". The concept and essence of "organic agriculture" (organic farming) is legally defined and fixed in English-speaking countries. One of the founders of organic agriculture was the British botanist A. Howard ("Agricultural Covenant", 1940). In 1939 E. Balfour was influenced by the works of A. Howard and organized a scientific experiment on lands in the UK to compare conventional and organic farming. Her book "Living soil" is widespread even in present times and led to the founding of one of the currently known organization for organic agriculture – Soil Association. In Japan, organic agriculture began to develop about 100 years ago (founder – M. Okada).

One of the founders of "organic farming" is a Japanese farmer Fukuoka, M. (beginning of the XX century). He practiced a new method of farming, which he called "odorless, without fertilizers, without weeding, without pesticides, the method of doing nothing in natural agriculture" (Veko and Ravino, 2016).

Organic agriculture according to FAO definition – "is a unique production management system that ensures and improves the health of agro-ecosystems, including biological diversity, biological cycles and soil biological activity, and this is achieved using agricultural, biological and mechanical methods and by the exclusion of all synthetic non-agricultural impacts" (FAO, 2016).

Organic agriculture is a system of agriculture, animal husbandry and fishery, in which special attention is paid to the protection of the environment and the use of natural methods of farming. All this is relevant not only to the final product, but also to the entire complex of production and delivery of agricultural products. To this end, artificial products such as genetically modified organisms (GMOs) and a number of agricultural inputs, including pesticides, veterinary drugs, additives and fertilizers, are excluded from the entire agricultural cycle, from production and processing to transportation and delivery. Instead, manufacturers of organic products adopt natural agricultural methods and modern scientific knowledge in the field of ecology, thereby striving to improve the ecosystem for the long term, to increase its productivity and product quality, to protect the environment. Advocates of organic methods believe that this is a more sustainable and less destructive approach to agriculture (Morger et al., 2012).

Today in the literature and mass media it is possible to meet the different terms defining safe production, for example, eco-, bio-, organic. All these terms designate the products that are grown, collected, processed, and packed according to the standards of ecological (or biological, organic) production accepted in Europe. In different countries, different options are used to designate products that meet the principles of organic agriculture: "organic" (English-speaking countries, Ukraine); "ecological" (Czech Republic, Denmark, France, Hungary, Lithuania, Poland, Slovakia, Spain, Sweden, Ukraine); "biological" (Georgia, Germany, Greece, Italy, Latvia, Netherlands, Portugal); "natural" (Finland).

Essence, principles and methods of organic agriculture

According to the International Federation of Organic Agriculture Movements (IFOAM), organic agriculture must meet the requirements of economic efficiency, environmental safety, and social responsibility and be guided by certain principles. The basic principles of organic agriculture include: "health": to maintain and improve the health of the soil, plants, animals, humans and the planet as a whole and indivisible unit; "justice": to build relationships that ensure fairness with regard to the common environment and life opportunities;

"ecology": to be based on the existence of natural ecological systems and cycles, operating on it, emulate them and help sustain them; "care": management must be precautionary and responsible to protect the health and well-being of present and future generations and the environment (IFOAM, 2017).

In 1980, the IFOAM issued its first standards for organic agriculture, which are central to the establishment of state standards and inspection systems. Here are some of the main positions (Mazurova, 2009):

- at least three years of cultivation should be carried out without the use of chemical fertilizers;
- seeds for organic farming should be adapted to local conditions, resistant to pests and weeds and, most importantly, not genetically modified;
- soil fertility should be maintained through a variety of crop rotation and biodegradable fertilizers exclusively of microbiological, plant or animal origin;
- use of herbicides, pesticides, insecticides, nitrogen-containing and other chemical fertilizers is prohibited;
- pest control should be based on physical barriers, noise, ultrasound, light, traps, special temperature regime, etc;
- in the process of growing cattle for meat antibiotics and growth hormones shall not be used;
- farmers must record all animal treatments (treatment records are audited annually by the certifying bodies);
- use of radiation and genetic engineering in the production is strictly prohibited;
- if the product is designated as Organic, a manufacturer must use 100% organic ingredients.

The main elements of organic agriculture are shown in Figure 1 and Table 1.



Fig. 1. System of organic agriculture. Compiled by: Organic Farming (2018).

India relies on the following six methods of organic farming: crop diversity, soil management, weed management, control of other organisms, animal husbandry, non-acceptance of genetic modification (Food NDTV, 2018). China practices intercropping (intercultural), focusing on the "double standard" of growing multiple crops in the same area at the same time. Intercropping is sometimes

supplemented by a double pruning when a farmer can alternate pruning of different crops during the growth period. Both practices can improve nutrient utilization and enhance pest control in crops. Studies have shown that when using this method, the yield of maize, for example, can increase from 42 to 92%, and the average annual income of farmers – by 54% (Plos Ecology Community, 2018).

Table 1. Main provisions of organic agriculture.

Main characteristics	Effect of use
Protecting long-term soil fertility by maintaining organic content levels, encouraging soil biological activity, and careful mechanical intervention.	The use of crops, "green" manures, organic fertilizers and crop rotation in order to increase the biological activity of the soil and maintain its fertility.
Provision of nutrients in crop production "indirectly" by using relatively insoluble nutrient sources which are made available to the plant by soil microorganisms.	Biological control of crop rotations and other methods of control over weeds, insects and diseases.
Nitrogen self-sufficiency by using legumes and biological nitrogen fixation, as well as effective utilization of organic materials.	Orientation to the biodiversity of the agricultural system and the environment.
Weed, disease and pest control, based primarily on crop rotations, natural predators, diversity, organic fertilizers, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention.	Rotary pasture and mixed forage pastures for livestock technologies and alternative animal health care.
Broad-based livestock management that fully applies evolutionary adaptations, behavioral needs and animal welfare issues with respect to nutrition, maintenance, veterinary care, breeding and cultivation.	Reduction of external and internal costs and elimination of synthetic pesticides and fertilizers, hormones and antibiotics.
Careful attention to the impact of agriculture on the environment and the conservation of wildlife and natural habitats.	The focus is on renewable resources, conservation of soil and water resources, restoration techniques, maintenance and improvement of ecological balance.

Compiled by: Organic Farming (2018); European Commission, (2017).

The European system is the most developed and normatively reinforced in the sphere of organic agriculture. According to the main regulatory documents, the requirements for organic producers are directed toward the following objectives (European Commission, 2013; European Union Council Regulation, 2007; European Union Council Regulation, 2008):

1. Establishment of a stable system of agriculture management, which is characterized by: the system of environmental management, maintenance of soil fertility, cleanness of water, welfare of plants and animals by natural ways, and maintaining a balance between outcomes and methods; the ability to maintain a high level of biological diversity; responsible use of energy and natural resources such as water, soil, organic matter and air; high standards of animal protection, emphasis on meeting the specific needs of certain species of animals.

2. The desire to produce food of high quality.

3. Focus on the production of a wide variety of agricultural products that meet consumer demand,

with production process not damaging the environment, human health, the plant biodiversity, animals and the well-being of the Earth taken as a whole.

The main methods of organic farming and novel approaches in the practice of it are shown in Figure 2.

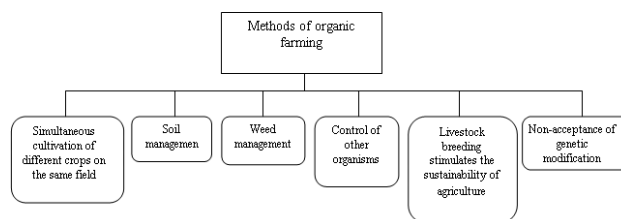


Fig. 2. Methods of organic farming.

In organic agriculture, it is necessary to apply soil treatment, which contributes to the maintenance and increase of soil fertility and biodiversity, biological activity of the soil, prevents erosion and soil compaction. In doing so it is required to include in the technology the crop rotations with a substantial proportion of perennial grasses and legumes, sideral pairs, compost of organic origin. To grow local, more resistant varieties of plants is a natural way to control

pests. Such approach promotes culture of agricultural production, its ecologization, introduction of progressive resource-saving technologies (FAO, 2017).

The need for the development of organic agriculture in Russia

Nowadays Russia faces the task of developing organic agriculture focused on ensuring the sustainable development of agriculture and food security of the country, while preserving the health of its citizens. Modern agriculture in Russia is based on the principles of chemicalization, the use of various pesticides, antibiotics, additives, etc., although in recent years there has been a growing demand for high-quality food. People living in the modern, accelerated pace of life, understand how important it is to eat quality food, which is not only the basis of human activity, but also serves as a barrier to the spread of diseases and increases life expectancy. The positive impact of organic agriculture is especially welcome in the harsh climatic conditions of the North and the Arctic, where the human body requires additional energy.

In the Forecast of scientific and technological development of the agroindustrial complex of the Russian Federation for the period of up to 2030, prepared at the National Research University Higher School of Economics and approved by the Ministry of agriculture of the Russian Federation in January 2017, there are points that directly indicate at the global change of management systems, the replacement of the chemization of agricultural production with adaptive landscape, biologized agriculture. Organic agriculture is called a promising direction for Russian firms in releasing the products with high added value and good export potential (Organic farming in Russia, 2018). Obviously, its development requires a system of knowledge, quantitative and qualitative indicators to analyze, plan, track the dynamics, create development strategies, road maps, and regional programs.

In Russia, the number of organic producers certified by the international standards is still unknown, as well as how much Russia imports and exports organic products, because there is no reference on organic products in the Customs service in the all-Russian classifier of economic activities. There are no data on commodity flows, sales structure, target groups. There is no analysis of

successful experience of farms in different regions. The situation on the biological agriculture is even more difficult. There is no uniform concept and generally accepted criteria of biologization of agriculture. Goals, principles, criteria and methods of organic farming are not indicated (Organic farming in Russia, 2018).

In 2016, DISCOVERY Research Group published a study of the organic farming market, where the Russian market also entered the report for the first time. The results of the study are not representative due to the lack of a common approach to the identification of environmentally safe products, registers of organic producers, export data and other important indicators in Russia (Ecoclasser, 2017). There is an expert assessment from I.A. Garaev, the Director of the Institute of Organic Agriculture, that the market of world organic products assessed in 60 billion euros, Russia's share is \$148 million (0.21%) (Garaev, 2016).

Nowadays in Russia the term "environmentally friendly products" is often used primarily to attract consumers, increase demand and interest in such products, despite their price and quality. However, the term "organic products" reflects not only the "environmental safety" of products that are controlled at all the stages of production, but also its physico-chemical, organoleptic and other characteristics that meet the principles of organic agriculture. Since in the EU and the USA the need to grow and consume organic food and its impact on health and the environment are actively promoted among the population, foreign consumers, unlike Russian, know what they pay for.

S.V. Kuteev of A.A. Nikonov all-Russian Institute of Agrarian Problems and Informatics characterizes the tendency of growth of the organic products market of the Russian Federation in this way: the area of certified organic lands in 2008-2012 tripled – from 47 to 146,3 thousand hectares, the number of producers increased from 25 to 60 farms. However, these are very small figures at the national level (Koteev et al., 2015).

It is obvious that the Russian market of organic products is at an early stage of development. Thus, the share of organic agricultural land in the total area of agricultural land in 2012 amounted to 0.07%, and the share of producers of certified organic products was 0.0004% of all the agricultural producers. In Russia there are only 3192 hectares of certified

organic agricultural land (according to European, American and Japanese standards) (National Organic Union, 2018). Russia, where 40 million hectares of land are out of use, has a huge advantage in this term compared to Europe, where there is a shortage of land for organic farming. According to the National Organic Union, the volume of the Russian market of organic products in 2014 was only 10% of domestic products, and the remaining 90% were imported from the EU.

Russia is currently one of the countries where organic agriculture has no generally accepted terminology. For the first time the definition of organic products and its production standards in Russia appeared in Sanitary and Epidemiological Rules and Regulations 2.3.2.1078-01 in 2008. It says that "Organic food is food produced with technologies that ensure the production without the use of pesticides and other plant protection means, chemical fertilizers, growth stimulants and animal feed, antibiotics, hormonal and veterinary drugs, genetically modified objects, and without being subjected to treatment with ionizing radiation" (SanPin, 2011). The state standard in the field of organic agriculture was adopted only in 2015 – GOST R 56508-2015 "Organic Products. Rules of production, storage and transportation".

As of today, Russia has developed a draft law called "On Production and Turnover of Organic Products" from 11.03.2016 No. at-13-07/2691, but it has not yet been adopted, which is one of the main constraints in the development of Russian organic agriculture. In April 2018, in the State Duma of Russia, the draft law passed its first reading, which gives hope the approval of the law to take place this year.

I.A. Garayev believes that the draft law has not been finalized: there is no elaboration on the use of manure, litter, and compost based on them, and manure and litter can be used not only from organic farms, but also from industrial enterprises, but after a special neutralizing processing when all chemical pollutants (antibiotics and pesticides) will be diminished to the required standards. He also claims that the above-mentioned GOST does not take into account the certification of biological products and organic fertilizers that it allows using. These shortcomings, according to the scientist, will lead to significant problems with the use of biological products and organic fertilizers in organic agriculture.

In this regard, it is necessary to create and systematically replenish the register of producers, biopreparations and fertilizers allowed for use in organic agriculture of Russia, as it is done in the EU and the USA.

Despite the fact that there is no federal law in the country that would regulate and control the production of organic products, several regions (Voronezh, Ulyanovsk, Belgorod, Krasnodar region) have developed their own regulatory documents that contribute to the transition to Organic agriculture.

Analysis of the legal framework and certification system allows us to conclude that the national system of certification and control of organic producers in our country actually does not work. Control functions of production and marketing of organic products is vested on the Federal Service, which conducts routine checks of producers of organic products no more than twice a year. Considering that farmers of organic production have insufficient knowledge and skills in the sphere of production and realization, it seems feasible to carry out unscheduled inspections in order to reveal and eliminate discrepancies at all the stages of production. Training of specialists is important for the transition from traditional agriculture to organic farming.

In the emerging Russian market of organic products agricultural producers have to undergo certification in the voluntary domestic systems of certification or in foreign and international organizations to mark their products as organic and be able to export them outside the country. Now in Russia, a voluntary certification by private standards is carried out by a few organizations, among them the "St. Petersburg Ecological union", Agrosofiya, NCP, Eco-Cluster, LLC, "Lavkalavka" LLC and "Natural products" JSC.

But not all the Russian agricultural producers seek to pass it. This is due to the fact that certification is subject to very strict requirements, and information and financial support from the state is absent. The certification procedure is time-consuming and expensive. During the production inspection, the conditions of cultivation and processing of products are checked on 200 parameters. The certification procedure will cost from 1.5 to 8 thousand euros depending on the scope of work, the duration of the procedure is up to 3 months, the validity of the certificate is for one year. The disadvantages of this approach are obvious: high cost; certification

authorities are based abroad; there is no guarantee that a popular brand is not forged; a consumer should understand the types of certification; it takes time to pass certification; small farms cannot bear certification financially; the dominance of imported goods dubbed "ORGANIC"; high prices for organic products; misleading consumer terminology and markings.

In the European Union, organic certification provides for continued monitoring of compliance of the production process and finished products with the rules of organic production. For this purpose, annual inspections of documentation, audit of production and analysis of the final product are conducted.

In Russia the really organic food which passed certification can be purchased only in specialized supermarkets of a high class such as "Azбуka Vkusa", "Globus GURME", "Bio-Market". They offer products mainly imported from Germany, England, Italy, France and Belgium. Organic production from the USA is presented mainly by children's food. A wide range of organic products can be found in such chain supermarkets as "Green Crossroads", "Metro Cash&Carry" and "Seventh continent". But all these shops are located mainly in Moscow and St. Petersburg.

The study summarizes the most significant factors determining the importance of organic agriculture: the need to improve animal productivity and crop yields, ensure efficient use of energy, reduction of the negative impact on the environment, expansion of production and marketing of organic products, the socio-economic importance of organic agriculture for the country. At the same time, there are barriers that impede its development in Russia:

- there is no legal framework and approved terminology in the field of organic agriculture;
- special bodies of control, management and accreditation in the sphere of production and sale of organic products are not established;
- a state target program of development of organic agriculture is not developed;
- agriculture business in the country has insufficient experience of organic farming;
- lack of qualified specialists in the field of organic agriculture and their training in professional institutions;
- insufficient state support for agriculture;
- low accessibility of organic products for the population (overestimated prices for final products

compared to conventional products and low per capita income in general);

- high cost of production with low profitability;
- lack of competitiveness of organic products of domestic agricultural producers;
- trading network for the sale of domestic organic products is not developed.

Russia has a great potential and opportunities for the development of organic agricultural production in livestock and crop production. The rich land resources, the low level of chemicalization use, a variety of flora and fauna – all of these allow Russian firms to actively develop this area of business, bearing in mind that organic production is in great demand among the population which is ready to pay for it large sums money compared to poor-quality food.

The possibility of development of organic agriculture on the example of the Komi Republic

Today, the main goal of the Komi Republic's agriculture is self-sufficiency of the basic agricultural products of good quality and in sufficient amount for the local population (850.5 thousand people as of 2017), of which the share of the rural population is 22%. And only about 2% of the inhabitants of the Komi Republic are engaged in agriculture. Living in the harsh climatic conditions of the North, the local residents need to eat quality and fresh food, which is a basic foundation of human living conditions and increase of life expectancy.

Currently, the agro-industrial complex of the Komi Republic is represented by 276 organizations. Those are incorporated food producers, diversified agricultural organizations, farmers and private household farms. However, over the period 1980-2016 there was a sharp decrease in the production of basic agricultural products (Figure 3). Trying to explain this phenomenon, there is a need to assess the quality of the soil in more detail in order to identify areas that are now favorable for growing crops, increasing outputs of agricultural production and providing local residents with fresh and quality local products.

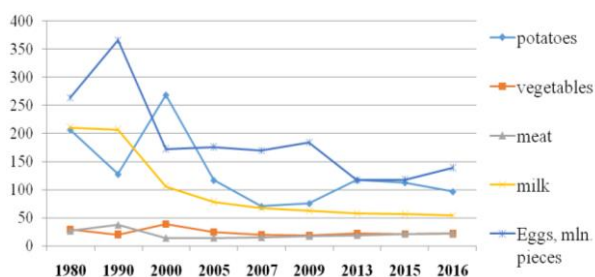


Fig. 3. Dynamics of agricultural production in the Komi Republic in 1980-2016, thous. tonn. Compiled by: 28, 29.

Plenty of research conducted at the Institute of Physiology (the Komi Scientific Center of the Ural branch of the Russian Academy of Sciences, in the Department of Environmental and Medical Physiology, studies on the actual human nutrition spanning more than 15 years) show that "inhabitants of the European North are characterized by increased consumption of fat component in diets. This is due to the environmental conditions of the North...which determine the high energy needs of the organism ... the fat component of the diet is burdened with saturated and unsaturated fat portions, which lead to an imbalance in nutrition and, accordingly, in the blood". In 2010 "most of the observed units are characterized by unsatisfactory provision of organism

with vitamins (polyvitamins), an evidence of inadequate nutrition of micronutrient component due to the lack of vitamins in food, and increased demand of the body exposed to the harsh natural and climatic conditions". Previously, in the Northern regions, people mostly ate their own agricultural products and gifts of the forest (prey, venison, fish, berries, mushrooms, etc.), while the level of disease was lower, obesity was not observed. This fact is confirmed also by experts of the Ministry of health of the Komi Republic.

The state report of the Komi Republic for 2016 notes the high proportion of fat and easily digestible carbohydrates in the nutrition structure of the population, which leads to an increase in the number of people suffering from overweight and obesity. Overweight and obesity, among other risks, are the cause of the development of cardiovascular, oncological, endocrine diseases, diseases of the digestive system. With the problems mentioned above, it becomes obvious how important it is for residents of the North and the Arctic to eat high-quality, i.e. organic food. Table 2 shows the benefits of organic food.

Table 2. The advantages of organic agricultural food product.

Index / factor	Characteristics
Best (quality) food	Organic foods are much richer in nutrients compared to traditionally grown foods. Nutritional value of food is determined by the content of minerals and vitamins. Organic farming enhances soil nutrients, which are transmitted to plants and animals.
Helps us stay healthy	Organic products contain no chemicals. This is due to the fact that organic farmers do not use chemicals at any stage of the food production process, as their commercial partners do. Organic farmers use natural farming methods that do not harm people and the environment. The products grown in traditional way are prone to causedangerous diseases such as cancer and diabetes.
Without the use of poison	Organic farming does not use toxic chemicals, pesticides and herbicides. Studies have shown that most of the population fed by toxic substances used in traditional agriculture has been the victim of diseases such as cancer. Since organic agriculture avoids these toxins, it reduces the incidence of diseases associated with them.
Organic products have a high degree of authentication	For any product that may qualify as organic food, its production must pass a quality check that carefully examines the productionprocess. The same rule applies to international markets. This is a big win for consumers because they get real organic products. These quality control and investigation exclude charlatans who want to benefit from the label of organic foods supplying commercially produced products.
Lower price	There is a big misconception that organic products are relatively expensive. In reality, they are cheaper because they do not require the use of expensive pesticides, herbicides and various types of chemical additives. In fact, you can get organic products directly from the source at reasonable prices.
Improved (real) taste	The quality of food is also determined by its taste. Organic food often tastes better than other food. The sugar content of organically grown fruits and vegetables gives them additional flavor. The quality of fruits and vegetables can be measured using Brix analysis.
Organic farming is environmentally friendly and efficient	On farms, chemicals penetrate and heavily pollute the soil and nearby water sources.This applies to those agricultural organizations that lease agricultural land and exploit it heavily. This situation affects the life of plants, animals and people. Organic farming does not use these aggressive chemicals; the environment remains protected.
Longer shelf life	Organic plants have greater metabolic and structural integrity in their cell structure than conventional crops. It allows storingorganic foods for a longer period of time.

Compiled by the author according to research: What is Organic Farming? <https://www.conserve-energy-future.com/organic-farming-benefits.php>

All the agricultural products of the Komi Republic are produced by “Hazard Analysis and Critical Control Points (HACCP)” certification which provides control at all the stages of production and is responsible for the safety and quality of food products. The main objectives and principles of this certification are: safety of all the stages of food supply, from harvest to the sale; regular analysis of risks of biological, microbiological, chemical, toxic or physical nature; constant check of the product at critical control points; trained personnel who have the necessary sanitary permits; compliance of the environment with sanitary and hygienic standards; implementation of verification procedures with regular inspection of all the components of the system; a presence of a list of corrective measures activated when the permissible values in the control critical points are exceeded; strict documentary records of the inspections and deviations found.

The certification used allows entitling the products produced in the region environmentally safe, although they do not have a special certification in the field of organic products.

Identification of demand for environmental products

Whether it is important for the local residents of the Komi Republic to eat quality, i.e. organic, products, whether there is a demand for it, and whether they consider local products organic are large points of concern. To find the answers, a sociological survey was conducted (the period from May, 22 to August 28, 2017) among the residents of the Komi Republic with the participation of the author.

The questionnaire developed by young European scientists and presented in Lisbon in 2014 at the program of Active Youth under the auspices of "Biological agriculture", which was attended by representatives of the chambers of Commerce of Italy, Portugal and Spain, was taken as a basis. The aim of the project was to stimulate the creation of enterprises producing biological products within 180 days. That questionnaire included 13 questions answered by 56 people. Our version of the questionnaire was supplemented with additional 25 questions. To simplify the survey, the questionnaire used the phrase "eco-products", which is equivalent in meaning to the concept of "organic food". The survey of the residents of the Komi Republic results

in 243 questionnaires filled. A comparative list of responses to some common questions in Europe and the Komi Republic is presented in Table 3.

Despite the fact that the surveys were conducted in different countries, the respondents' answers are quite similar and indicate that people want to eat quality products regardless of where and under what climatic conditions they live. The people associate the use of environmental products with their health, wanting to prolong life, but because of high prices, most people cannot afford to buy them.

To the question "What is the name of environmental products that most appealing to you?" 63.9% of the respondents said that they "like" the concept of "natural products" (Figure 4).

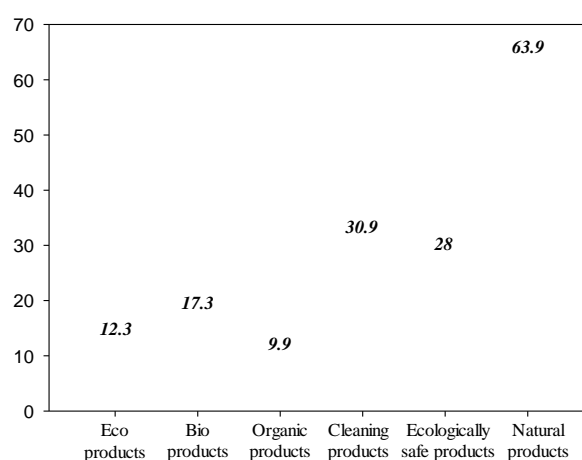


Fig. 4. Variants of the name of ecological products, %. Based on: the poll.

The pattern of answers from respondents to a question: "Are you ready to pay more for ecological products?" was as follows: most of them (41%) believe it should be at the price of traditional products; 25% are willing to pay only 10% more; 28% of respondents – 20% more, only 3% of respondents are willing to buy organic products regardless of its price. Such a differentiation to the pricing of environmental products to residents is due to the level of their respective income. More than half of the respondents found it difficult to answer the question "Can you say that our local agricultural products are eco-products?"

Land quality assessment in the region. One of the main factors in the development of organic agriculture is the quality of land in the region. It determines the possibility of growing organic food and exercising organic (biological) agriculture. In 2017, the area of land for agricultural purposes amounted to 1857.4 thousand hectares in the Komi

Republic (4.5% of the total area of the territory). Agricultural enterprises and households engaged in agricultural production occupy 8170,5 thousand hectares of land, of which the area of agricultural land is 187,6 thousand hectares. 9528.3 thousand hectares of land were registered to be reindeer pastures.

Table 3. Comparative table on general issues on organic food in Europe and the Komi Republic (eco-products), %.

<i>Question</i>	<i>Europe</i>	<i>Komi Republic</i>
Number of respondents, units	56	243
Sex	Man – 39	Man – 48.6
	Woman – 61	Woman – 51.4
Age	18-24 – 26.8	18-29 – 30
	25-30 – 16	30-44 – 43.6
	31-40 – 23.2	45-54 – 20.6
	41-50 – 14.3	55-64 – 4.5
	51-60 – 12.5	65 and more – 1.2
	60 and more – 7.2	
Place of residence	North Africa - 2	Syktvykar – 87.9
	Europa - 89	Vorkuta- 4.1
	South America - 5	Ukhta – 1.6
	Subtropical Africa - 2	Usinsk - 2
	Rest - 2	Usogorsk - 2
		Pechora – 0.8
Level of education	Secondary – 30	Rest – 1.6
	College – 39	Secondary – 2.5
	Incomplete higher – 13	College – 11.1
	Higher - 16	Incomplete higher – 24.7
	Other - 2	Higher – 61.7
		Employee – 7.4
Occupation	Student - 18	Worker – 12.8
	Working student – 11	Farmer – 0.8
	Worker – 53	Businessman – 7.4
	Various – 4	Manager – 7
	Unemployed – 7	Specialist – 41.2
	Pensioner - 7	Pensioner – 5.8
Factors to purchase eco-products	Health - 70	Student – 17.6
	Taste – 40	Health - 75.7
	Curiosity – 38	Taste – 46.1
	Ecology – 17	Curiosity – 8.6
	Fashion – 2	Ecology – 32.5
	Ad - 2	Fashion – 6.6
Share of eco-products in food purchases	0% - 16	Ad – 2.9
	1-25 % - 60.7	0% - 18.5
	26-50 % - 14.3	1-25 % - 52.7
	51-75 % - 5	26-50 % - 20.6
	76-100 % - 4	51-75 % - 7.8
		76-100 % - 0.4
Factors preventing the purchase	There is no confidence that the products are really environmentally friendly and safe – 37	There is no confidence that the products are really environmentally friendly and safe – 13.3
	Too expensive – 85	Too expensive- 44,4
	Small assortment – 8	Small assortment - 25,5
	Quality control of food is doubtful – 9	Quality control of food is doubtful- 8,2
	The production technology of eco-products is the same as that of conventional products- 5	The production technology of eco-products is the same as that of conventional products- 8,2
	Other – 2	
Do you see the difference between eco-products and conventional products?	Yes – 82	Yes – 93.4
Do you believe eco-products have a positive impact on your health as opposed to conventional foods?	No – 18	No – 6.6
Will you advise to buy eco-production to other people (relatives, friends, acquaintances)	Yes – 91	Yes – 95.1
	No – 9	No – 4.9
	Yes – 87	Yes – 94.7
	No – 13	No – 5.3

Note: Compiled by the author based on questionnaire materials.

The authors used the concept of "eco-products (ecological products)", which is equivalent to the concept of "organic food", for the reason of simplifying.

The agrochemical inspection conducted by Federal State Institution "Syktyvkar Agrochemical Service Station" revealed a general decrease in the soil fertility of agricultural lands as of 01.01.2017. The share of arable land with high acidity was 83.4%, farmland – 91.7%. In comparison with 1995 results, the area of sour soils of arable land increased by 11.3%. At the same time, a decrease of mobile phosphorus in the soil was reported. The weighted average of its value in the arable land decreased from 192 mg/kg in 2000 to 181 mg/kg in 2016. The level of exchangeable potassium in the soil has decreased especially sharply – the area of the soil with a low

potassium content increased from 19.6% in 1985 to 41.8% in 2016.

The analysis of qualitative characteristics of soils by agrochemical indicators allows us to draw a following conclusion. The results as of 2016 compared to 1991 indicate that on the surveyed area of arable land and agricultural ground the areas of the "strongly and medium-acidic" soil have increased while the areas of the "weak-acidic and close to neutral" territory decreased. The distributions of areas by the levels of mobile phosphorus and exchange potassium content has not been significantly changing over the last ten years (Table 4).

Table 4. Qualitative characteristics of agricultural land by agrochemical indicators, % of total area .

	Farmland, total						Arable land					
	1991	1996	2000	2015	2016	2016/ 1991	1991	1996	2000	2015	2016	2016/ 1991
<i>Acidity, (pH)</i>												
strongly acidic (4.5 и lower)	53.7	52.9	56.6	56.9	58.1	4.4	29.5	25.8	32.0	36.1	36.0	6.5
medium-acidic (4.6-5.0)	20.5	19.3	19.4	21.9	22.0	1.5	21.5	22.6	22.1	26.0	26.6	5.1
slightly acidic (5.1-5.5)	13.3	13.8	12.5	12.3	11.6	-1.7	21.7	22.4	21.3	20.6	20.8	-0.9
close to neutral (5.6- >6.0)	12.5	14.0	11.5	8.9	8.3	-4.2	27.3	29.2	24.6	17.3	16.6	-10.7
<i>Content of mobile phosphorus, (P₂O₅ mg kg⁻¹ of soil)</i>												
low (<50)	33.3	32.6	32.3	22.5	23.1	-10.2	14.8	13.6	14.0	8.4	8.5	-6.3
medium (51-100)	28.3	29.1	29.2	26.8	26.6	-1.7	22.5	23.6	25.9	18.5	17.6	-4.9
high (101-150)	16.8	19.1	17.8	17.9	18.4	1.6	18.4	20.7	19.4	17.6	17.9	-0.5
very high (>151)	21.6	19.2	20.7	32.8	31.9	10.3	44.3	42.1	40.7	55.5	56.0	11.7
<i>Content of exchange potassium, (K₂O mg kg⁻¹ of soil)</i>												
low (<80)	44.7	48.3	55.9	55.5	56.1	11.4	29.0	33.5	39.9	42.0	41.8	12.8
medium (81-120)	29.7	28.8	26.1	27.7	27.3	-2.4	25.8	25.5	27.8	26.3	25.9	0.1
high (121-170)	13.7	12.8	11.0	10.2	9.8	-3.9	18.8	17.3	14.6	15.8	16.2	-2.6
very high (>170)	11.9	10.1	7.0	6.6	6.8	-5.1	26.4	23.7	17.7	15.9	16.1	-10.3
<i>Humus content, (%)</i>												
very low (<2.0)	DNA	н/д	41.4	30.2	29.8	-11.6	54.6	49.4	46.0	35.2	33.8	-20.8
low (2.1-4.0)	DNA	н/д	50.8	54.6	52.3	1.5	38.8	42.6	46.4	52.9	52.2	13.4
medium (4.1-6.0)	DNA	н/д	7.7	11.0	11.2	3.5	6.6	8.0	7.6	8.1	8.6	2.0
high (>6.0)	DNA	н/д	0.1	4.2	6.7	6.6	-	-	-	3.8	5.4	-

Based on: State budgetary institution "Syktyvkar Agrochemical Service Station".

DNA – data not available.

Note: On humus in 1991 and 1996 only arable land was surveyed.

Application of mineral and organic fertilizers in the Komi Republic in the present time have decreased in comparison to 1990 by 11 and 4 times respectively. In Russia taken as a whole a similar reduction was by 3 and 2 times. By 2016, in the Komi Republic for the first time in many years there have emerged an increased content of humus in the farmland – 6.7%. Compared to the all-Russian level, in 2015 there were 35% of arable land with increased acidity, 31% had low humus content, 22% lacked phosphorus and 9%

lacked potassium. Studies of farmland and arable land by the agrochemical state of the soil with regard to the degree of acidity, the content of exchange potassium, phosphorus and humus for the period 2015-2016 were conducted in municipalities, but their incompleteness and lack of dynamics severely limit the ability to analyze and develop proposals aimed to improve the quality of soils and enhance the environmental efficiency of agricultural lands in the municipalities.

Assessment of the fertility of the soil of agricultural lands of the Komi Republic derives the conclusions that the improvement of the composition and structure of the soil should be carried out by including a large proportion of perennial grasses, legumes, sideral vapors in the technology of agriculture crop rotation and the use of organic compost. These methods have a clear advantage over the increase of the amount of organic and mineral fertilizers and chemical meliorates applied to agricultural land.

The Komi Republic needs to learn from other regions' successful experience of implementing programs for the transition and development of organic agriculture, taking into account local geographical and socio-economic characteristics. Among the favorable conditions for such a transition one may note the presence of local demand for organic products, compliance of agricultural products with HACCP certification requirements, and the success of "Agrocomplex "INTA polar"" LLC, whose products (venison meat) have been certified according to the international quality standard ISO 14000 (Environmental Management Systems – Requirements and Guidance for Use) and now almost fully consumed outside the region and Russia.

The activities that should contribute to the development of organic agriculture in the region include:

- development of a regional program aimed to support the development of agriculture, focused on the production of organic agricultural products, taking into account the specifics of local farming and natural and climatic conditions of the Komi Republic in compliance with the draft law "On the Production and Circulation of Organic Products" dated March, 11, 2016 AT-13-07/2691;

- formation of the legal framework of agricultural production of organic products, which does not contradict the federal legislation of Russia and will take into account issues related to certification, control of production and sale of organic products and the establishment of an information base in this field;

- research by competent and creative teams (scholarship and educational organizations, laboratories) in order to identify a potential of organic land use in the region, taking into account the characteristics of the agricultural sector in the North;

- development of special educational programs for training and professional development of specialists in the field of agriculture, focused on the production of organic products;

- development of a regional market of organic products with the introduction of a special logo (a quality mark trusted by consumers) of organic products of the Komi Republic, similar to the label "Choose ours", which will allow a consumer to choose local organic products among a large number of imported products;

- participation of the local producers of organic products in international and Russian exhibitions and fairs in order to promote their products and enter new markets;

- carrying out information propaganda among the residents of the Komi Republic through regional and municipal TV channels and newspapers, lectures among adolescents on the benefits of organic food (emphasizing the role of the local products) in order to build consumer confidence.

The focus on organic agriculture in Russia, including the Komi Republic, opens the following possibilities: sustainable development of the rural areas and improvement of the quality of life of rural population; modernization of the technological base of breeding and seed production, promotion of innovative development and increase in profitability in agriculture business; growth of competitiveness of domestic agricultural products through promotion of ecological values; creation of new markets and export perspectives of organic food.

Conclusions

Main findings obtained in the course of our study are summarized in this section. The market of organic products is growing worldwide, the demand is increasing on an annual basis. Land allocated to organics is increasing. The successful experience of organic agriculture in the EU and the USA was revealed, where laws were adopted and control and management mechanism created. Nowadays most countries now prefer organic agriculture because it fights pests and weeds in a non-toxic way, implies lower production costs and maintains ecological balance, while promoting biodiversity and protecting the environment.

The transition to organic agriculture for agriculture tradition in Russia is a relevant issue. It is going to ensure sustainable agriculture on the basis of

ecological modernization of industrial and technological facilities, and help increase the production of organic food with minimal use of physical capital, including land and water resources. At the same time, the transition from a traditional chemical-based system to an alternative organic farming system is a complex, expensive, and time-consuming process.

In Russia it is necessary to create a mechanism of public administration and control in the field of organic land use and production, with the sequence of actions and effective tools aimed at the development of organic agriculture determined. Favorable components are present: natural and climatic conditions and land potential, emerging domestic demand for organic products, accumulation of regional experience in the formation of organic agriculture.

The following priority areas of organic agriculture development are identified for the Komi Republic: scientifically-based assessment of a potential of organic land use; formation of the regulatory framework of organic production; development of the regional market of organic products.

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References

Analysis of the application and use of the sign of conformity of international and Russian systems of voluntary certification (marketing research). FBU "The State Regional Center for Standardization, Metrology and Testing in the Republic of Tatarstan. - Tatarstan. -85 p.

Agriculture desenvolvimento rural. Facts and figures on organic agriculture in the European Union. DG Agriculture and Rural Development, Unit Economic Analysis of the EU Agriculture European Commission. October 2013. - 46 p.

Basic Methods of Organic Farming. URL: <http://food.ndtv.com/health/organic-farming-1660644> (circulation date 15.01.2018).

China leads the way: Intercropping for ecological and economic efficiency in agriculture. - URL: <http://blogs.plos.org/ecology/2015/10/17/china-leads-the-way-intercropping-for-ecological-and-economic-efficiency-in-agriculture/> (circulation date 07.03.2018).

European Union Council Regulation No. 834/2007 of 28 June 2007 on organic production and marketing of organic products and repealing 2092/91 // Official Journal of the European Union. - 2007. - L. 189. - 23 p.

European Union Council Regulation No.889 / 2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) no. 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control. Official Journal of the European Union. - 2008. - L. 250. - 84 p.

Garaev I.A. Perspectives of organic agriculture in Russia. Genetic editing in the service of a person. Analytical Department of the Staff of the Council of Federation. It was prepared following the results of the Scientific and Methodological Seminar of the Analytical Department of the Staff of the Council of Federation of the Federal Assembly of the Russian Federation, November 10, 2016, Moscow. // Analytical bulletin .- 2016. - № 49 (648). - P.49-57.

History of the impact on the nature of technogenic factors. URL: <http://ecology-of.ru/> (circulation date 10.07.2017).

International association of suppliers of natural eco products "Ecocluster" .Official site .- URL: <http://www.ecocluster.ru/monitoring/?ID=13728> (circulation date 28.12. 2017).

Koteev SV, Yurkenayte A.Yu., Egorov N. Formation of the institutional and legal foundations of the organic products market as a key factor in its viability and development (on the example of Russia and the Litva) // Agrofood policy of Russia. -2015.- No. 2 (14). - P. 35-38.

Mazurova A.Yu. Geography of the world market of bioorganic food products: Dis kand. Cand. geogr. sciences. - M., 2009. - 195 p.

Morger E., Bullon Karo K., Marin Dyura G. Organic agriculture and law. The Food and Agriculture Organization of the United Nations. - Rome. 2012, 237 p.

National Organic Union. Development of the market of organic products. URL: <http://rosorganic.ru/> (circulation date 11.03.2018).

Organic Farming. TNAU Agritech Portal.- URL: http://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html (circulation date 17.02. 2018).

Organic Europe. European section of the Organic World website. - URL: <http://www.organic-europe.net/country-info/germany/countryreport.html>(references26.08.2017).

Organic farming as a promising form of rational land use and production of quality products in Russia. - URL: <http://kazangost.ru/zakupka/organicheskoe-zemledelie-kak-perspektivnaya-forma-racionalnogo-zemlepolzovaniya-a-proizvodstva-kachestvennoj-produkcii-v-rossii/> (circulation date 30.06.2017).

Organic and biologized farming in Russia will be counted. - URL: <https://sozrf.ru> (circulation date 24.01.2018).

On the implementation of the Sanitary Rules (together with "SanPiN 2.3.2.1078-01. 2.3.2 Food raw materials and food) .Hygienic requirements for the safety and nutritional value of food.

Principles of organic agriculture. - URL: https://www.ifoam.bio/sites/default/files/poa_russian_web.pdf (circulation date 10.12.2017).

SustainableDevelopment - URL: <http://www.fao.org/sustainable-development-goals/goals/goal-2/en/> (circulation date 27.10.2017).

Transformation of our world: An Agenda for Sustainable Development for the period until 2030. Resolution adopted by the General Assembly on September 25, 2015.

Veko AA, Ravino A.V. Principles of organization of organic agriculture // Problems of anthropogenic impact // Culture and ecology - the basis of sustainable development of Russia. From "green" university to green economy: a collection of materials of the International Forum, Yekaterinburg, April 13-15, 2016. Part 1 / Ural Federal University named after the first President of Russia BN. Yeltsin, Department of Culturology and Design. - Ekaterinburg: Ural Federal University named after the first President of Russia BN. Yeltsin.-2016. - P. 154-158.

What is organic agriculture? FAO Inter-Departmental Working Group on Organic Agriculture. - URL: <http://www.fao.org/organicag/oa-faq/oa-faq1/en/> (notices on 17.06.2016).

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