Prospects for organic agriculture development in the context of modern challenges and opportunities

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Abstract. Against the background of rapid technological progress and new challenges of a climatic, geopolitical, and social nature, modern agricultural production is characterized by significant changes in the conditions of its management, new trends in structure, innovations in technology, organization, and goal setting. The material in this article is the result of theoretical and empirical research on the prospects for the development of organic farming and the manufacture of organic products in other agricultural sectors. The complexity of the study involves consideration of the needs and opportunities of organic agriculture, which are emerging on the part of both its producers and consumers. In addition, the paper examines and considers the institutional environment in which agricultural enterprises make decisions to change the structure of their production towards organic products, and the state organizes support and assistance, both financial and other (organizational, informational, educational, marketing). The main scientific conclusion is that in the coming years, firstly, organic production, due to understandable circumstances (high costs, low demand, limited support from the state and society as a whole), will still not occupy a significant share in the total volume of products manufactured in the country, secondly, new technologies contribute to the promotion of this area of agricultural activity by creating the necessary conditions for this, and thirdly, organic agriculture is supported by the state, but it has become significantly more active in recent years, representing an essential part of the implementation of sustainable development concept, being an area of application of its principles and methods.

1 Introduction

Modern science identifies organic agriculture as a special system of organizing farming activities, and then food production, which is harmoniously combined with the best environmental and climatic practices, on the one hand, and modern food requirements, on

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the other [1]. The trend in the development of products manufactured using natural resources and nature-saving technologies is formed within the boundaries of the modern concept of sustainable development of society, which provides for the economical use and renewal of natural resources, the application of high standards of animal protection and the conservation of biodiversity [2]. In general, organic production performs a twofold social role, firstly, ensuring the functioning of a specific market (market of organic products) and satisfying the population's need for healthy food, and secondly, contributing to the protection of the environment, the preservation of flora and fauna in rural areas, and their dynamic and sustainable development.

Compliance with high standards in the field of health, environment, and animal welfare in the production of organic products is an integral part of the high quality of these products and a condition for their identification as such. Gradually, considering the emerging public priorities, the stimulation of organic production, the formation of appropriate areas and instruments of state support are becoming an integral part of the general agrarian policy in many countries of the world, including the Russian Federation [3]. Today, considering the available experience, scientific research on various aspects and results of the development of organic agricultural production and the food system as a whole, in particular, related to such features as (1) the institutional environment that promotes the use of appropriate technologies and methods in production, (2) best practices worthy of imitation in various Russian regions, (3) factors that stimulate and limit the implementation of these technologies in the economic activities of farmers and agricultural organizations, (4) the most effective methods of supporting organic production at the federal and regional levels. It is these research questions that are at the center of the research, the main results of which are presented in this article.

2 Methods and Approaches

Based on the scientifically proven postulate that in favorable institutional conditions, private farms motivated by economic, social, and environmental outcomes can act as drivers of rural development, their activities in the field of organic production are in the focus of attention in the research undertaken in this article. At the same time, other economic entities (agricultural organizations) that integrate organic farming technologies and other methods of manufacturing organic products into their production aroused scientific interest. Moreover, individual economic practices are included in the context of the study, demonstrating that the goals and methods of organic farming (as well as organic animal husbandry) are closely consistent with the rural population ideas about what food products should be and what methods should be used for their production to preserve the human environment in an adequate (relevant to modern social requirements) condition. In addition to the best examples available, the institutional environment, including legislation, policy documents, and informal institutions, whose impact on this segment of agriculture is undeniable and significant, was subject to rigorous study. Finally, the use of a comparative research method predetermined the inclusion in the work of a thorough analysis of international experience and legislation in force in other countries, which made it possible to identify such aspects of the functioning of organic agriculture and its environment that are most acceptable to domestic conditions and more adequate to them.

3 Results

Following the public agenda aimed at the development of organic agricultural production, as well as public priorities aimed at the consumption of healthy and safe food, the volume of organic production and the scale of organic farming differ in many countries of the world

with positive dynamics, although it can be argued that such segments of agriculture occupy a significant share in the overall indicators of agricultural production, so far groundless. For example, a 25% increase in agricultural land used for organic farming is outlined in the plans of the European Union countries only by 2030 (Regulation (EU) 2018/848 on organic farming [4]), although it is becoming increasingly difficult to follow the course taken in the context of the growing crisis phenomena in the economies of European countries [5]. As for the Russian Federation, the organic farming sector in Russia has been developing in recent years both in terms of the areas used and in the context of the number of farms involved in the production of organic products, but still in our country (in the circumstances of new threats and challenges) there are many limitations and difficulties, overcoming which requires additional time and additional costs [6].

Specifying the most well-known areas of application of organic technologies in domestic agriculture, several should be highlighted, emphasizing their features and prospects. Organic crop production (cultivation of cereals, vegetables, fruits, and berries), carried out without the use of synthetic fertilizers, pesticides, and GMOs, characterized by the use of siderates, compost, biologics to improve the soil, the use (along with other methods) of crop rotation and mechanical weed control [7], can be placed in the first place among them. Organic animal husbandry is also becoming increasingly important, providing for (a) the rearing of livestock and poultry without antibiotics, growth hormones, and GMO feeds, (b) the organization of free grazing, the use of natural feed, and (c) humane animal husbandry, considering their natural needs. Against the background of the production diversification observed within the boundaries of modern agricultural farms, the population has been paying attention in recent years to organic beekeeping, the characteristic features of which include the production of honey without chemical treatment of beehives and without the use of antibiotics, the placement of apiaries in ecologically clean areas, and feeding bees exclusively with natural honey. In the same vein, organic fish farming is developing – the breeding of fish in natural reservoirs without artificial feeds and growth stimulants, which helps maintain the biological balance in aquatic ecosystems [8]. Equally important are the methods of organic production applied at the technological chain stages that lie before (production of necessary resources) or after direct production (processing of products obtained in the industry). These include the organic production of fertilizers and plant protection products, in particular, the production of biofertilizers based on organic waste and compost, and the development of biological preparations to protect plants from pests and diseases. The processing of agricultural raw materials and the production of organic food (dairy products, meat, bread, beverages, etc.) are extremely important for obtaining finished products that meet the requirements for food products identified as organic. At this stage, the use of minimally processed ingredients without synthetic additives, the use of eco-friendly packaging and the organization of special logistics come to the fore. In addition to these types of activities, agroecotourism is at the center of attention of the analyzed industry development area, which is why support for farms offering environmentally friendly products and outdoor recreation, as well as business entities introducing educational tours into the tourism industry, promoting the principles of organic agriculture and its results is being updated [9].

Examining the processes of the organic production spread in recent years, it is important to note that, having appeared in certain regions and districts, relevant practices are actively developing in various regions of the Russian Federation. According to Roskachestvo, as of 2024, 200 organic producers have been certified in the country. The leader in the number of certified manufacturers is the Voronezh region, where 21 manufacturers are registered. The Belgorod region is in second place with 16 certified manufacturers. Thus, the agricultural farm Agropark from the Shebekinsky district of the Belgorod region, which certified tomatoes, peppers, blackberries and raspberries, became the 200th anniversary producer of organic products in Russia. The third place is occupied by the Krasnodar Territory, where

there are 14 certified enterprises producing a wide range of organic products, including vegetables, soybeans, sunflowers, corn, rapeseed, cereals, and flour. The Moscow region is also among the top 5 regions in terms of the number of certified organic producers. Among them there are such farms as the multidisciplinary farmstead Farm M2 Shulgino and CJSC ECO-farm Konovalovo.

The manufacture of organic products is also developing in the Ural Federal District, although not as actively as in some other regions of Russia. According to the statistics presented in the publications, in 2022 the Sverdlovsk region ranked 29th in the country in terms of the number of organic producers, having only two certified enterprises. All this is despite the fact that agriculture in the Ural Federal District makes a significant contribution to the Russian agricultural sector. The region produces about 8% of the total livestock production and about 4% of the country's crop production [10]. Poultry farming forms the basis of animal husbandry, while about 10% of the total poultry population in Russia is concentrated in the district. Thus, although the manufacture of organic products in the Ural Federal District has not yet reached high levels, the region has the potential to develop this area in the future. The focus in the development of organic production is on environmentally friendly farming methods and meeting the demand for high-quality food.

The available scientific generalizations based on careful studies of the results of the incorporation of organic practices into domestic agriculture suggest that the focus of agricultural producers on the development of organic production is fully consistent with society's desire to green the economy, is closely linked to the use of environmentally friendly innovative technologies and other (organizational, social and other) innovations, contributes to the formation of circular agricultural production and its other modern systems. As a result, for the population, this approach guarantees the consumption of products produced in accordance with strict quality standards and requirements for ensuring a healthy diet, and for producers it means being able to carry out their activities without causing significant damage to nature, preserving it for future generations. The research undertaken by modern scientists demonstrates that organic production, consistent with the goals of sustainable development, has many advantages both for the production participants themselves (producers and consumers) and for society as a whole [11].

It should be emphasized that the key players in the organic market are both producers and consumers. Despite the fact that not everyone can afford to purchase organic products, and the low incomes of many families are a serious constraint on the growth of demand in this segment of farm products, public interest in such products is obvious not only at the household level, but also at the state level. Realizing how important healthy and natural nutrition is for children, youth, the elderly, and the general population, modern social programs and projects include, for example, school nutrition algorithms, attitudes to nutrition in higher (and other) educational institutions, and catering in companies and enterprises. Important in promoting nutrition that ensures optimal functioning of the human body and full-fledged human life, contributing to the promotion of health and the prevention of noncommunicable diseases, should be considered its new concepts at the household level (promoted and implemented healthy nutrition systems), in response to which retail chains and specialized points of sale (stores) organize the purchase of products and their sale. Government policy to support the population incomes (families with children, low-income, etc.) is directly related to the implementation of the outlined approach.

As for organic producers, their situation can be described as ambiguous. Low demand for these (unique) products, on the one hand, and high production costs, on the other, cannot ensure production efficiency sufficient for successful operation in the current conditions, and this is typical not only of the Russian Federation, but also of international practice in general [12]. At the same time, for young farmers, the niche associated with organic farming and animal husbandry is promising, since, firstly, it represents a truly untapped market segment,

and secondly, it is usually the focus of attention of authorities at various levels (federal, regional, and local). We are talking not only about purely financial support tools outlined in modern government programs and projects, although they are certainly necessary for farmers who use, in fact, extensive production techniques, but also about other areas of assistance, including the dissemination of relevant information, the development of necessary technologies, the implementation of important educational programs and research for the industry. The study of the possibilities of regulating the organic products market and other promising theoretical and practical issues has been updated recently both in science and in practice [13]. Given the importance of organic agriculture for achieving the goals of sustainable development, a special state strategy is being formed, involving its support through public investments in research and development, preferences for producers implementing sustainable production models in animal husbandry, crop production, and other sub-sectors of agriculture and forestry suitable for the production of environmentally friendly products [14]. The agricultural policy of the Russian Federation, like other components of the institutional environment, has been actively stimulating the transition to a more sustainable food system in recent years, providing for the use of all possible channels of assistance to those agricultural producers who, implementing the principles of organic agriculture, resist adverse climate change, participate in environmental protection, and contribute to the preservation of public health through more natural and full-fledged meals. The calculation is that gradually, as the value of organic products increases and their production efficiency increases, agricultural producers will identify the activity in question as more promising, and the government will be able to switch support to other problems and tasks.

It is important to note that the public also fully supports initiatives related to the transition of agriculture to the production of organic products, as at the same time it solves other pressing issues related to ecology, conservation of biodiversity, neutralization of the adverse effects of climate change and their slowdown [15]. For example, in this case, biodiversity is associated with special (nature-saving) methods of tillage, as a result of which organisms (microorganisms) living in the soil are preserved, and, as a result, the fauna of certain territories is preserved. Reducing (or completely eliminating) the use of synthetic fertilizers and other chemicals during plant cultivation, in animal care, in forestry technologies contributes not only to the production of safe food for the population, but also to the creation of favorable conditions for the wildlife conservation. In addition, many methods used in this segment of agriculture ensure the economical use of natural resources, meet modern standards of pet care, while solving some social problems, such as (1) adequate incomes for farmers, (2) a favorable rural environment, and (3) the retention of young people within rural areas.

Turning to the content of the institutional environment that is important for the success of organic agriculture, it is appropriate to note that in the current circumstances, various government programs related to organic production and institutional decisions recorded in laws, regulations, and other documents are of high value. Speaking about the current legislation in the field of organic farming (the main component of the institutional environment in which it develops), it should be noted that in the Russian Federation, the main key legislative act regulating the production of organic products is Federal Law No. 280-FZ of August 3, 2018 "On Organic Products and on Amendments to Certain Legislative Acts of the Russian Federation". Its content is such that this institutional document, first of all, establishes requirements for the production, storage, transportation, labeling, and sale of organic products, as well as defines procedures for conformity assessment and state support for producers. According to this law, when manufacturing organic products, it is necessary to comply with the basic requirements regarding such aspects as (1) isolation of production (organic production should be separated from the production of non-organic products), (2)

prohibition of the use of certain means of production and methods (prohibited the use of agrochemicals, pesticides, antibiotics, growth stimulants, hormonal drugs, methods of genetic engineering, cloning, hydroponic method of growing plants, and ionizing radiation), (3) the use of biological methods (preference is given to means of biological origin for the control of pests and diseases of plants and animals), 4) labeling of products (organic products must be appropriately labeled, which confirms their compliance with established requirements). In addition, the law provides for the creation of a Unified State Register of Organic Producers and defines state support measures for such producers.

In 2023, the Government of the Russian Federation approved a Strategy for the development of organic production until 2030. The main objectives of this strategy cover several aspects of its production and consumption. Regarding the consumption of organic products, it is expected that its volume will grow to 149.8 billion rubles by 2030. As for production, by 2030 it is planned to increase the volume of final organic products for the domestic market to 114.5 billion rubles, and therefore it is planned to increase the area of land on which organic farming technology is used (from 656 thousand hectares in 2021 to 4.2 million hectares by 2030) [16]. At the same time, the state intends to use all available measures in its arsenal. First of all, state support for producers is planned and implemented, namely, subsidies and grants have been introduced for agricultural producers switching to organic farming methods. Adequate formal institutions are equally important for the sector development, and therefore the regulatory framework is constantly being improved, for example, depending on the prevailing realities, legislation in the field of organic agriculture is being adjusted, including that part of it that concerns the simplification of certification procedures and product quality control. Finally, information and educational support is provided, involving the implementation of educational programs and the organization of information campaigns to raise awareness among producers and the public about the benefits of organic products. As noted in the analytical reports of the government, the Ministry of Agriculture of Russia, together with other government agencies, is actively working on the development of organic production, striving for sustainable growth of this sector and meeting the demand for environmentally friendly food.

According to the Strategy for the development of organic Production until 2030, "currently, about 30 producers are engaged in the production of organic cereals, among which large agricultural producers predominate, operating mainly in the Siberian Federal District (Krasnoyarsk Territory, Tomsk region), the Central Federal District (Ivanovo, Kaluga, Moscow, Oryol, Smolensk and Tula regions), the Volga Federal District (Perm Krai, Penza region), the Southern Federal District (Rostov region)" [16].

The gross harvest of organic vegetables in the Russian Federation in 2021 amounted to 7.1 million tons (Figure 1).

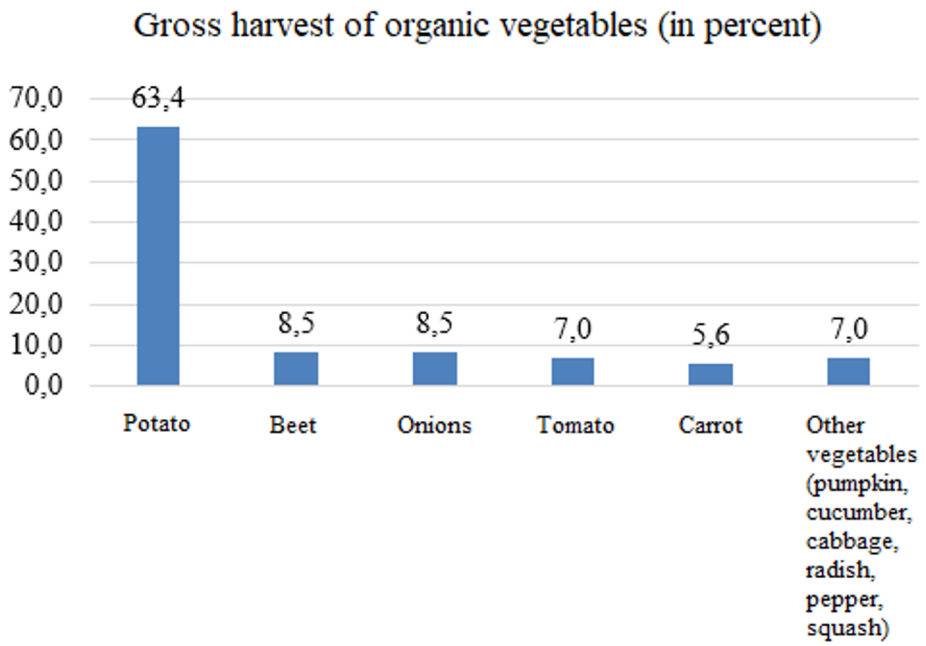

Fig. 1. Gross harvest of organic vegetables in the Russian Federation.

The largest share of organic vegetables is accounted for by potato (63.4%), beets (8.5%), onions (8.5%), tomatoes (7%), carrots (5.6%), and other vegetable crops such as pumpkin, cucumbers, cabbage, radishes, peppers, and squash. Organic vegetables are grown in 13 regions of the country, located in "the central part and in the south of Russia, in Primorye, Siberia, and the Central Chernozem region" [16].

In the country's livestock industry, 18 producers are engaged in the production of "certified organic meat and dairy products, and the share of organic livestock in the total volume is 0.16% so far." In 2021, "the volume of organic milk production by certified producers amounted to 17,275 tons, of which 65% is drinking milk, of which 54% was transferred for processing and 1,200 tons of fermented dairy products were produced" [16].

Evaluating the results of a comparative analysis of domestic formal institutions with Western ones (taking place in the international space), it can be stated that, despite some inherent differences, they have in common that they are constantly changing with changes in the fast-growing sector of the agrarian economy (organic agriculture). Their characteristic modifications are reduced to the following: 1) simplification of rules for organic farming by phasing out a number of strict restrictions; 2) strengthening the control system with reliable checks throughout the supply chain; 3) coverage of organic production technologies for an increasingly wide range of agricultural products (including beeswax, wool, etc.), as well as the introduction of some of them (for example, deer, rabbits, poultry) specific additional conditions; 4) simplification of certification procedures for small farmers and the introduction of special algorithms and requirements for them. The general trend of government support for all countries is to ensure that farmers are given guarantees that at the stage of transition to organic production, their additional costs will be fully compensated by the state and, moreover, producers will have additional incentives to comply with the rules of organic production [17]. The logic of government support is such that, as consumer

demand for organic products increases, favorable conditions are created in society to expand the market for these products, to increase the incomes of farmers engaged in organic production, and as a result, the need for government agencies and mechanisms to intervene in this area is gradually decreasing. At the same time, the legal framework in the field of organic production should, firstly, ensure fair competition and effective functioning of the domestic market of organic products, and secondly, create conditions for building consumer confidence in products labeled as organic.

Considering that the use of organic technologies in Russian agriculture contributes to improving the quality of products, preserving soils and biological diversity, as well as developing exports of organic products, the Minister of Agriculture of the Russian Federation O. Lut emphasizes the need to actively support organic agriculture in the country. Based on the fact that organic products are a promising niche for small businesses, and the demand for such products among citizens leading a healthy lifestyle is growing, the Ministry of Agriculture plans to introduce additional grants for organic producers, and also encourages farmers to actively engage in organic farming [18].

4 Conclusions

In conclusion, it should be noted that the practical consequence of the evolution of agricultural technologies in the key of organic farming are both new examples of organic agriculture development and a new agricultural policy, the content of which expands the opportunities for agricultural producers to increase the acreage occupied by organic production, attract additional resources (including financial) to change the structure of production towards organic products, to develop new types of activities related, for example, to organic aquaculture, organic production in the field of forestry, etc. Government programs and institutional documents being developed and implemented in various countries are aimed, firstly, at maintaining the competitiveness of the sector, secondly, at creating an appropriate market of interest to all its participants, and thirdly, at attracting investments for the dynamic development of organic production in the near future and in the longer term. In fact, today there is already an improvement in the rules of organic production, considering the experience gained in the course of their application, the adjustment of the institutional field of functioning of the agricultural sector in question, the organization of public policy in the direction of increasing compliance of the results (products, first of all) with the high expectations of consumers, as well as ensuring their increasing clarity and real incentives for those to whom the instruments of state support are addressed.

Due to the fact that organic production places special demands not only directly on production technologies, but also on processing, logistics, and sales, an increasing number of participants are involved in the analyzed sector, involving scientists, teachers, and government officials. Despite numerous studies in the field of organic production, the variety of business practices in this area, as well as the different features of the institutional environment in which they are implemented, stimulate scientists to new rigorous research, allowing them to come to numerous conclusions regarding the economic, social, and environmental consequences of this industry development area.

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