Innovative technologies and challenges production of organic ecological products in the regions of Russia

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Abstract. The increase in agricultural production and food production in excess of regulatory needs, ensuring food security in Russia led to the expansion of agricultural exports and the change in the course of development of the agro-industrial complex from import substitution to export-oriented production. However, access to the world food markets requires producers of high quality products, its certification in accordance with international standards. The article shows the resource potential, the possibilities of Russian producers in the production of environmentally friendly products, the development of organic agriculture, the use of bio-intensive technologies, as well as the problems of ecological agriculture, the mechanisms of their solution on the example of the Altai territory.

1. Introduction

The food market in modern conditions shows a clear priority in the direction of the development of the organic products sector. The development of the organic market is due to many reasons. This is the uncertainty of possible consequences and distrust of genetically modified products; perceived danger to human health of products of mass production; negative attitudes to traditional products due to recent epidemics (mad cow disease, bird flu, foot and mouth disease, etc.); a comprehensive information company aimed at promoting organic products, preferences of the population for a healthy lifestyle, including nutrition with organic products and others.

Organic production has been practiced in more than 160 countries of the world and on more than 37 million hectares of agricultural land. In Russia, 150 thousand hectares of agricultural land is certified for organic production [1, 2]. The resources of the regions of agro-industrial specialization allow to expand the production of organic products. At the same time, unresolved problems exist, it is necessary to develop mechanisms for their solution.

2. Methods

The works of Russian and foreign scientists of agrarian economists constitute the theoretical basis of the research carried out on the issues of agro-industrial production; development of land relations in agriculture; scientific reports and recommendations of the Russian Academy of Sciences, laws, decrees of the President, orders of the Government of the Russian Federation, regulatory documents of constituent entities of the Russian Federation, EU regulatory framework for the development of

organic agricultural production, IFOAM standards. The system approach has formed a methodological basis and allowed to ensure the comprehensiveness, consistency, and purposeful-ness of the research. Analytical, abstract-logical, design-calculated, economic-statistical, economic-mathematical, monographic, and other research methods were used in the process of work.

3. Analysis results

Studying the experience of agricultural production shows that the development of agriculture in the countries of the world community is more focused on organic production of environmentally friendly, safe for human health products, which provides improved quality and life expectancy of the population [1, 2, 3, 4, 5, 6, 7, 8, 12]. Scientists and practitioners are working on organic agriculture. Discussions continue, starting with terminology used in the research and practice of organic agriculture, as well as the resource potential and technologies of ecological farming [7, 9, 10, 11, 12, 21].

In 1924, Rudolf Steiner introduced the concept of biodynamic farming, which later became the forerunner of organic farming. For the first time, the term "organic farming" was sounded in 1940 by Lord Northbourn (Lord Northbourn, Walter Ernest Christopher James). A great contribution to the development and popularization of the concept of organic agriculture was made by Albert Howard, Yves Balfour, Jerome Irving Rodeil. In 1939, Yves Balfour proposed the Hagli experiment, in the course of which more than 40 years in different fields within the framework of one farm, "ordinary" (traditional) and organic farming were carried out for the purpose of comparative analysis [5, 21].

The solution of the problems of environmental safety of production and, at the same time, its large-scale increase has not only economic, but, above all, social and demographic significance for providing the population with ecologically clean products of agriculture and food. Scientists in the countries of the world trace a fairly clear correlation between the deterioration of the quality of nutrition and the growth of various kinds of diseases, especially among children. Only 18–20% of newborns in Russia are practically considered healthy, and genetic disorders are observed in 30% or more of them [7].

In general, organic agriculture includes social responsibility, provides environmental safety, and economic efficiency (Figure 1). Conducting agricultural production in accordance with the laws of nature is the main idea of the biological-dynamic method of management.

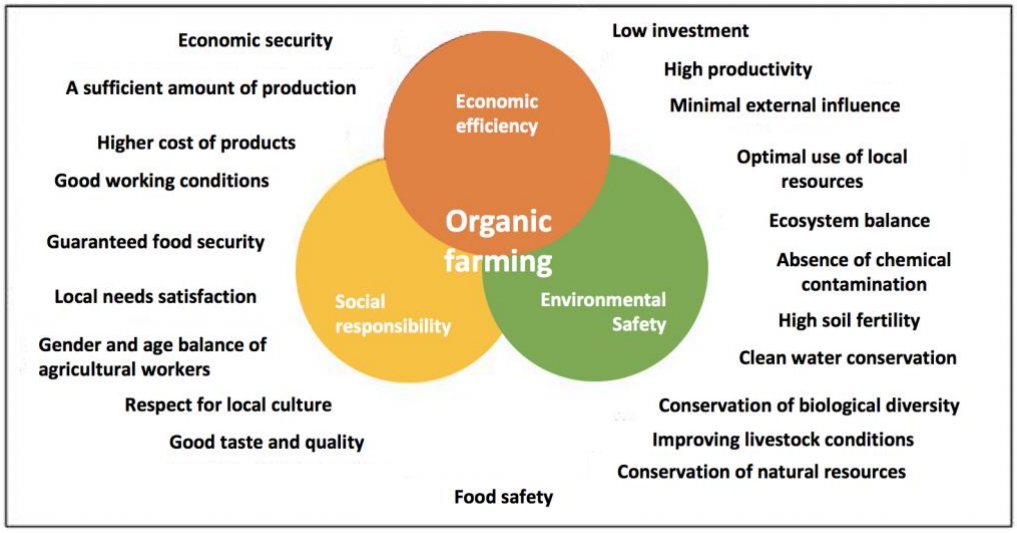

Figure 1. Components and efficiency of ecological agriculture.

Due to the understanding of the environmental conditions prevailing in the modern world, over the past two decades, interest in the ecological issues of farming has increased, contributing to the natural

restoration of soil fertility and the maintenance of an equilibrium natural ecosystem. The number of farms in the USA, China, India, Japan, and EU countries is increasing, leading agricultural production based on environmental principles. This technology of agricultural production is a serious alternative to the established traditional (industrial) agriculture [5].

Today, the degree of efficiency of agricultural production largely depends on the level of its balance, as well as the organizational and economic methods of farming. The public consciousness has reached a certain level of its development, when not only the growth of production, but also the degree of preservation of natural resources serves as a measure of agricultural production, which is determined by constantly increasing man-made pressures on environmental objects (soil cover, bioorganisms, atmosphere and water resources), as a result of which imbalances of fragile natural equilibrium occur.

The groundless increase in the rates of introduced synthetic mineral fertilizers, the excessive use of chemical means of protecting agricultural plants, the inconsistency of a scientifically based system of alternating crop rotations, the use of intensive technologies in the agricultural sector, led to serious environmental consequences (a sharp decrease in soil fertility, a decrease in the humus horizon, a decrease in the population of animals and birds areas of intensive agricultural production, a penetration of chemicals into the air atmosphere and water resources).

The resulting dilemma of the further development of agricultural production and the preservation of the natural environment as the basis of the vital activity of future generations has determined the search for alternatives for the development of the agricultural sector. Thus, for about three decades, leading foreign agricultural scientists and practitioners are gradually introducing organic methods of agricultural production, in the direction of solving territorial environmental issues and improving food quality, turning this trend into a strategically important and significant sector of the economy.

The dynamic development of organic agricultural production takes place in the USA, Canada, European Union countries, Australia, China, Japan. According to the report of the International Federation of the Organic Agriculture Movement (IFOAM), agricultural producers in more than 130 countries of the world are introducing methods of organic production of agricultural products, in parallel with the industrial system of agricultural production. Asian countries occupy the third position in the ranking of countries engaged in organic agricultural production in terms of the area of land allocated for organically oriented methods of management. The European Union today is the main consumer of eco-products, where the main sales volume falls on Germany. The physiological value and ecological safety of organic products is the most important criterion for consumers who agree to pay a higher price for it.

The resulting confrontation between the agrarian sector and nature has determined the need to move agricultural production to a qualitatively new level, implying the adaptation of technology to organically oriented methods of management, the natural and environmental conditions of a specific territory and environmental requirements for food produced.

As mentioned earlier, the term “organic agriculture” was introduced in the writings of Lord Northbourne, namely “A Look at the Ground” [25]. “Biological agriculture,” “ecological agriculture,” “biodynamic agriculture,” “sustainable agriculture” are the closest synonyms for this definition. However, a detailed review and analysis of differences and points of contact between the above terms was not included in the scope of the presented study.

The process of analyzing information sources on the development of organic agriculture in different countries has shown that today there are many definitions of this activity.

According to the definition presented in the Codex Alimentarius, “Organic farming principles are a comprehensive management system for agro-industrial production, which means not using chemical fertilizers, plant protection products, and genetically modified organisms (GMOs), reducing atmospheric, soil, and water pollution, as well as healing and increase the productivity of interdependent communities of people, as well as flora and fauna” [12].

Further creation and development of social production determines the necessity of taking into account environmental factors and principles. It is necessary to search for new directions in the field of

environmental management, formed on the maintenance of basic conditions important for the life of society and social production, such as clean air, preservation of water and soil resources, reduction of the likelihood of depletion of natural resources. Objectively, it is necessary to develop the concept of ecological-economic balance. So, the problems that were presented in the early 1990s at the UN conference, formulated in the Concept of the Sustainable Development of the World Community. At the heart of the IFOAM and Codex Alimentarius provisions is the definition given to organic agriculture as a unified production management system that improves the condition of ecosystems, including maintaining biological cycles and the biological activity of soil cover. The basis of organic agriculture is minimization of the level of use of synthetic and chemical fertilizers and plant protection products. However, in these documents it is noted that the technology of organic production does not guarantee the complete absence of chemical residues in the agricultural production, which is caused by the general background pollution of the environment. Thus, the most important goal of the organic system of agricultural production is the improvement of the qualitative and productive characteristics of dependent on each other soil, plants, animals and people.

The principles of organic agriculture are defined at the world level:

- Organic agricultural production is designed to preserve and improve the health of the soil, plants, animals, humans, and the planet as a whole;
- Organic farming should be based on living ecological systems and cycles, involving working with them, imitating them and helping them to survive;
- Organic farming should be based on relationships that ensure equity, take into account the general conditions and life possibilities of bioecosystems;
- Organic farming should be conducted from the standpoint of ensuring the prevention of diseases, protecting the health and well-being of present and future generations of the world's population and the environment [1].

European agricultural scientist Frank Eichorn understands organic farming “as a system of agricultural production based on natural resources, which include crop rotations, composts, methods of biological plant protection, new technologies for sparing mechanical soil treatment with the complete elimination of synthetic fertilizers, and plant protection chemicals (synthesized feed additives) for lambing and genetically modified components” [9].

Agricultural producers need to certify organic products with access to domestic and world markets. However, many agricultural enterprises, particularly in developing countries, maintain natural organic agriculture due to the lack of funds for the purchase of mineral chemical fertilizers and pest control systems, as well as the lack of access to modern organic technologies. And they do not have, respectively, certification of manufactured products.

In American agricultural legislation, organic agriculture is defined as a production system in which the use of mineral chemical fertilizers, plant pest protection and synthetic, chemical feed additives are minimized or eliminated. Organic farming is based on the use of an effective crop rotation system, plant residues, organic fertilizers, nitrogen-rich legumes, crop and green fertilizers, gentle mechanical soil treatment, and biological methods of protection from agricultural pests and weeds. Organic farming systems also prohibit the use of seeds, reproduced animals, other products obtained using genetic engineering, radiation exposure, as well as the use of fertilizer as wastewater [29].

According to the majority of scientists not only in Russia but also in other countries, there is no consistent concept of environmentally friendly or organic product in scientific works and practice, respectively, and organic and ecological agriculture. One of the generalized definitions characterizing organic products in agriculture is products produced by organic eco-biotechnologies without the use of chemical pesticides against plants, synthetic and chemical fertilizers, the content of humus in the soil is increased by applying organic fertilizers, hormone preparations, and antibiotics [9, 25, 26, 28].

So, Z. V. Nikitina as ecological agricultural production understands the following:all technological cycles of production and processing of products should be aimed at creating conditions that ensure

safety and high quality of agricultural products. The mechanism for managing the quality of ecoproducts is an environmental management system based on a system of standards containing requirements for the production, processing, storage, transportation and sale of organic products, which is an important component of the environmental management system [25].

Based on the presented interpretations, we believe that the essence of organic agriculture can be defined as a concept covering all farming systems based on natural resources and resources, taking into account the natural needs of flora and fauna, the natural environment, the production of organic products is its main goal, confirmed by international and Russian environmental certificates [11].

It should be noted that in all the considered terms the main goal of organic agriculture is traced, which is the production of safe and high-quality agricultural products by minimizing soil processing, reducing the use of organic and mineral fertilizers and using the system of rotation of crop rotation.

The IFOAM defines the following principles as the basic principles of organic farming: the principle of health (the health of the soil, plant and animal life, people and the planet as a whole), the principle of ecology (maintaining ecological balance); the principle of justice (careful attitude of people to other natural living beings); the principle of care for future generations and the environment. The presented principles determine the scope of the tasks of organic agriculture at various natural and economic levels [28].

The definition of **ecological agriculture**, in our opinion, is broader, non-organic, and includes, in addition to the generally accepted positions of organic production, **the preservation of soil fertility, the environment, and the environmental safety of its own production.**

Social, environmental, and economic efficiency also accompanies ecological agriculture.

The global growth of ecological agriculture is continues. Thus, according to the data of the study "The World of Organic Agriculture 2017", the total turnover of organic products in the world is about 75 billion euros, the total area of land cultivated using ecological farming technologies in 2015 was 50.9 million hectares (compared with 2007, it increased by 20.5 million hectares). The largest number of eco-farms is in India, Ethiopia, and Mexico. The world's largest market for environmentally friendly products is found in the United States (turnover of 35.9 billion euros). On the second and third lines of the 2015 rating are Germany (8.6 billion euros) and France (5.5 billion euros). Experts predict the Asia-Pacific region to become the growth leader in organic agriculture by 2020 [7, 8].

Naturally, climatic conditions and the resource potential of rural areas of individual regions of Russia allow developing ecological agriculture oriented to domestic and foreign markets. The study of the results of the human impact of human activities on the environment involves a comprehensive study of the state of the air and water basins of rivers, soil, safety and quality of products. According to a study by scientists at the University of Gorno-Altai [4, 30], the ecological state of the Altai water basin is mostly favorable (Figure 2).

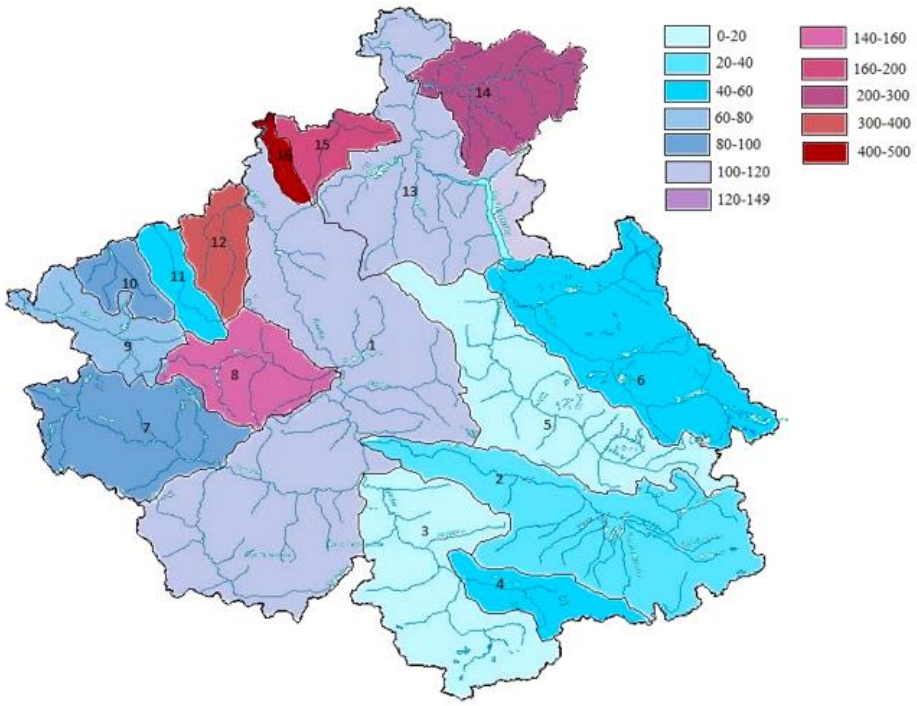

Figure 2. Amount (tones) of pollutants (together with suspended substances) coming from the catchment area per year. The numbers denote the river basins: 1 – Katun; 2 – Chuya; 3 – Argut; 4 – Dzhazator; 5 – Bashkaus; 6 – Chulyshman; 7 – Koksa; 8 – Ursul; 9 – Charysh; 10 – Anuy; 11 – Peschanaya; 12 – Sema; 13 – Biya; 14 – Lebed; 15 – Isha; 16 – Mayma.

The Altai Territory occupies the 3rd place in the Environmental Rating of the Subjects of the Russian Federation, retaining it in 2018 (Table 1).

Table 1. Ecological rating of the subjects of the Russian Federation for the estimated period of 06/01/2017 - 08/31/2017 [18].

№	Rating dynamics	The subject of the Russian Federation	Nature Security Index	Industrial Ecological Index	Socio-Ecological Index	Consolidated Environmental Index
1	-	**Tambov region**	68/32	54/46	75/25	**67/33**
2	-	**Altai Republic**	67/33	37/63	70/30	**60/40**
3	-	**Altai region**	54/46	45/55	70/30	**58/42**
4	+4	**St. Petersburg**	33/67	51/49	73/27	**56/44**
5	-1	**Chuvash Republic**	48/52	36/64	74/26	**56/44**
6	-1	**Ulyanovsk region**	52/48	46/54	63/37	**55/45**
7	-	**Moscow**	27/73	53/47	73/27	**55/45**
8	-2	**Belgorod region**	42/58	49/51	69/31	**55/45**
9	+4	**Murmansk region**	51/49	45/55	65/35	**55/45**
10	-	**Kursk region**	58/42	37/63	64/36	**54/46**
11	+9	**Komi Republic**	56/44	37/63	65/35	**54/46**
12	+4	**Magadan region**	70/30	31/69	59/41	**53/47**

The soil cover retains its natural fertility due to the minimal application of mineral fertilizers during the reform period of the 1990s, because a lack of funds for intensive agricultural production identified real opportunities for the development of organic agriculture and the production of environmentally safe food in the Altai region. The insufficient level of chemicalization affected the de-crease in soil fertility; however, to some extent, it was a deterrent to further soil degradation and ecological imbalance of agricultural land. So, on the territory of the Altai region significant areas of the deposit are present, suitable for organic farming [2].

At the same time, the dynamics of mineral and organic fertilizers and their influence, the yield of grain crops are shown in Figures 1, 2. At the same time, the yield fluctuations are insignificant with a significant decrease in the level of mineral fertilizers.

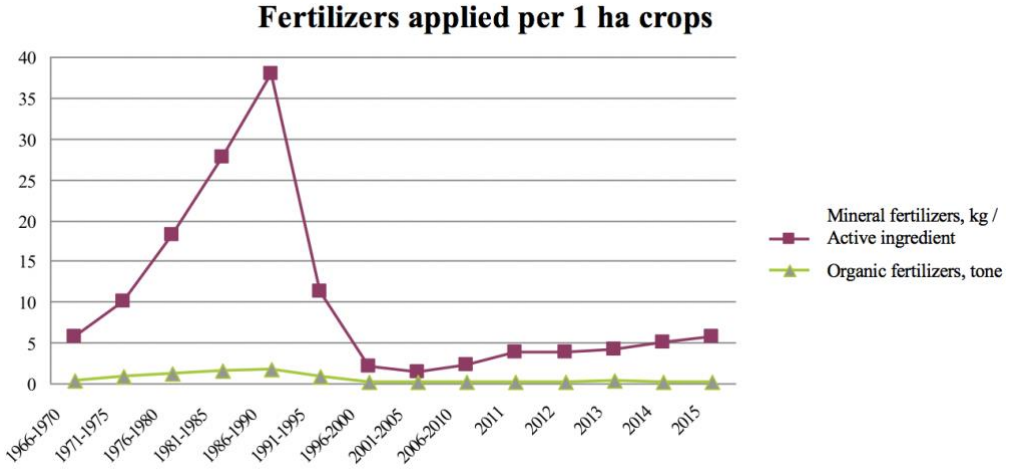

Figure 3. Fertilization on 1 ha of crops in the Altai region [according to data 2, 6].

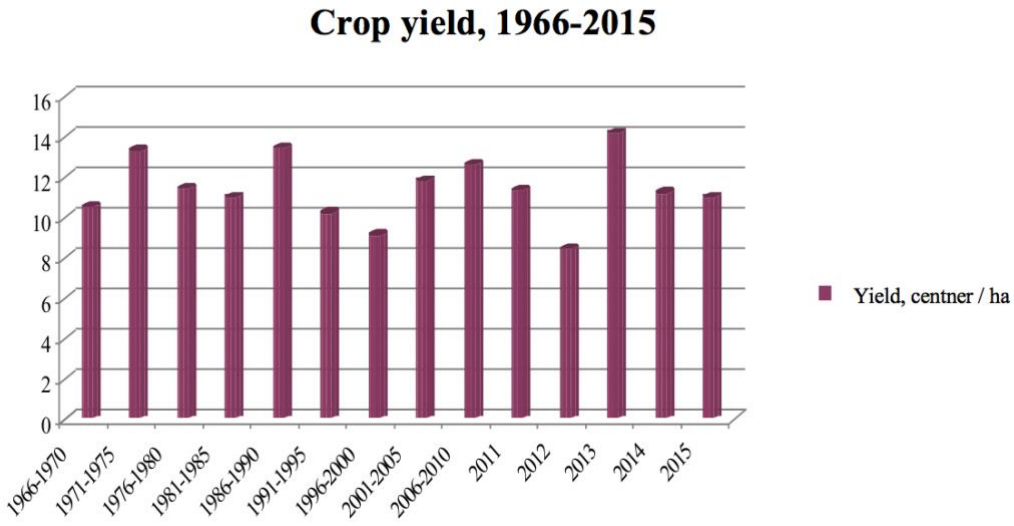

Figure 4. The yield of grain crops in the Altai region [2, 6].

The development of an economic-statistical model reflecting the dependence of the yield of grain crops on the level of application of mineral and organic fertilizers and the solution of the economic – mathematical problem did not reveal a close relationship between the yield of grain crops and the amount of mineral and organic fertilizers applied in agriculture of the Altai region (according to

Perova T. N.). The following relationship between factors was revealed in the course of correlation and regression analysis:

- Between the grain yield and the application of mineral fertilizers per 1 ha of crops, the link is direct weak, since the correlation coefficient r = 0.23, with an increase in the dose of mineral fertilizers per 1 ha of sowing, the yield of grain crops will increase;
- Between the grain yield and the application of organic fertilizers per 1 ha of crops, the link is directly weak, since the correlation coefficient r = 0.18, with an increase in the dose of organic fertilizers applied per 1 ha of sowing, the grain yield will increase.

Regression statistics showed that not all factors were taken into account when building the model, since the multiple correlation coefficient (multiple R) is equal to 0.265. This combination of factors affects the result by 26.5%, since the coefficient of determination (R square) is equal to 0.265. Since R squared is less than 0.95, we can talk about low accuracy of approximation [2, p. 62-63].

Nevertheless, these results confirm the economic feasibility of the development of agriculture, focused on the production of organic products, the rejection of the use of mineral fertilizers due to their low efficiency and potential of organic and biotechnologies in the agro-industrial complex.

The results of the experiments of the University of Kornuel for more than 20 years, published in 2005, showed that organic methods of growing crops and soybeans cause yields not lower than those grown by conventional methods using mineral fertilizers and chemical plant protection products against pests. However, they require less energy for fertilizer production and do not lead to the accumulation of herbicides in the soil [22]. Similar Swiss experience showed, however, a 20% reduction in yields in organic agriculture compared to traditional methods, with a 50% reduction in energy costs for fertilizers and 97% for pesticides [15]. According to comparisons of American scientists, with organic farming, crop yields average 95-100% of the yield of similar crops, traditionally cultivated with the use of chemical mineral fertilizers and means of protection against pests [5].

This factor has a significant impact on the attractiveness of agricultural products in terms of environmental cleanliness and attracts foreign partners to create joint projects in the region for the production of organic agricultural products. The implementation of such projects increases the financial component of agricultural enterprises, where real conditions are created to improve life and cultural leisure, helps to retain people in the countryside, and develop the livestock industry.

As a result of the introduction of fallow lands, the expansion of arable land leads to the need to increase the number of animals, and this in turn increases the employment of the population while providing people with year-round work, creating additional jobs, solving the problems of rural employment.

In organic farming, the replenishment of soil fertility and the return to the soil of the batteries delivered with the harvest is achieved mainly through the use of organic fertilizers and the use of innovative biotechnologies. Particular attention is paid to the creation of conditions for the functioning of soil biota, especially microorganisms that destroy organic compounds and release plant nutrients. Bone and blood meal, minerals (phosphates, carbonates) are recommended to be used as fertilizers.

Biological methods have been developed and applied to control weeds and pests: this is the introduction of natural enemies, as well as specific pathogens. Rotations are developed taking into account the pest development cycle. Tillage designed for the destruction of weeds, or deep seeding their seeds. Refusal from year-round stalling, compulsory grazing, or free-range poultry, not using synthetic feed additives and animal growth hormones show a sign of organic farming in animal husbandry.

Introduction to the crop rotational area of fallow lands creates prerequisites for increasing the acreage under forage crops and developing more efficient crop rotations with alternating grains and forage crops, which ultimately leads to increased yields and improved soil fertility based on increased activity of soil biota [19]. Improvement of water and air regimes in fruit replaceable crop rotations leads to accelerated decomposition of organic residues and increased biota activity.

According to the results of research conducted by M.L. Tsvetkova and O. Manylova, deep loosening of steam contributed to an increase in the activity of microorganisms by 32-50%, and a reduction in the number of cultivations and the introduction of herbicides into pairs contributed to a decrease in the number of microorganisms by 30%. Mechanical treatments create a more favorable background for the humification of organic matter, which ensures the growth of fertility and partial mineralization to create conditions for balanced nutrition of plants, thereby replacing the need for high doses of mineral fertilizers. Together, these activities are, along with the organization of fruit-replacing crop rotations, the fundamental basis that provides a guarantee of obtaining safe, in terms of ecology, agricultural products. Subject to an increase in livestock numbers on farms in the district, the possibility of introducing organic fertilizer (manure) onto arable land appears [31]. The system of agrotechnical measures for the development and entry into the crop rotational area of fallow lands includes the assessment and development of technology ensuring the subsequent receipt of environmentally friendly products on them.

However, big problems exist when introducing methods of ecological production. The financial costs necessary for the introduction of these technologies are estimated at $ 200–1000 per 1 ha for cereals and at $ 5000–8000 per 1 ha for fruit production. The lack of certified land (in Russia only amounts to 0.003% of the total area of agricultural land) and the increase in time costs and costs for the production of environmentally friendly products hinders the development of the industry, which is several times higher than the time costs for the production of conventional products. At the same time, not all organic certified lands are cultivated, because the conversion process (transition from traditional agricultural production to organic) takes at least three years. This leads to the fact that a number of farmers do not start using the land until the end of the conversion period [32].

Over the past 7 years, according to the Union of Organic Farming [36], there are 8–9 times more organic producers. The number of OPP producers in Russia – mostly small and medium in size (from 50 to 1,500 hectares) [35] – is, according to various estimates [35, 32], from 70 to 90 enterprises, while, for example, in India 585 000 agricultural producers of organic matter, in Germany – more than 25 000, and in the USA – almost 15 000 enterprises [33]; major producers produce the major share of OPP – owners from 1,500 to 3,000 hectares of land, as well as holdings, consisting of three to ten agribusinesses [32, 33].

Most Russian producers of organic products are located in the European part of the Russian Federation and are concentrated in the Yaroslavl, Saratov, Rostov, and Moscow regions, as well as in the Krasnodar region, the southern regions of the Urals, Siberia, and the Far East (Figure 5).

Experts of the Ministry of Agriculture of the Russian Federation emphasize that in 15-20 years, Russia can take up to 10% of the world market for organic products and food, and organic agriculture itself can become a new area of global influence. For this, Russia has everything: a huge natural potential, huge reserves of fresh water and fertile land, etc. For example, already today the countries of the Asia-Pacific region consider Russia as a territory for the production of organic products. This is especially true for the Far East of the country, which is a “young” zone of agriculture, because “150 years is not a time limit for the earth” [36].

Figure 5. Distribution of producers of organic products on Russian territory [35].

The ISO 14024 standard “Environmental Labels and Declarations – Guiding Principles”, as well as the Russian equivalent the GOST R ISO 14024 “Environmental Labels and Declarations Type I. Environmental Labeling. Principles and Procedures,” are the document that regulates the approaches to voluntary environmental certification, taking into account certain requirements at all stages of organic production [8, 17].

Standards define the requirements for indicators:

- The level of concentration of environmental pollutants in the certification objects – organic products;
- The level of environmental pollution in the production areas;
- The level of environmental safety for humans and agricultural animals;
- Recycling of organic components (closed production cycle);
- Rational use of land resources in the production of organic products;
- Use of renewable sources and resources;
- Level of discharges (emissions);
- Environmental performance of transportation (logistics) of organic products;
- Environmental indicators of waste disposal;
- Use of innovative alternative agricultural technologies in the production of organic products.

To increase the efficiency of agricultural development processes oriented towards the production of organic products, the use of international certification of agricultural organizations planning to switch to organic production methods is justified. The basis of standards in the development of domestic standards of organic agricultural production was the system of standards proposed by the International Federation of the Organic Agriculture Movement (IFOAM), which spelled out requirements for organic agricultural production. [1, 8, 13, 20].

Control by the state structures over food quality is necessary. According to the norms of the law “On the Quality and Safety of Food Products”, the use of food raw materials made with the use of chemical additives, growth stimulants, veterinary drugs, pesticides, and other components hazardous to health during the manufacture of baby and dietary foods. In practice, these requirements are not always met, as there are no clear control mechanisms.

According to expert estimates, after the adoption of the law “On Organic Agriculture", as well as the introduction of sustainable farming technologies, an increase in the domestic product turnover of organic products of more than 15% is possible [10, 11].

In July 2018, the State Duma adopted the Federal Law (FZ) No. 372830-7 “On Organic Products and on Amendments to Certain Legislative Acts of the Russian Federation”, which introduced the official definition of the terms “organic products,” “producers of organic products,” “organic farming” and provided the product quality control and the maximum of information for consumers about organic products.

The law regulates the norms of production, transportation, labeling, and sales. Organic products, in accordance with the law, will need to be produced, stored and transported separately from inorganic products. Pesticides, hormones, agrochemicals, antibiotics, and growth stimulants (other than approved substances) are prohibited to use manufacturers. It is forbidden to use packaging made of materials that may cause pollution of organic products and the environment. Accredited bodies will carry out certification, a certificate of compliance with the requirements will be issued to manufacturers. After that, they will have the right to place on the packaging the appropriate labeling of organic products. For unjustified use of the labeling of organic products, the manufacturer will be fined not less than 100 thousand rubles. It also provides for the creation of a single public register of producers of organic products, the Ministry of Agriculture of the Russian Federation will lead it. This should oust unscrupulous market participants and have a positive impact on product quality” [37].

It is envisaged that the law will come into force on January 1, 2020.

Viktor Karamyshev, a member of the Control and Regulations Committee, comments on the adopted law, "We have been waiting for this bill for many years. The first attempts to regulate legislation in this area were made almost 15 years ago. In more than 80 countries of the world, laws on organic products are in force, but we are not yet among those countries. Unfortunately, today the market for organic products is developing spontaneously in our country. People began to pay more attention to their health, trying to buy "clean" products. As of today, Russia holds less than 1% of the global organic market, but the government plans to increase this share in the next few years to 10-15%. Theoretically, there are all possibilities for this, since we have a lot of free clean land and water. And this is our great advantage" [37].

The study and assessment of the resource potential of the agro-industrial complex of the Altai region allow to justify the strategic priorities of the development of industries and production directions in the agriculture of the region. Thus, the post-perestroika reforms, insufficient funding for the further intensification of the agro-industrial sector have determined the real potential for the development of organic agricultural production in the Altai region [20, 23].

In a competitive environment, providing opportunities for civilized and dynamic market development, creating a high level of competitiveness of the economy are the key elements among the national and regional priorities of any country and, therefore, the most important functions of government regulation.

4. Results

In connection with the increasing negative human impact of human activity on the environment, one could mention the high rates of population growth, the lag of reproduction and restoration of natural resources, the intensification of the production of material goods, especially agriculture. Global warming will accelerate the processes of desertification, complicating the living conditions of the population and farming. In this regard, the movement is becoming increasingly active for environmental safety and the preservation of the environment, soil resources, water, renewable energy sources, the Slow Food movement is expanding for healthy nutrition, preserving the traditions of national and regional cuisine [1, 2]. In Russia, the year of 2017 has been declared by the President the Year of Ecology, which indicates the country's integration into the world trend.

Ecological safety of vital activity of the population assumes an integrated approach to solving problems of environmental conservation and ecosystem management of production processes and environmental management [18].

Ecosystem management is one of the six cross-cutting thematic priorities of the United Nations Environment Program (UNEP). Climate change, disasters and conflicts, ecosystem management, environmental governance, harmful substances and hazardous waste, resource efficiency - sustainable consumption and production are the six cross-cutting thematic priorities [4, 5].

By definition, UNEP defines ecosystem management as an approach to managing natural re-sources, focusing on the sustainability of ecosystems to meet environmental and humanitarian needs in the future. Scientists see it as an approach to managing natural resources, with the new integrated. The following features are characteristic of ecosystem management: focusing activities on the long-term sustainability of resources; maintaining and improving the biodiversity of the environment; thinking on a wide spatial and temporal scale; integration of economics, sociology, and ecological systems in the planning process; adjustment of management plans in connection with monitoring and new information; recognition of the complexity and interaction of "ecosystems"; recognition that people are part of the ecosystem [5].

At the heart of the "ecosystem approach" is the notion of "ecosystem". It was introduced into the scientific circulation of A. Tensley in 1935 (Great Britain) to denote a relatively stable system, including the community of living organisms and their living environment. The United Nations Conference on Environment and Development in Rio de Janeiro in 1992 consolidated the international

legal definition of "ecosystem", defined the obligations of the parties to preserve (restore) ecosystems [5].

5. Conclusions

Russia's long-term goals (that include export-oriented agriculture and food industry due to the fact that the country has a unique export potential) are backed with enormous natural resources for the production of environmentally friendly products. This is 20% of the world's freshwater reserves, 9% of the arable land of the planet (115 million hectares), 58% of the world black earth reserves [7], 38.8 million hectares of fallow agricultural land (including vapors) that did not receive a long time of chemicalization.

Approximately 67% of the all arable land is concentrated in agricultural organizations, about 15% is made up of peasant (individual) farms and individual entrepreneurs, and 17% of arable land is used by households. In the world, the main volume of organic crop production falls on farm and personal subsidiary farms. In the Altai Territory, they account for a third of all arable land, and for the production of potatoes and vegetable and melon crops [8, 40]. In this regard, it is necessary to pay attention to the importance of environmental and social responsibility of business.

The environmental functions and management of the resource potential of organic agriculture in the regions are carried out by administrative departments, regional ministries have been established. The Ministry of Natural Resources and Ecology of the Altai Territory is the executive authority of the Altai Territory that implements the state policy in the field of environmental protection and nature management, water, forest relations, protection, and use of wildlife, aquatic biological resources, as well as hunting and conservation of hunting resources. The Ministry carries out general management and control over the use of natural resources within the framework of its powers, and this requires the resolution of many particular issues related to the production and sale of environmental products. Russia's ability to withstand compliance with international standards and to be competitive in world markets where organic farming is in demand is quite high: huge reserves of land in Russia, the introduction of ecological farming systems must be carried out over vast areas, coordinating with many small owners. Information support of farmers on new, more efficient technical means, biotechnologies in organic agriculture, and certification of organic products for environmental cleanliness, safety of products, use of intensive biotechnologies, financial support for organic agriculture, processing, and sale of eco-products remain problematic.

In this regard, and on the basis of ecological and economic feasibility, we have proposed bringing the ecosystem management to the level of small villages and farms through the formation of microclusters, rural ecoclusters on the principles of co-operation and business-administrative partnership.

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