Crop production trends in the context of the Food Security Doctrine of the Russian Federation

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Abstract. The article examines the dynamics of achieving the main targets for crop production in the Russian Federation and identifies the nature of the problems associated with under-fulfillment of some indicators for crop production. The commodity structure of the export/import of the Russian Federation for crop production for 2021, the dynamics of expansion and the structure of the acreage of agricultural crops are analyzed, information is provided on the achievement of the planned values of indicators for 2021, it is proved that Russia has reached the values of food security in almost all key areas: grain, vegetable oil, sugar, etc. The results showed that there are still a number of unresolved problems, including investing in domestic agricultural science and their effectiveness, reducing the human potential of innovative activity of the Russian agro-industrial complex, inefficiency of communications between key stakeholders, resource provision of the agro-industrial complex.

1 Introduction

The current state and development of agricultural industries can be characterized by a number of features that are reflected in the current system of state regulation. One of the important features of domestic agricultural production is the impact of changes and reforms in this area of the economy on the overall social situation in the country, since agriculture is both a branch of production and a sphere of human activity. This feature imposes obligations on the state to support the standard of living in rural areas, to preserve production in often unprofitable enterprises, to create conditions for the system of attracting specialists to rural areas, to provide rural infrastructure.

The specific features of domestic agricultural production necessitate the use of various mechanisms and instruments of state regulation within and considering strategies and targets for the development of the agro-industrial complex. The process of our country's accession to the WTO predetermined changes in the basic mechanisms of state regulation of agricultural production, formed a certain balance of market–based measures, on the one hand, and state regulation measures, on the other. By joining the WTO, Russia has even more clearly outlined its vector of development towards the global market. It has made commitments to limit measures of direct support for domestic agricultural production,

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which have a significant stimulating effect on the agricultural sector of the economy and thereby change the conditions of the global competitive environment.

The purpose is to examine the dynamics of achieving the main targets for crop production in the Russian Federation and to identify the nature of the problems associated with under–fulfillment of some indicators.

Domestic researchers (A. Semin, O. Betin, N. Bagaeva, etc.) [1] conducted a study of the sustainable state of the components of agriculture in the Russian Federation and Eastern European countries, and concluded that sustainability can be achieved through the introduction of innovations in agriculture. It is open innovations and new technologies in the management of agricultural systems in modern conditions that are the determining factor in the process of qualitative improvement, which includes the ability to develop the most fertile agricultural land to meet the needs of a growing population (M. Oliveira, F.G. Da Silva) [2] and modernization of agricultural production (L. Ditzler, L. Klerkx, J. Chan-Dentoni) [3] and agricultural systems (J.H.J. Yun, E.S. Jeong, X. Zhao, S.D. Hahm, K.H. Kim [4], J.H.J. Yun, Z. Liu [5], G. Medeiros, E. Binotto, S. Caleman, T. Florindo [6]).

The year 2022 attracted Western researchers with Russia's special military operation in Ukraine and the difficulty of supplying agricultural products and fertilizers to Western markets. Abdul Mottaleb, Gideon Kruseman, Sieglinde Snapp [7] believe that since Russia and Ukraine are major wheat exporters, this will worsen the already unstable food security situation in many developing countries, disrupting wheat production and exports and accelerating price increases in import-dependent developing countries. Almost the same opinion is held by K. Abay, L. Abdelfattah, C. Breisinger, J. Glauber, D. Laborde [8], A.R. Bentley, J. Donovan, K. Sonder, F. Baudron [9], B. Bechdol, J. Glauber, T. Dozba, C. Welsh [10], E. Chikava [11] who highlight the potential negative consequences of the ongoing armed conflict between Russia and Ukraine for the food security of developing countries.

2 Materials and methods

This study used data from FAOSTAT, a database administered by the Food and Agriculture Organization of the United Nations (FAO) [12]. Information on wheat consumption per capita and wheat prices for 180 countries is available in FAOSTAT. For several countries and territories, data on GDP per capita (for example, Cook Island, Equatorial Guinea); wheat consumption (for example, Brunei Darussalam, Equatorial Guinea); wheat production (for example, Guinea-Bissau, Eritrea); GDP growth rates (for example, Venezuela, South Sudan, Palestine) are not available. For the Russian Federation, the information is available in full. Also, the data for this article are mainly taken from the online database of open access Rosstat - the Federal State Statistics Service of Russia, as well as important statistical data to assess the dynamics of agricultural development are taken from the open access sites of the Federal Customs Service of Russia and Rosreestr.

3 Results and Discussion

The foreign trade of the Russian Federation with foreign countries is characterized by a positive balance of the Russian trade balance in agricultural products and food in 2021. According to the Federal Customs Service of Russia, in 2021, compared with 2020, the trade turnover of the Russian Federation with foreign countries increased by 17.9%, exports increased by 21.4%, imports increased by 14.2% [13]. In the commodity structure of imports of the Russian Federation, the share of food products and agricultural raw materials in 2021 amounted to 11.6%.

In the commodity structure of exports of the Russian Federation, the share of food products and agricultural raw materials in 2021 amounted to 7.5%. The main commodity items in the structure of agricultural exports in value terms were: wheat (24.1%), sunflower oil (10.8%), crustaceans (7.2%), frozen fish (6.5%), barley (3.4%), corn (2.8%), rapeseed oil (2.7%), chocolate confectionery (2.3%), fish fillets (1.7%) and soybean oil (1.6%).

The main recipient countries are Turkey, China, Iran, Kazakhstan, South Korea, Belarus, Egypt, the Netherlands, Ukraine and Uzbekistan. According to the Global Food Security Index for 2021, Russia ranks the 23rd in the top of the list of 113 countries [14]. This was made possible thanks to the new Food Security Doctrine. Decree of the President of the Russian Federation No. 20 of January 21, 2020 approved the new Doctrine of Food Security of the Russian Federation.

Russia has achieved food security values in almost all key areas: grain, vegetable oil, sugar, meat and meat products, fish and fish products. According to the Russian Ministry of Agriculture, in 2021 the level of self-sufficiency (food independence) in the Russian Federation was the following:

- For sugar - 100%, which is 10 percentage points higher than the threshold value of the Food Security Doctrine (at least 90%).
- for vegetable oil - 176.6%, which is almost twice higher than the threshold value of the Food Security Doctrine (at least 90%).
- For fish and fish products - 153.2%, which is 1.8 times higher than the threshold value of the Food Security Doctrine (at least 85%).
- For vegetables and melons - 86.9%, which is 3.1 percentage points below the threshold value of the Food Security Doctrine (at least 90%).
- for food salt - 69.4%, which is 15.6 percentage points lower than the threshold value of the Food Security Doctrine (at least 85%).
- For fruits and berries - 43.6%, which is 16.4 percentage points lower than the threshold value of the Food Security Doctrine (at least 60%).
- According to Rosstat, in 2021 the level of self-sufficiency was:
- For grain - 149.9%, which is 1.6 times higher than the threshold value of the Food Security Doctrine (at least 95%).
- for potatoes - 88.4%, which is 6.6 percentage points below the threshold value (at least 95%).
- For milk and dairy products - 84.2%, which is 5.8 percentage points below the threshold value of the Food Security Doctrine (at least 90%) [15].

According to Rosreestr [16], as of January 1, 2021, the area of agricultural land available to enterprises, organizations, farms, societies, citizens (associations of citizens) engaged in the production of agricultural products was 193.5 million hectares (99.9% by 2020). In the structure of agricultural land, arable land accounts for 60.5% (117 million hectares), forage land - 36.7% (71 million hectares), the share of perennial plantations and deposits accounts for 2.8%. In the reporting period, the area of agricultural land decreased by 109.2 thousand hectares, including arable land - 40.1 thousand hectares, fodder land - 171.6 thousand hectares.

In 2021, the entire sown area of agricultural crops in the Russian Federation amounted to 80.4 million hectares, which is 0.6% higher than the level of 2020 and 1.4% more than the level of 2016.

Grain and leguminous crops were sown on an area of 47 million hectares, which is 1.9% lower than in 2020 and 0.2% lower than in 2016. The area of corn crops for grain increased by 3.5%, buckwheat - by 12.3%, rye – by 5.6%, leguminous crops - by 5.4%. Also, in 2021, there was an increase in the area under sugar beet - by 8.4%, sunflower – by 14.1%, soy - by 7.3%, rapeseed - by 13.2%. Wheat crops decreased by 2.2%, barley - by 4.2%, rice - by 3.5%, flax - by 24.5%.

A similar trend was observed in 2020. In general, in the Russian Federation, the size of acreage for 2016-2020 has not undergone significant changes – the increase was 0.8% and there is a tendency to change the structure of crops (Table 1). It should be noted that in 2023 the acreage will be significantly expanded due to the inclusion of new territories into the Russian Federation (Lugansk, Donetsk, Zaporozhye, Kherson regions).

Table 1. Acreage of agricultural crops in the Russian Federation, thousand hectares [17].

Name of the indicator	2016	2017	2018	2019	2020	2021	2021 in % by 2020
The entire acreage	79312	80049	79634	79888	79948	80 436.7	100.6
Cereals and leguminous crops, including:	47100	47705	46339	46660	47900	47 005.9	98.1
wheat	27709	27924	27264	28092	29444	28 802	97.8
rye	1265	1185	980	850	982	1036.5	105.6
barley	8322	8010	8325	8793	8530	8176	95.8
oats	2860	2887	2853	2545	2421	2291.4	94.6
corn	2887	3019	2452	2593	2855	2954.1	103.5
millet	435	265	260	393	446	294.7	66.1
buckwheat	1205	1692	1045	811	873	980.6	112.3
rice	208	187	182	194	197	190.3	96.5
triticale	228	175	154	140	111	124.8	112.1
leguminous crops	1752	2221	2754	2164	1960	2065.3	105.4
sunflower for grain	7607	7994	8160	8584	8545	9753.4	114.1
soy	2237	2636	2949	3079	2858	3068	107.3
mustard	181	157	334	374	201		
winter rapeseed	98	154	189	191	307	1684.7	113.2
Potato	1441	1350	1325	1255	1188	1146.7	96.5
Outdoor vegetables	551	535	526	517	512	497.6	97.2
Forage crops	16425	16342	16124	15425	14751	13 853.3	93.9

There are trends of reduction in the total size of sown areas of all types of crops in large agricultural organizations with a slight increase in peasant (farmer) farms. The assessment of agricultural production volumes will provide more complete information on the achievement of planned values of indicators (Table 2).

The targets were exceeded for the gross harvest of grain and leguminous crops in agricultural enterprises, farms, including sole proprietors - by 1.2% (120 million tons were actually harvested), sugar beet in agricultural enterprises, farms, including sole proprietors - by 3.9% (41.1 million tons), oilseeds (excluding rapeseed and soybeans) in agricultural enterprises, farms, including sole proprietors - by 35.3% (17.2 million tons), the size of the acreage occupied by cereals, legumes, oilseeds (excluding rapeseed and soybeans) and fodder crops, by 0.2% (71 631.1 thousand hectares with a target indicator of 71 475.4 thousand ha).

The planned values of the following indicators have not been achieved: the area of preparation of low-productive arable land actually amounted to 253.6 thousand hectares (the level of implementation is 78%) due to a change in the structure of arable land, with a decrease in fallow areas, as well as due to the lack of agricultural producers of sufficient working capital.

Currently, the Russian Federation has the ability to increase sales volumes, including exports of various products and, first of all, commercial grain.

Table 2. Information on the achievement of planned values of indicators [18].

Name of the indicator	2020 (fact)	2021		
		Plan (in accordance with the approved passport of the departmental project)	fact	implementation, %
Gross harvest of grain and leguminous crops (in weight after completion) in agricultural enterprises, farms, including sole proprietors, thousand tons	132 606.7	118 648.3	120 031.6	101.2
Gross sugar beet harvest in agricultural enterprises, farms, including IP, thousand tons	33 863.7	39 596.8	41 149.7	103.9
Gross collection of flax fiber and hemp fiber in agricultural enterprises, farms, including sole proprietors, thousand tons	42.6	34.84	29.81	85.6
Gross potato harvest in agricultural enterprises, farms, including IP, thousand tons	6811.1	7150.9	6612.6	92.5
Gross harvest of vegetables open ground in agricultural enterprises, farms, including sole proprietors, thousand tons	5429.8	5326.4	5051.8	94.8
Gross harvest of oilseeds (excluding rapeseed and soybeans), thousand tons	14 320.3	12 743.6	17 237.5	135.3

Table 3. Balance of resources and grain use, thousand tons [18].

Indicators	2019	2020	2021
Resources, total	194 121	210 720	203 090
Stocks at the beginning of the year	72 639	76 874	81 597
Import	282	381	176
Usage, total	117 247	129 123	123 669
Export	39 330	48 537	42 732
Stocks at the end of the year	76 874	81 597	79 421

In 2021, grain exports decreased by 12% compared to 2020. According to the Federal Customs Service of Russia, in 2021 the export price of wheat increased by 25.6% and amounted to 266.8 US dollars per ton. And despite the opportunity to sell more grain abroad at a higher price, the Government of the Russian Federation prioritized the saturation of the domestic market, which ensured the fulfillment of targets for the Doctrine of Food Security.

4 Conclusion

Despite the high rating positions that our country occupies in the world export of certain types of agricultural crops (wheat, vegetable oil), we continue to meet the needs of the country by importing other types of raw materials, accordingly, it is critically important to move away from import dependence on certain groups of agricultural products in conditions of unlawful sanctions pressure.

The key barriers to innovative transformation of the agro-industrial complex correlate with the systemic problem of inefficiency of communications between key stakeholders (business, science and Federal Executive Authorities) in the following manifestations:

- Imperfection of the regulatory framework with an emphasis on the bureaucratic nature of the problems (largely outdated and contradictory, at the same time rapidly changing, but insufficiently elaborated legislation. inaction of officials, their unwillingness to understand new issues, lagging in decision-making).
- The lack of a dialogue between business and science, the reasons for which are both objective (a low level of equipment of the research institute, a shortage of personnel and competencies) and subjective (different vision of goals and results, business often cannot formulate a task understandable to science, science presents its developments in a language not understandable to business).
- Inefficiency of the technology transfer support system: existing support measures are aimed at the conventional path of agricultural development and are not focused on breakthrough and truly innovative areas.

The development of the agricultural sector of the Russian economy is stimulated by the improvement of state support measures, technical and technological modernization, the development of its scientific potential, as well as an increase in demand for agricultural products and food. In the near future the following aspects are necessary:

- Modernization of the institutional environment.
- Improvement of innovation management in the agricultural sector of the Russian economy.
- Digital transformation of the agro-industrial complex.

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