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**ECONOMIC ASSESSMENT OF GROWTH POTENTIAL
OF EFFICIENCY IN AGRICULTURAL PRODUCTION**

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Abstract

The study's main goal is to perform an objective economic assessment of the potential for the improved performance of agricultural production. Based on the study results, the authors carry out a comprehensive analysis and assessment of fixed asset investment in the agricultural sector, innovative activity in agrarian sub-industries, as well as shares of plant cultivation and animal husbandry in agricultural products. The authors have formulated and substantiated the following conclusions: one of the key potential areas for the improved performance of agriculture is the development of innovative technologies. In 2011-2018, the number of people employed, fixed asset costs and gross output of products in current and comparable prices increased at a high rate, showing the industry's achievements and possibilities for further expansion of production.

Keywords

Economic assessment – Tendency – Efficiency – Performance indicators – Growth potential

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Main provision

It is possible to improve the performance of agricultural producers in several areas. The selection of performance improvement mechanisms requires a well-balanced cost-based approach.

It is necessary not only to determine growth potential, but also to assess their cost, to make the preliminary and final calculation of the efficiency of their development.

Introduction

As the Russian territory is huge, it is necessary to note that the agricultural sector's production and economic indicators substantially depend on natural factors.

They vary considerably in the enormous Russian territory and, consequently, this impacts the pace of the agricultural sector's development, including the amount of natural production of main plant cultivation and animal husbandry commodities.

At the same time, it is evident that apart from natural factors the agricultural sector's development trends also depend on innovative activity and investment.

Literature Review

The development of agricultural research and educational institutions in the country aims to improve the performance of businesses in the industry.

Main areas for the development of the modern agrarian policy and economic conditions for the improved performance of agricultural enterprises were disclosed in the articles by R.Kh. Adukov¹, A. V. Belokopytov², V. A. Bogdanovsky³, I. N. Buzdalov⁴, Yu. T.

¹ R. Kh. Adukov, "Osenka effektivnosti gosudarstvennogo upravleniya agrarnym sektorom", *Economics of Agriculture in Russia* num 6 (2015): 36-43.

² A. V. Belokopytov, *Organizatsionno-ekonomicheskiye rezervy povysheniya effektivnosti ispolzovaniya trudovykh resursov v selskom khozyaistve*. Collection: innovative activities of science and education in agricultural production, materials from the International Scientific Practical Conference (Kursk: 2019).

³ V. A. Bogdanovsky, "Faktory i rezervy rosta proizvoditelnosti truda v selskom khozyaistve", *Economics, Labor, Management in Agriculture* Vol: 9 num 42 (2018): 114-121.

⁴ I. N. Buzdalov, *Strategiya agrarnoi politiki v perekhodnyi period: kontseptsia i osnovnye napravleniya* scientific edited articles of the Russian Institute of Agrarian Problems and Informatics (Moscow: 2002).

Buzilov⁵, V.Z. Mazloev⁶, V. I. Nechaev⁷, A. V. Panin⁸, A. G. Paptsov⁹, A. V. Petrikov¹⁰, A. A. Polukhin¹¹, E. I. Semenov¹², S.O. Akhmetova¹³, S. Bychkova¹⁴, Z. O. Tokhayeva¹⁵ and many other agricultural economists.

Proposed Methodology

The study's statistical base included materials of the Federal State Statistics Service (the Russian Federation)¹⁶, the National Report on the Execution and Results of Execution in 2018, the State Program for the Development of the Agricultural Market and Regulation of Agricultural Products, Raw Material and Food Markets¹⁷. The retrospective review of the data included the period from 2013 to 2018.

Introduction

The study was conducted as part of a dissertation. The study focused on the performance of agriculture at the government level. Sources of empiric information were official statistical data, data from the National Report on the Execution and Results of the Execution of the State Program for the Development of Agriculture and Regulation of Agricultural, Raw Material and Food Markets for 2018. The study logically continues the work previously performed to study factors forming the potential for improved performance of agricultural production.

⁵ Yu. T. Buzilov, V. I. Sokolov, *Ekonomika i organizatsia sel'skokhozyaistvennogo proizvodstva. Training methodical aid.* (Moscow: Mysl, 1978).

⁶ V. Z. Mazloev, *Organizatsionno-ekonomicheskii mekhanizm realizatsii strategii ekonomicheskogo rosta: monographia.* (Chelyabinsk: Publishing house, 2011).

⁷ V. I. Nechaev, *Ekonomika sel'skogo khozyaistva* (Moscow: Koloss, 2010).

⁸ A. V. Panin, *Ekonomicheskii rost v sel'skom khozyaistve na osnove modernizatsii proizvodstva* (Moscow: Publishing House Print Pro LLC, 2015).

⁹ A. G. Paptsov, "Napravlenia obespechenia globalnoy prodovolstvennoi bezopasnosti", *Agroindustrial complex: economics, management*, num 10 (2015): 103-107.

¹⁰ A. V. Petrikov, "Sovershenstvovanie budzhetrovaniia sel'skogo khozyaistva", *Analytical bulletin of the Federation Council of the Federal Assembly of the Russian Federation* Vol: 21 num 678 (2017): 24-30.

¹¹ A. A. Polukhin; E.I. Semenova y E. A. Novoselov, "Metody obosnovaniia proektov sozdaniia zhivotnovodcheskikh kompleksov", *Economics of Agriculture of Russia* num 12 (2018): 35-39 y A. A. Polukhin y A. B. Yusipova, "Mirovoy opyt i avangardnye innovatsii v tsifrovoi transformatsii sel'skogo khozyaistva", *International Scientific Agrarian Journal* num 4 (2019).

¹² E. I. Semenova y A. S. Domrachev, "Otsenka sotsialno-ekonomicheskoi effektivnosti sel'skogo khozyaistva", *Economics of Agriculture of Russia* num 12 (2014): 63-68.

¹³ S. O. Akhmetova; M. S. Suleimenova y M. B. Rebezov, "Mechanism of an improvement of business processes management system for food production: case of meat products enterprise", *Entrepreneurship and Sustainability Issues* Vol: 7 num 2 (2019): 1015-1035.

¹⁴ S. Bychkova; E. Zhidkova y D. Eliashev, "Production activity control methods of the agricultural organizations", *Entrepreneurship and Sustainability Issues* Vol: 7 num 2 (2019): 1330-1340.

¹⁵ Z. O. Tokhayeva; B. Z. Almukhambetova; B. Keneshbayev y K. Akhmetova, "Innovative processes' management in agriculture and food security: development opportunities", *Entrepreneurship and Sustainability Issues* Vol: 7 num 3 (2020): 1565-1579.

¹⁶ Unified Interdepartmental Information and Statistical System (UIISS of State Statistics) [Electronic resource]. Available at: <http://fedstat.ru> y Data from the State Committee of Statistics. Available at: <https://www.gks.ru/>

¹⁷ The National Report on the Execution and Results of Execution of the State Program for the Development of Agriculture and Regulation of Agricultural, Raw Material and Food Markets for 2018. Approved. Resolution No. 1352-R issued by the Russian Government on June 22, 2019.

Methods

In the study, we applied generally accepted economic methods: economic-statistical, particularly calculation of average annual growth rates, monographic (analysis of 16 references, articles published by leading Russian and foreign scholars on the topic under review in the period from 2014 to 2018), analytical and the method of graphical analysis.

Results

At the initial stage, agricultural enterprises that are provided with state support were grouped in terms of profitability. Later we considered indicators relating to innovative activities in agriculture and relative performance indicators at the state level. We performed an economic assessment of the potential for the improved performance of agricultural production.

Discussion

As Table 1 shows, the specific weight of groups of agricultural enterprises that were provided with state support in 2018 compared with 2017 did not change. Thus, the specific weight of the groups with profitability exceeding 60% decreased by 0.1%, the specific weight of the groups whose profitability ranged from 30% to 60% decreased by 0.71%, the specific weight of the groups whose profitability ranged from 0% to 30% increased by 0.09%, the specific weight of the groups whose profitability ranged from -60% to -30% increased by 0.86% and the specific weight of the groups whose profitability was below -60% increased by 0.07%. An important component for the development of the potential for the improved performance of agricultural enterprises is the availability of investment.

Groups in terms of profitability, %	Years			
	2017		2018	
	Number, units	Group's portion of the total, %	Number, units	Group's portion of the total, %
Total	18,178	100.00	17,499	100.00
Above 60%	1,413	7.77	1,343	7.67
30%-60%	2,355	12.96	2,144	12.25
0-30%	11,332	62.34	11,085	63.35
-30%-0%	1,806	9.94	1,756	10.03
-60%-30%	423	2.33	559	3.19
Below -60%	649	3.57	612	3.50

*calculated based on data from the National Report on the Execution and Results of Execution in 2018 of the State Program for the Development of Agriculture and the Regulation of Agricultural, Raw Material and Food Markets. Approved Government Resolution No. 1352-r dated June 22, 2019.

Table 1
Division of agricultural enterprises provided with state support into groups in terms of profitability

Table 2 shows the growth in fixed-asset investment in the agricultural sector. Specifically, during the five years under analysis, fixed-asset investment jumped increased by less than 50%. This is a sign of the industry's investment appeal and possibilities for its substantial technical and technological upgrade. Notably, during the same period investment in the Russian economy grew by slightly more than 25%. This characterizes agriculture as a fast developing industry.

Item	Years					2018 vs. 2014, %
	2014	2015	2016	2017	2018	
Fixed asset investment, the entire economy	13,902.6	13,897.2	14,748.8	16,027.3	17,595.0	126.56
Total, %	100	100	100	100	100	
Of which:						
Agriculture, forestry, hunting, fishery and fish breeding	524.3	518.8	623.4	705.5	777.0	148.20
Total, %	3.8	3.7	4.2	4.4	4.4	+0.6%
Of high:						
Plant cultivation and animal husbandry, hunting and the provision of the relevant services in these segments	492.5	483.6	582.6	651.4	707.7	143.70
Total, %	3.6	3.5	4.0	4.1	4.0	+0.5%

*Compiled based on the analysis of Russia in Figures data. Brief Statistical Collection. - 2019. – 549 pages.

Table 2
Assessment of fixed asset investment in the agricultural sector

We think that a key point for the improved performance of agriculture is the development of innovative technology (Table 3).

At present, a modest share of agricultural producers introduces innovation in their activities on an intensive and comprehensive basis. Based on official data from the Federal State Statistics Service, from 1.3% to 4.2% of agricultural producers, depending on the sector, introduce technological innovation on a comprehensive and targeted basis.

In Russia, projects have been executed relating to management and production systems, the agricultural training fund and European machinery. Equipment for precision agriculture has been supplied by Eurotechnika GPS LLC, an official distributor of Trimble Agriculture (USA), AgLeader (USA), Amity (USA), Ntech (USA), OmniSTAR (the Netherlands) and Pessl (Austria).

AGPS EZ-GuidePlus navigation devices have been used in the Samara region since 2004. They are used annually to process pesticides and micro fertilizers in the area of 3,500 ha.

It was found that the entire field included an overlapping area of 8 ha, the area of crossing areas in the entire field totaled 3 ha, the aggregate area of overlapping and crossing sections amounted to 11 ha, with herbicides costing 712.00 rubles/ha.

When using AGPS EZ-GuidePlus navigation devices for parallel driving, funds saved on herbicide and fertilizers reached 15%, or 107.00 rubles/ha. Total funds saved for the cultivated area amounted to 374,500.00 rubles. Night operations during more favorable conditions (higher air humidity compared with daytime, open stomas of plants capable of absorbing protective means, etc.) made it possible to increase the efficiency of chemicals.

Item	Years		2018 +/- vs. 2017, %
	2017	2018	
Amount of domestic innovative agricultural products, shipped by enterprises, million rubles	28,446.0	33,829.1	+18.92
- cultivation of annual plants	10,625.8	10,260.1	-3.44
- cultivation of perennial plants	442.5	491.5	+11.09
- cultivation of sprouts	457.3	480.6	+5.09
- animal husbandry	16,602.3	21,732.2	+30.90
- mixed farming	0.0	213.6	x
- auxiliary activities in the production of agricultural crops and post-harvest processing of agricultural products	318.1	651.0	+104.69
Innovative agricultural products, work, services, re-introduced or after substantial technological changes, million rubles	20,957.7	25,581.4	+22.1
- cultivation of annual plants	9,446.0	8,152.6	-13.7
- cultivation of perennial plants	442.5	491.5	+11.1
- cultivation of sprouts	457.3	0.4	-91.3
- animal husbandry	10,430.5	16,211.2	+55.4
- mixed farming	0.0	213.6	x
- auxiliary activities in the production of agricultural crops and post-harvest processing of agricultural products	181.5	512.1	+182.2

*Calculated based on data from the Federal State Statistics Service (<https://www.gks.ru/>) and data from Russia in Figures. Brief Statistical Collection. - 2019. – 549 pages.

Table 3
Innovative activities in Russia's agricultural sub-industries

Crops on average increased by 1 c/ha during four years when navigation devices AgGPS EZ-GuidePlus were applied (2004-2007). While additional products received per ha of crops cost 300.00 rubles and the annual increase in profit from grain output exceeded 1 million rubles, i.e. funds spent to buy GPS devices paid back in less than a year. This model of the navigation system was replaced by more advanced and efficient devices (AgGPS EZ-Guide 252 and AgGPS EZ-Guide 500) that can be used to apply fertilizers and pesticides, to sow seeds, to map areas of fields, etc.

Based on the Samara-Solana OJSC in the Stavropol district of the Samara region, the parallel driving system AgGPS EZ-Guide 500 in combination with the EZ-Steer engine, which was studied during all types of field works, including soil cultivation, sowing and harvesting, turned out to be more efficient. It was established that this device provided high accuracy of up to 2 cm. In addition to fertilizers and pesticides, seeds and fuel were saved in the course of any operations, and the device's payback period was also one year.

As Table 4 shows, the specific weight of plant cultivation and animal husbandry products in all categories of agricultural output in 2018 in the Central Federal District and the Russian Federation was nearly the same. The situation is opposite in the Moscow and Yaroslavl regions (with plant cultivation and animal husbandry products prevailing accordingly).

Name of the region	Businesses of all categories		Agricultural producers		Individual enterprises		Farming enterprises, individual entrepreneurs	
	Plant cultivation	Animal husbandry	Plant cultivation	Animal husbandry	Plant cultivation	Animal husbandry	Plant cultivation	Animal husbandry
Russian Federation	50.2	49.8	45.7	54.3	48.0	52.0	76.9	23.1
Central Federal District	48.9	51.1	41.5	58.5	61.0	39.0	84.4	15.6
Belgorod region	31.8	68.2	24.3	75.7	77.9	22.1	85.3	14.7
Bryansk region	40.7	59.3	34.2	65.8	47.9	52.1	82.9	17.1
Vladimir region	38.2	61.8	21.5	78.5	78.3	21.7	42.3	57.7
Voronezh region	59.3	40.7	52.9	47.1	59.9	40.1	90.9	9.1
Ivanovo region	35.9	64.1	18.5	81.5	55.7	44.3	50.3	49.7
Kaluga region	41.2	58.8	26.6	73.4	73.4	26.6	30.9	69.1
Kostroma region	40.6	59.4	19.6	80.4	65.2	34.8	51.7	48.3
Kursk region	57.4	42.6	53.9	46.1	54.5	45.5	94.8	5.2
Lipetsk region	60.2	39.8	59.0	41.0	51.3	48.7	92.1	7.9
Moscow region	50.8	49.2	39.2	60.8	74.8	25.2	60.5	39.5
Orel region	66.5	33.5	65.9	34.1	52.3	47.7	91.7	8.3
Ryazan region	51.8	48.2	43.4	56.6	65.3	34.7	75.4	24.6
Smolensk region	34.8	65.2	24.3	75.7	51.3	48.7	52.1	47.9
Tambov region	56.4	43.6	53.6	46.4	46.5	53.5	90.3	9.7
Tver region	22.4	77.6	10.7	89.3	46.6	53.4	65.2	34.8
Tula region	59.6	40.4	53.2	46.8	61.7	38.3	88.1	11.9
Yaroslavl region	26.6	73.4	15.5	84.5	60.6	39.4	55.4	44.6
City of Moscow	84.0	16.0	85.8	14.2	92.9	7.1	5.1	94.9

*Calculated based on data from the Federal State Statistics Service (<https://www.gks.ru/>)
Table 4

Specific weight of plant cultivation and animal husbandry products in agricultural output in 2018 (in actual prices, %)

Plant cultivation products substantially prevail in the output of farming enterprises and individual entrepreneurs in the Central Federal District and the Russian Federation (84.4 and 76.9%, respectively). This means that there are no sufficient resources to expand opportunities for animal husbandry output. The resource potential of grain output in the Russian Federation plays a backbone role in the structure of the agroindustrial sector and in providing the country's food security. Grain crops are the main factor for the sustainable development of agriculture. As the Russian Federation holds sufficient land resources, grain growing plays an important role.

As global demand for gross grain production is on the rise, the grain market is very important in terms of the strategy. Another, no less important area of grain application, should be the higher output of animal husbandry products. Gross harvest in 2018 compared

to 2014 in terms of weight after the processing of grain and pulse crops at enterprises of all categories increased by 7.6% in the Russian Federation and 9.8% in the Central Federal District. As regards the Central Federal District, the indicator decreased by 3.7% in 2015, but increased by 7.1%, 22.7% and 9.8% from 2016 to 2018. However, gross harvest in terms of weight after the processing of grain and pulse crops at enterprises of all categories decreased by 10.5% in 2018. Forage output is currently decisive because it substantially impacts the country's agricultural production. Forage crops are not only a source of forage production, but also form the basis for the preservation of soil fertility. Rosstat data on gross output of forage crops show a downward trend, including in 2018, compared with 2014 in the Central Federal District (-29%, on average around 6% per year) and in the Russian Federation (-34%, an annual average reduction of 7%) as insufficient resources led to lower crops and areas under crop. As for gross production of melons and gourds at enterprises of all categories in 2014-2018, output in 2018 decreased compared with 2014 by 11.8% and 10.95% in the Central Federal District and the Russian Federation, respectively. However, the indicator in the Central Federal District grew, although less than 5%, in 2018 compared with the previous year. There was no crop of melons and gourds in the Moscow region in 2018. In accordance with the FAO – WHO standards, the personal consumption rate of various food items is 959.7 kg. Meat and milk consumption in the Russian Federation totals 701.6 kg, or 80% of the standard, and fish consumption accounts for 55% of the standard. At the same time, the consumption of main food items, above all vegetables, fruit, milk and meat per capita in the Russian Federation is substantially lower than in developed countries. This means that it is necessary to accelerate real production growth for all types of agricultural products. Since the 2000s, the Russian Federation has been implementing several policy documents aimed to improve the performance of the agricultural sector, including the national project "Development of Agriculture" (2006-2007), the Doctrine of the Food Security of the Russian Federation (2010), the State Program for the Development of Agriculture and the Regulation of Agricultural Product, Raw Materials and Food Markets for 2008-2012, the State Program for the Development of Agriculture and the Regulation of Agricultural, Raw Material and Food Markets for 2013-2020. Animal husbandry plays a key role in all of the above projects. The value of animal husbandry products is enormous. This sector provides households with food (eggs, milk, meat, butter, etc.). Overall, animal sources foods account for 60% of the population's diet.

From 2011 to 2018 the number of people employed, the cost of fixed assets and gross output in the current and comparable prices increased at a high pace in the district's agricultural sector, implying the sector was successful and can continue to expand production. As animal husbandry is not sufficiently profitable or unprofitable at current sales prices, most agricultural enterprises gradually reduce their livestock. Due to a contraction in livestock in Russia and, consequently, lower output in the agricultural sector, the share of grain resources used to feed cattle and poultry has been gradually decreasing. Most Russian scholars and agricultural professionals believe that instead of higher exports of Russian grain it is expedient to use grain crops to feed animals, thereby promoting the development of this sector, higher livestock and production. This area of grain use will allow the country not only to solidify its independence in terms of animal sources food consumption, but also to promote the creation of new jobs in the agricultural sector and at processing facilities.

Cattle production (in live weight) in 2018 increased by 34.8% and 6.2% in the Central Federal District and the Russian Federation, respectively, compared with 2014. The Central Federal District's results account for roughly 35% of the country's total numbers. Like cattle breeding, pig husbandry depends on the efficiency of feeding and rearing. From 2014 to 2018 pig output (in live weight) increased, including pig meat output in the Central Federal

District increasing by 40.7% in 2018 against 2014, with the Tver region taking the lead (output more than doubled). The country's indicator increased by 40.7% in 2018 compared with 2014 (like in the Central Federal District).

Conclusion

The assessment of the profitability rate for the production of main plant cultivation products, excluding subsidies provided, showed a 3% annual increase in 2018. The profitability rate of main animal husbandry products continued to decrease. General profitability (excluding subsidies) of animal husbandry decreased by 0.8%, while poultry farming and pig husbandry were increasing at a dynamic pace. Main manufacturers of agricultural products in the Central Federal District are agricultural producers. Agriculture is a fast-growing sector of the economy, which is underscored by strong investment and innovative activities. For this reason, the modernization and introduction of innovative technologies are an important direction for the improvement of performance.

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