

# Digitalization of agriculture in Russia: current state, problems and prospects of development

*Elena Ivanova*\*, and *Maria Glyzina*

Don State Technical University, Faculty of Innovative Business and Management, Department of Economics and Management, 344000, Gagarin square, 1, Rostov region, Rostov-on-don, Russian Federation

**Abstract.** The article examines the main trends in the development of agriculture in Russia, their positive orientation is noted, despite the threats and challenges that arise in the process of its progressive development. From the standpoint of an integrated approach, the problem field of this important sector of the national economy has been formed, which includes such interrelated components as: the retirement of large agricultural areas from business turnover; low rates of updating equipment for the industry; insufficient level of development of small farming forms in rural areas; low level of development of infrastructure organizations; lack of cheap investments for the industry development; low rates of digital transformation of business processes of agricultural production. The necessity of intensifying scientific research in terms of the digital transformation of the agricultural sector of the country is noted and a set of issues that are the most controversial on the analyzed problem is highlighted, including the state of the legislative framework; state support; personnel support for digitalization, the use of foreign experience, methodological support; strategic prospects. For each of the directions, the author's position is proposed, formed considering current state of digitalization in country regions and possibilities of its resource provision

## 1 Introduction

Agriculture, as the basic branch of the modern agro-industrial complex of the country, is a strategically important sphere of the Russian economy, providing the population with high-quality food of domestic production, which is an important component of the economic security of the state as a whole.

In the face of challenges and threats to the domestic agro-industrial complex, the agricultural sector, as part of all its structural elements, continues to demonstrate positive dynamics. According to Rosstat, agricultural production in Russia increased by 10.2% in 2022 compared to 2021 (in comparable prices). At the same time, the increase in the crop sector was 15.9%, and in animal husbandry – 2.4%.

To a large extent, positive trends in agriculture development are associated with its support from the state, which is explained by the organizational and economic features of

---

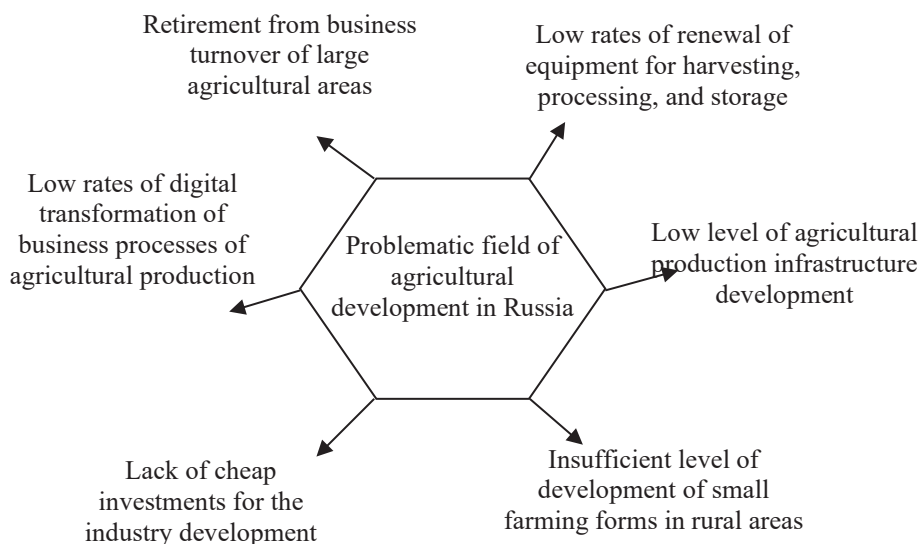
\* Corresponding author: [Elena\\_dstu@mail.ru](mailto:Elena_dstu@mail.ru)

this industry functioning and the difficult conditions of foreign economic activity in the context of the import substitution policy implementation.

In general, the types and procedures of state support for agricultural producers are currently regulated by Federal Law No. 264-FZ dated December 29, 2006 "On the Development of Agriculture" [1], the state program for the industry development for 2013-2025, approved by Government Decree No. 717 dated July 14, 2012 [2]. Thus, for example, in 2022, several programs of subsidizing the agricultural sector were implemented: grants intended for the development of peasant farms; subsidizing part of the interest on the loan; partial compensation for the construction of household facilities for the family; subsidies provided on a one-time basis to young farmers for the arrangement of their farms; repayment of part of the agricultural machinery leasing costs.

Agricultural producers are also supported in the regions. In the Rostov region, for example, their financial support is carried out in various forms in accordance with the Regional Law dated 16.12.2022 No. 795-ZS "On the regional budget for 2023 and for the planning period of 2024 and 2025" [3].

At the same time, despite the achieved results in the development of animal husbandry, crop production, a whole complex of factors of both objective and subjective nature hinders the further sustainable development of the agricultural sector of the Russian economy (Figure 1, compiled using sources [4, 5, 6]).



**Fig. 1.** The problematic field of agricultural development in Russia.

Most of the problems of the domestic agriculture development have already been sufficiently investigated in modern economic publications [7, 8, 9], but the issues of its digitalization require systematization, generalization of analytical materials already accumulated in this context and development of recommendations for further improvement of the digital transformation of business processes of agricultural production.

## 2 Materials and Methods

When working with the sources, the Scopus and the Web of Science database in the field of agriculture digitalization were used. The sources were analyzed over the past five years in Russian and English from among those published in specialized journals.

Comparative research and classification of materials was carried out by keywords: agriculture, digitalization, animal husbandry, crop production, digital platforms, state support for agriculture.

The information base of the study was made up of policy materials in the field of digital transformation of agriculture; official statistics of Rosstat. The following scientific methods were used: analysis, generalization, logical interpretation of data.

### **3 Results**

As a result of the study, the problem field of agriculture in Russia was formed and the causes of its individual components were identified. The process of agriculture digitalization is presented in the form of a number of interrelated components, the development of which in the strategic perspective will optimize the business process of digital transformation of the country agricultural sector.

### **4 Discussion**

The issues of agricultural sector digitalization are currently widely considered in economic publications, are the result of active discussion at conferences of various levels. The study of these analytical materials allows to conclude that the following issues are the most controversial (Figure 2, compiled using sources [10, 11, 12, 13]).

Let's consider each of the discussion areas, considering the points of view of various authors, and propose our own version of their improvement and further development for some of them.

The economic literature has already fully developed an understanding of digital agriculture as an economy that operates using various digital technologies, as well as innovative methods of agricultural production.

The basis of the legislative framework of the agriculture digitalization process is the national project "Digital Agriculture", the implementation of which will be carried out in the period 2019-2024 [14]. Within the framework of this project, the conceptual foundations of the national platform "Digital Agriculture" were developed, which includes the most promising areas: blockchain technologies; big data; elements of small mechanization; artificial intelligence; Internet of Things; satellite navigation and control systems.



**Fig. 2.** The most controversial issues are the problems of agriculture digitalization.

Further development of the legislative framework should be carried out, in our opinion, in the direction of considering the specifics of individual forms of management in the agricultural sector, in particular agricultural holdings. This is due to the fact that their activities form an optimal level of intersectoral interaction, have economies of scale, lead to cost reduction, and actively implement the main strategic directions for achieving the country's food security.

The main directions of digitalization include its two main sectors: animal husbandry and field breeding, on which development level the country's food security largely depends [15].

In the future, it is planned to expand the scale of state support to the agricultural sector of the country. At the same time, special attention will be paid to small farming forms in rural areas, for which such types of farming will be used: grants for newcomer farmers; reimbursement of part of the loan costs; financial support for livestock breeding; reimbursement of part of agricultural production costs [16].

All areas of digitalization in agriculture need a thorough feasibility study to prevent the implementation of inefficient solutions. In this regard, it is necessary to develop detailed methodological guidelines for calculating the economic efficiency of the digital transformation of business processes of agricultural production, considering the specifics of agriculture sub-sectors.

Digital technologies in agriculture include a wide range of solutions, ranging from small mobile applications that are used to support solutions, to role-based sensors and remote sensing technologies used for data collection, as well as drones and general-purpose robots [17].

Promising areas are the following: tracking of agricultural machinery, use of unmanned aerial vehicles, Big Data technologies for processing large arrays of information.

The staffing of this business process is of particular importance for the systematic solution of the problems of agricultural production digitalization. In this area, it is extremely necessary to increase the training of IT agronomists, IT-zootechnicians, and other specialists in the digital direction. The improvement of the personnel component will

allow to activate the process of introducing digital technologies into the production processes of the agricultural sector.

The success of agriculture digitalization in Russia undoubtedly depends on the use of positive foreign experience with its adjustment to the specifics of the domestic agricultural sector. Such a fairly detailed analysis is considered in the available publications, in which a special place is given to such countries as Germany, Switzerland, Ireland.

To activate the digitalization process, it is advisable to organize foreign internships of Russian specialists in these countries and partially compensate for the necessary costs from federal or regional budgets while maintaining the co-financing principle.

The central point in the entire system of agriculture digitalization is the issue of its proper financing. Due to the fact that agricultural production has a high level of risk, it is necessary to minimize various risks using effective mechanisms for the inflow of investments in the industry.

Considering a certain technological lag in the digital transformation of the domestic agro-industrial complex from a number of developed countries, it is assumed that the share of digital technologies in agriculture will increase every year with the expansion of the scale, as well as types and forms of state support. The priority in this regard should be as follows: robotics, the use of the Internet of Things, precision farming, "smart farms", raw materials management.

Such strategic directions in the development of the business process of agriculture digital transformation are more or less recognized by many researchers of the analyzed problem [19, 20] and can be accepted as a basic option for the agricultural sector transformation.

## Conclusions

Agriculture in Russia as a strategic sector of the agricultural and industrial complex of the country as a whole is developing dynamically, showing a steady trend towards growth and innovative development. At the same time, the presence of threats and challenges of modern market processes lead to the presence of a number of systemic problems in the field of agro-industrial production, the solution of which in modern conditions is associated with agricultural production digitalization. To solve such a complex task in the strategic perspective, it is necessary to improve the regulatory framework of the digitalization process, its methodological support, increase the scale of state support, improve digital technologies and platforms using various sources of financing and positive foreign experience.

## References

1. Federal Law No. 264-FZ of December 28, 2006 "On the development of agriculture" Retrieved from: [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_64930](http://www.consultant.ru/document/cons_doc_LAW_64930) Accessed: 12.04.23. [in Rus.]
2. Decree of the Government of the Russian Federation of 14.07.2012 No. 717 "On the State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets" (2012). Retrieved from: <https://www.consultant.ru/cons/cgi/online.cgi?req=doc&rnd=smqmQ&base=LAW&n=443057&dst=143738&field=134#NUctKbTdgi4gD1CW> Accessed: 12.04.23. [in Rus.]
3. The Regional Law of the Rostov region dated 12/16/2022 No. 795-ZS "On the regional budget for 2023 and for the planning period of 2024 and 2025 Retrieved from:

- [https://pravo.donland.ru/doc/view/id\\_16122022\\_33220/page/1/](https://pravo.donland.ru/doc/view/id_16122022_33220/page/1/) Accessed: 10.04.23. [in Rus.]
4. A. Golubev, A. Golubeva, Scientific Works of the Free Economic Society of Russia **229**, 196-209 (2021) 10.38197/2072-2060-2021-229-3-196-209.
  5. M.N. Kabanenko, L.I. Dubrova, Current state and prospects of agricultural development in Russia, Economics, Entrepreneurship, and Law **10(3)**, 715-728 (2020) doi: 10.18334/epp.10.3.100688
  6. A.N. Anischenko, Food Policy and Security **6(2)**, 97-108 (2019) doi: 10.18334/ppib.6.2.41384
  7. V.E. Torikov, V.A. Pogonyshev, D.A. Pogonysheva, *State and prospects of digital transformation of agriculture*, Bulletin of the Ryazan State Agro Technological University n.a. P.A. Kostychev (2022). 10.36508/RSATU.2022.54.2.013.
  8. K. Kurbanov, *Activation of innovation activity and digitalization are the most important factors in the development of the agro-industrial complex of the south of russia*, Regional problems of economic transformation 31-38 (2022). 10.26726/1812-7096-2022-10-31-38.
  9. M. Balykhin, E. Astrakhantseva, *Digitalization is the main vector of development of agriculture in Russia*, Storage and processing of agricultural raw materials 146-157 (2022). 10.36107/spfp.2021.300.
  10. Sh.X. Zavraev, A.S.-A. Khasukhadzhiev, Digital transformation of agriculture 132-134 (2022) 10.36684/59-2022-2-132-134.
  11. J. Alves Justo Mendes, N. Gabriela Pereira Carvalho, M. Neves Mourarias, C. Barbosa Careta, V. Gomes Zuin, M. Cecílio Gerolamo, Sustainable Production and Consumption **34**, 613-637 (2022) 10.1016/j.spc.2022.09.027.
  12. K.G. Engås, J.Z. Raja, I.F. Neufang, Technological Forecasting and Social Change, **190** (2023) doi.org/10.1016/j.techfore.2023.122405.
  13. H. Lingireddy, K. Bhargava, B. Madhusudhan, C. Teja, E. Abhishek, B. Sri, *An Overview of Digital Technologies in Agriculture and their Applications* 750 (2023)
  14. M. Oborin, Agrarian Bulletin of the **220**, 82-92 (2022) 10.32417/1997-4868-2022-220-05-82-92.
  15. National Project "Digital Agriculture" Retrieved from: <https://mcx.gov.ru/upload/iblock/900/900863fae06c026826a9ee43e124d058.pdf> Accessed: 12.04.23. [in Rus.]
  16. Z. Podoba, A.A. Moldovan, A.A. Faizova, Problems of Economic Transition **62**, 707-720. doi: 10.1080/10611991.2020.2062208.
  17. S. Surabhi, S. Avinash, K. Sumit, Journal on Information Technology, **11**, 30 (2022) 10.26634/jit.11.4.19085.
  18. O. Sanzhina, E. Itygilova, E. Vanchikova, E. Imeskenova, E. Vanzatova, Bulletin of Kazan State Agrarian University **17**, 167-173 (2022) 10.12737/2073-0462-2022-167-173.
  19. M. Shatilov, A. Razin, M. Ivanova, *Business Transitions in the Digital Economy: Perspectives from Agriculture* (2021). doi: 10.1007/978-3-030-58823-6\_23.
  20. I. Sandu, I. Kirova, N. Ryzhenkova, *Economy of agricultural and processing enterprises* 32-39 (2021). doi: 10.31442/0235-2494-2021-0-8-32-39.