

Problems and prospects for the development of the agroindustrial complex in Russia

Ludmila Spektor¹ and Ekaterina Khomutova^{1*}

¹Institute of Service and Entrepreneurship (branch) of DSTU in Shakhty, Shevchenko 110, Shakhty city, Rostov region, 346500, Russia

Abstract. The article deals with the problems of the dynamics of agro-industrial complex of Russia and the tendencies of its functioning in modern conditions. The peculiarities of the agrarian sector of the country, advantages and disadvantages of the agro-industrial complex development are studied. The author expresses the opinion about the necessity of certain actions in the state policy on the regulation and support of agro-industrial production. It is necessary to develop a set of measures to stimulate the development of the introduction of alternative energy in rural areas, as well as in the areas of industrial livestock complexes, as well as to develop technological regulations for the production of agricultural organic products, its evaluation standards and mechanisms for the transition of Russian agriculture from the production of higher environmental quality to "green standards". It is necessary to pay attention to such areas as sustainable investment development, technical and technological proposals, land reclamation infrastructure, digitalization and many others. **Key words:** Agribusiness, the agro-industrial complex, of agricultural producers, agricultural resources, system for agricultural food, technology regulations, green standards.

1 Introduction

The agro-industrial complex of the country is an integral part of the entire national economy, which allows to optimize the employment of the population, participating in the formation of gross national product and food security to a large extent, as well as the economic security of the country. There are more than 60 branches in the agro-industrial complex (subsequently AIC), which means that agribusiness in Russia is a multi-branch system.

2 Methodology

The subject of the study are the problems and prospects that arise in the AIC of Russia. Determination of possible ways to solve and overcome the problems and prospects of development of the Agribusiness of the country.

The methods used in the study: methods of systematization and generalization, the comparative method, methods of induction and deduction. The materials used in the study

*Corresponding author: 1465469kat@gmail.com

included methodological literature, periodicals and Internet sources, as well as data from official sources of information, which actively cooperate with representatives of the Russian agro-industrial complex.

3 Results of the research

The agro-industrial complex, as part of the basic socio-economic systems, implements the following objectives:

1. the creation of economic benefits for the population, expressed in food and goods for consumption from agricultural products;
2. the creation of a reserve to ensure the food security of the state;
3. decent, efficient labor and successful entrepreneurship;
4. ensuring the efficiency of the entire AIC system;

According to the results of the study, the main problems of the development of the agroindustrial complex in the Russian Federation today are:

- degradation of ecosystems under the influence of agriculture;
- the problem of food waste;
- decrease of agroclimatic potential;
- spread of plant and animal pests and diseases;
- high growth of prices for oil products;
- decline in real disposable income of the population by about 17%;
- decrease in the level of wages and salaries of the population;
- decrease in the level of qualification of rural personnel;
- decrease in GDP.
- pandemic.

Having considered the main problems of development of the agro-industrial complex, let's move on to the prospects of development of the agro-industrial complex. These include:

- information technology and IT infrastructure in the AIC (Farm Management Technologies: "smart" farms);
- e-commerce platforms for agribusiness;
- creation of robotics in agribusiness (drones, machines, mechanisms, automatic systems);
- development of biotechnology;
- new farming systems [1, 2].

The level of digitalization of the agro-industrial complex in Russia is very high. There are large companies that, even with global companies, have a high level of digitalization and robotization. Basically, these companies work on agricultural exports and compete with other international companies whose level of digitalization is high.

Factors hindering the digitalization of agribusiness include:

- poor communications;
- lack of cellular communication in land areas;
- low levels of digital literacy among the population;
- poor training of employees.

There are a huge number of farms in our country that cannot afford to buy new digital equipment due to lack of money or small production volume.

Small farms are interested in digital solutions that can visibly and quickly reduce their costs and find and expand their markets.

These may include:

- technologies related to high-speed Internet access;
- monitoring, surveillance and control systems;
- unmanned aerial vehicles;
- automated agricultural machinery;

- electronic field maps;
- technologies using big data analysis and neural networks for intelligent fertilization.

Innovative processing and logistics technologies will help to save on fuel, storage, packaging and transport of products. Production efficiency can range from 10 to 40%, significantly increased with the help of new agricultural systems. Regardless of plant size, digital technologies help reduce energy and water consumption by more than 20%. They also increase yields by 10-35% [3].

The most popular today are: digital mapping of areas using drones, field monitoring, among others. Using NDVI index, battery-powered field weather stations transmitting data from the fields online, sensors on agricultural machinery measuring a number of parameters - from location in the field to fuel consumption, climate control systems in vegetable and fruit storage facilities which monitor a number of internal environmental indicators, remote control of irrigation installations, digital work systems, fertilizer and crop protection products consumption, devices that identify weak points during harvesting and subsequent transportation, automatic control of the environment, and so on.

An example of the application of modern digital technology is a robotic plant for the production of smoked sausages, located in Kashira.

Let's look at the main indicators of the state of the agricultural industry in Russia.

Table 1. Main indicators of the agricultural sector in Russia.

Indicator	2017	2018	2019	2020	2021
Production of agricultural products by category of enterprises					
Households of all categories, %	100	100	100	100	100
Of which agricultural organizations, %	55.2	56.5	57.7	58.2	59.1
Of these, households, %	32.4	31	28.6	28.2	25.5
Of these, farms, %	12.4	12.5	13.7	13.6	15.4
Indicators of the resource base of agricultural enterprises					
Sown area, million hectares	54.4	53.6	53.2	52.6	52.7
Livestock, million head	33	31.6	32.9	31.5	30.1
Number of tractors in farms, thousand pcs.	216.8	211.9	206.7	203.6	198.3
Number of harvesters in farms, thousand pieces.	57.6	56.9	55	53.9	52.6

According to the Russian Ministry of Agriculture, the budget of state programs for the integrated development of rural areas and effective use of agricultural land and development of land reclamation has been increased: 59.9 billion rubles will be allocated to the first program - 7.4 billion rubles more, and 38.4 billion rubles to the second program - 13.2 billion rubles more.

The amount of support for concessional lending to export-oriented companies, subsidies to grain producers and bakeries has been somewhat reduced as part of the State program for the agro-industrial complex. But if necessary financing will be increased. The source, as in 2022, will be export duties.

4 Discussion of results

To date, the AIC is the largest complex, combining a number of sectors of the economy, focused on the production and processing of sources of raw materials and obtaining from it the products brought to the end consumer.

The structure of the agro-industrial complex includes 3 main spheres of activity and looks as follows:

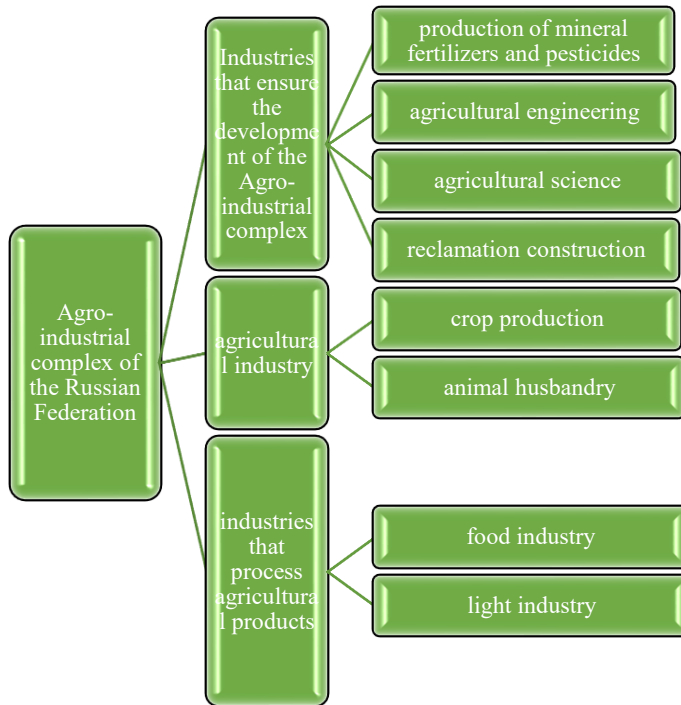


Fig. 1. Structure of the agro-industrial complex.

Dynamics of development of Russian AIC this year is mainly positive. In crop production record harvests of grains were achieved, the gross output of which may reach 145 million tons in net weight and will exceed last year's figures by 19.5%: almost a quarter more wheat and 30% more barley were harvested. The yield of sugar beet (+5.3%), potatoes (+5%), oilseeds (+9.4%), including soybeans (+12.5%) and rapeseed (+53%) also showed a positive trend.

Livestock production is likely to show multidirectional dynamics by the end of the year: pork production will increase by more than 6%, poultry - by 3.5-4%, milk - by 1%. At the same time, during 9 months of the current year there is a decrease of cattle (more than 1,8%), and by the end of the year the beef production may fall by 3,5%.

Standard crops, which led to an increase in the supply of grain to 159% instead of the planned 95%, led to an increase in the supply of grain on the market, contributing to a significant reduction in market prices, the current level of which often do not cover production costs. Grain producers are suspending sales and prioritizing their inventories in anticipation of higher prices. Despite the fact that grain storage areas available in Russia can hold 150 million tons of grain only half of them are able to store grain for more than 6 months and the rest cannot provide long-term storage of grain without serious quality losses.

Support for exports can provide crop producers with the necessary level of profitability and sown area, for which it is necessary to use all available mechanisms. The government has more than doubled the export quotas for grain, but it has no plans to reduce high export duties or at least raise the indicative price, which motivates such a decision by the effectiveness of the price suppression mechanism, which allows subsidizing agricultural producers [4, 5].

One of the biggest problems today is the problem of import substitution of seeds of agricultural crops. As for wheat, Russian breeding has made significant progress, bringing the share of domestic seeds up to 95%. According to experts, a small part of sown spring barley and wheat - 15-20% - are varieties of foreign selection. There are also no problems with domestic buckwheat and rice seeds. The situation with other crops is more complicated. Since 2010, the share of imported seeds for corn has increased from 36% to 58%, for sunflower - from 52% to 76%, for rye, because of the poor harvest in 2019 - from 32% to 56%. Similar problems with vegetable crops, primarily sugar beets. Russian agrarians have only 24% of seeds of domestic selection, the rest are imported.

The main promising directions for the development of the domestic import substitution policy in the near future should be: the development of a regulatory and legislative framework for the purpose of specifying and monitoring the intermediate results of economic processes; the development of agricultural production infrastructure with simultaneous support for the formation of clusters, technology parks, business incubators, transport and logistics complexes in agribusiness and the creation of special economic zones; expansion of financing of state programs for the development of agriculture with the provision of preferential loans, grants, subsidies, leasing programs [6, 7, 8].

Despite the good results and production records, 2022 was an extremely difficult year for the industry and the economy as a whole. February 24 and the start of a special military operation in Ukraine were followed by a series of new sanctions and challenges that forced the business to urgently restructure its work: adjust plans, change suppliers of production facilities, cope with rising costs amid a sharp increase in the dollar exchange rate, etc.

One of the key systemic problems of the industry's development remains the lack of investment. Thus, in 2020, according to Rosstat, investment in fixed capital in agriculture decreased by 7%, resulting in failure to meet the plan for this indicator. The reasons for weak efficiency are:

1. low profitability, primarily of most agricultural producers, whose profitability level in the twentieth year, taking into account state support was only 13%, which is clearly insufficient for the conduct of expanded reproduction in modern economic conditions;
2. excessive crediting of the majority of agrarians;

Limited access to concessional credits. The volume in the twentieth year, according to preliminary data of our Ministry of Agriculture, has decreased by almost 7%, with most of the support aimed at short-term lending, the maintenance of low volumes of financing of this direction, especially support for investment lending with significant stagnation of investment activity in the industry, due to the decline in investment attractiveness.

The key mechanism to stimulate investment activity is to compensate agricultural producers for a part of direct costs incurred for the creation and modernization of production facilities. It is believed that it is necessary to increase the amount of funding for this type of support and expand the management of its use. In particular, extending it to aquaculture facilities and food industry facilities (e.g. bio-factory for production of enzyme preparations for deep processing of agricultural products), as well as maintaining this mechanism for livestock complexes of the dairy industry and greenhouse complexes in 2022-2023.

It should also be noted that the existing measures of state support are mainly aimed at large commodity agricultural producers, rather than at comprehensive measures for the development of all modes of the economy [9, 10]. The dynamics of return on investment

directly depends on the activity of price relations in the agroindustrial complex. The pricing system does not suit the current consumers.

Speaking about the formation of prices for agricultural products, it should be emphasized that the most important factor is the growth of the cost of its production, which depends on the conjuncture of prices for agricultural resources, and they have been growing twice as fast over the past five years - by 17.6% than the prices of agricultural producers. Thus, stabilization of prices in the food market should begin with the reduction of disparity of prices for agricultural products and material and technical resources [11, 12].

It is believed that it is necessary to introduce zero rates of excise duties on fuel sales for agricultural producers, reduction of electricity prices for greenhouse complexes, for peasant farms engaged primarily in livestock activities, active regulation of prices in the market of mineral fertilizers, etc.

Anti-Russian sanctions have a negative impact on the domestic agricultural sector, complicate calculations, create logistical problems for delivery. Grain producers experience difficulties with transportation by grain carriers, cargo insurance and transshipment in foreign ports.

To somewhat reduce the negative impact of sanctions should help to organize a ruble system of payment for delivered grain, available to foreign buyers, which the Russian government in cooperation with the Central Bank plans to launch at the beginning of next year. However, this innovation will not solve the problems of exporters of other agricultural products.

The territories annexed as a result of the February events also need support. The government will be able to provide farmers of these regions with seed material through the intervention fund. Because of this, purchases of grain in this fund may increase from 36 thousand tons per day to 100 thousand tons or more.

Agricultural sector development indicators were also affected by partial mobilization, which caused a shortage of machine operators and truck drivers at enterprises and individual agricultural farms.

5 Conclusions

We believe it is necessary to strengthen the support of the poor through the introduction of a system of targeted food aid and the introduction of the "subsistence food" mechanism. It is extremely important to ensure the growth of the population's income, primarily in rural areas; this should be facilitated not only by state programs such as "Development of Agriculture", but also by the state program "Comprehensive Development of Rural Areas".

Unfortunately, the weak point of both state programs is their financial support, which is systematically ignored. Therefore, it is necessary either to achieve an increase in funding directly, or to adjust the goals and objectives, once again postponing the problems of rural unemployment, poverty, demography, low level of social infrastructure development to a more distant perspective. However, the solution of these problems in the future may be even more expensive.

One of the key problems of agricultural development is that under conditions of low investment activity it is not possible to achieve the necessary pace of technical and technological renewal, because, as you know, the load factor of machinery remains at the level of 3-5%. This means that its expected service life is about or more than 20 years. In terms of scientific and technological development of agriculture it is also advisable to accelerate the development and approval of sub-programs of the Federal Scientific and Technical Program of Agricultural Development to 25 years. After all, out of 8 programs only 4 have been developed.

In 2023 the Ministry of Agriculture intends to preserve the support programs for agricultural producers, but subsidies for grain producers and loans for exporters will be reduced. The budget of the three state programs in the sphere of agriculture will amount to 445.8 billion rubles in 2023 against 467.5 billion rubles in 2022.

The budget of state programs on complex development of rural areas and effective use of agricultural land turnover and land reclamation is enlarged - the first one is to receive 59.9 billion rubles (+7.4 billion rubles), the second - 38.4 billion rubles (+13.2 billion rubles).

Within the frames of the State Program of Agroindustrial Complex there will be cut down support of preferential crediting of export-oriented enterprises, subsidies for crops producers and bakery industry enterprises. The Ministry notes that if necessary financing may be increased at the expense of revenues from export duties.

Half of the total volume of funds, allocated for the State Program of AIC development in 2023, will be spent on stimulating investment activities, 24% (Br173.4 billion) - on development and technical modernization of agribusiness, 12% (Br41.4 billion) - on export support. There is 10 billion rubles for subsidies for grain producers. The companies, launching the construction of selection and seed-breeding centers, will be able to get 50% of their CAPEX compensations from the state.

At the same time, improving the mechanism of implementing the State Program must be based on a new socially oriented paradigm that should determine the future agrarian policy of the country taking into account the system of strategic management, forecasting and planning, interrelation of agrarian and macroeconomic policies, scientific and technological progress and digitalization, efficient land use, environment, mission of Russian peasantry and increasing its role in society, advanced development of the Far East region, convergence of Russian agribusiness [13, 14, 15].

Also, first of all, it is necessary to develop proposals for the formation of a science-based pricing system for agricultural food, taking into account the proportionality of profit distribution through redistribution, based on the given costs. Develop a complex of measures to stimulate the development of alternative energy implementation in rural areas, as well as in the areas of industrial livestock complexes. Finally, to develop technological regulations for the production of agricultural organic products, standards for its evaluation and mechanisms for the transition of Russian agriculture from the production of products of higher environmental quality to "green standards". And, of course, it is necessary to pay attention to such areas as sustainable investment development, technical and technological proposals, reclamation infrastructure, digitalization and more.

References

1. V. Tkach, E. Makarenko, T. Kushnarenko, IOP Conf. Ser. Earth Environ. Sci. **403(1)**, 012135 (2019) <https://doi.org/10.1088/1755-1315/403/1/012135>
2. D. Gulin, M. Hladika, I. Valenta, Proceedings of the ENTRENOVA - ENTERprise REsearch InNOVation Conference **5**, 502–511 (2019)
3. T. Medvedskaya, E. Zaporozceva, N. Zemlyakova, O. Yuryeva, E3S Web Conf. **273**, 08034 (2021) <https://doi.org/10.1051/e3sconf/202127308034>
4. Philippe Le Billon, Päivi Lujala, Environmental and land defenders: Global patterns and determinants of repression **65**, 102-163 (2020) <https://doi.org/10.1016/j.gloenvcha.2020.102163>
5. G.N. Ryazanova, IFAC-PapersOnLine **52**, 230-236 (2019) <https://doi.org/10.1016/j.nbt.2017.06.009>
6. P. Stankovics, L. Montanarella, P. Kassai, G. Toth, Z. Toth, Land Use Policy **99**, 45 (2020) <https://doi.org/10.1016/j.landusepol.2020.105071>

7. Z. Muchova, V. Rakovic, *Land Use Policy* **95**, 137 (2020)
<https://doi.org/10.1016/j.landusepol.2020.104644>
8. Fangning Shi Shiliang Liu, Yongxiu Sun, Yi An Shuang Zhao, Yixuan Liu, Mingqi Li, *Agriculture, Ecosystems & Environment* **302**, 44-56 (2020)
<https://doi.org/10.1016/j.agee.2020.107069>
9. Zhongsheng He, Lan Jiang, Zhe Wang, Rui Zeng, Daowei Xu, Jinfu Liu, *Global Ecology and Conservation* **20**, 46 (2019) <https://doi.org/10.1016/j.gecco.2019.e00721>
10. Jochem Jonkman, Ana P. Barbosa-Povoa, Jacqueline M. Bloemhof, *European Journal of Operational Research, Integrating harvesting decisions in the design of agro-food supply chains*, **276**, 247–258 (2019) <https://doi.org/10.1016/j.ejor.2018.12.024>
11. Firouzeh Taghikhah, Alexey Voinov, Nagesh Shukla, Tatiana Filatova, Mikhail Anufriev, *European Journal of Operational Research, Integrated modeling of extended agro-food supply chains: A systems approach*, **3**, 852–868 (2021)
<https://doi.org/10.1016/j.ejor.2020.06.036>
12. R.D. Raut, S. Luthra, B.E. Narkhede, S.K. Mangla, B.B. Gardas, P. Priyadarshinee, *Journal of Cleaner Production* **215**, 933–942 (2019)
<https://doi.org/10.1016/j.jclepro.2019.01.139>
13. Eisa Solgi, Hassan Sheikhzadeh, Mousa Solgi, *Journal of Geochemical Exploration* **185**, 70–81 (2018) <https://doi.org/10.1016/j.gexplo.2017.11.008>
14. S.K. Dary, H.S. James Jr., *Research in International Business and Finance* **47**, 240–249 (2019) <https://doi.org/10.1016/j.ribaf.2018.07.012>
15. U. Balisacan, M.-L. Chakravorty, Ravago, *Sustainable Economic Development* **11**, 540 (2015)