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PROBLEM OF TRANSFORMING AGRICULTURAL SECTOR OF RUSSIAN ECONOMY TOWARDS A DIGITAL BASIS

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Abstract

The article deals with the problem of establishing the conditions for transforming the agricultural sector of Russian economy towards a high-tech digital basis. The purpose of the study is to determine the real state of the agricultural sector of the Russian economy and to develop recommendations for the introduction of modern highly intelligent digital technologies into the agricultural production process. The study followed a systematic approach to justify the need of public debt application to raise the rates of economic growth. The research revealed that these activities are failing to develop in most regions of the country. The reason is that agricultural production is still mainly developing according to the extensive type of production. The problems of accelerated transforming the agricultural industry towards an intelligent digital basis are identified. It is proved that during the post-reform period in Russia, the process of restoring the balance of agricultural land and introducing new land plots into the production was underway, for this reason, a platform for the large-scale transformation of the agricultural sector towards a highly intelligent digital basis has not been prepared. Therefore, the main type of the agricultural sector development still remains an extensive type of production. It is revealed that the main reason for the impossibility of accelerated and large-scale transformation of the agricultural sector to a high-tech digital basis is also the lack of appropriate organizational work at the level of regions, ministries, and departments.

Keywords: Agricultural industry, digital economy, fixed assets, high-tech development, organization of production, production efficiency

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1. Introduction

Developed agricultural production is one of the main factors showing the economic and food independence of the country from the economic policies of other countries. During the post-reform period, the agrarian sector of the Russian Federation economy has experienced all sorts of obstacles to become an economically developed, food-independent country. For a long time, the Russian Federation had been importing agricultural products that could be sufficiently produced in the country. With the announcement of economic sanctions by Western countries, programs for leading the economy out of import dependence, including within the agricultural sector, began to be implemented in the Russian Federation. However, activities undertaken in connection with import substitution, in general, consist in the development of an extensive type of agricultural production, mainly through the agricultural land expansion (Mokhov et al., 2021).

In this regard, it should be said that the introduction of modern scientific developments, the use of digital technologies and the transfer of agricultural production to a high-tech, innovative basis is becoming an urgent problem for our country (Degtyarev, 2017).

2. Problem Statement

The objective of the study is to develop recommendations on the establishment of promising directions for the development of the agricultural sector of the Russian economy within the economy transformation towards a digital basis.

3. Research Questions

To solve the problem, it is necessary to consider the following research questions:

i. studying the state of the agricultural sector of the Russian Federation economy in addressing the food security issue;
ii. studying the problem of the introduction of modern information, intelligent technologies in the agricultural production process;
iii. consideration of agricultural production as one of the knowledge-intensive areas;
iv. determination of the main development vector for the agricultural sector over the long-term.

4. Purpose of the Study

The article is aimed at developing recommendations for the agricultural sector development in the Russian Federation based on intelligent digital technologies in addressing the issue of minimizing the dependence of the food production process on natural and climatic conditions.

5. Research Methods

Modern agricultural production in economically developed countries is a process of using modern scientific developments in the field of agricultural production (Anishchenko & Shutkov, 2019). In the

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Russian Federation, this process has the same vector of development. It should also be noted that the pace of implementation of scientific developments in agricultural production in our country is slow. In order to investigate the implementation level of scientific developments in the process of agricultural production, it is necessary to study the state of the Russian agricultural sector, the reasons for its lagging behind the agricultural sector of developed countries. For this purpose, in Table 01, we provide data illustrating the innovative activity of organizations in the agricultural sector of the Russian economy. It is well known that innovations are new developments introduced into the production process that facilitate the efficiency of this process. Efficiency enhancement of the production process is characterized by the quality improvement and an increase in the amount of products produced. The data presented in Table 01 show the share of innovative products in the total output of Russian agricultural organizations.

Table 1. The unit value of certain categories of innovative products in the total volume of goods shipped by Russian agricultural organizations, as a percentage

Types of agricultural products	Years			
	2017	2018	2019	2020
Total volume of shipped agricultural products	1.9	1.5	1.5	3.2
Proportion of annual crops value	1.9	1.5	1.5	3.2
Proportion of perennial crops value	3.1	2.4	2.1	3.6
Proportion of seedlings value	5.4	4.4	2.5	2.0
Proportion of livestock products value	1.7	2.1	3.3	1.8
Proportion of mixed agricultural products value	0.0	1.4	2.4	2.3
Proportion of value of ancillary works related to the agricultural crops production and post-harvest processing of agricultural products	1.8	3.5	0.5	0.9

The production of innovative products indicates that this enterprise implements modern high-tech methods of cultivation, processing, and storage of agricultural products in the production process. Innovative products are also distinguished by their quality and high competitiveness in the market.

Table 1 reflects the data characterizing the production process in the agricultural sector of Russia. Firstly, these data show a small share of innovative products. If all shipped products amount to 100 %, then for all innovative products it is only 15.8 % in 2017, 16.8 % in 2018, 13.8 % in 2019, 17 % in 2020. The share of innovative products for each specific type of product is even less. Secondly, the production dynamics of innovative products does not change during the entire study period. Thirdly, the situation with the production of crop products is, to a certain extent, better than with the production of livestock products. In general, it could be said that in the agricultural sector of the Russian economy, the production development of the innovative products is at an early stage.

The unit value dynamics of innovative agricultural products produced in the country is presented by the histograms in Figure 01.

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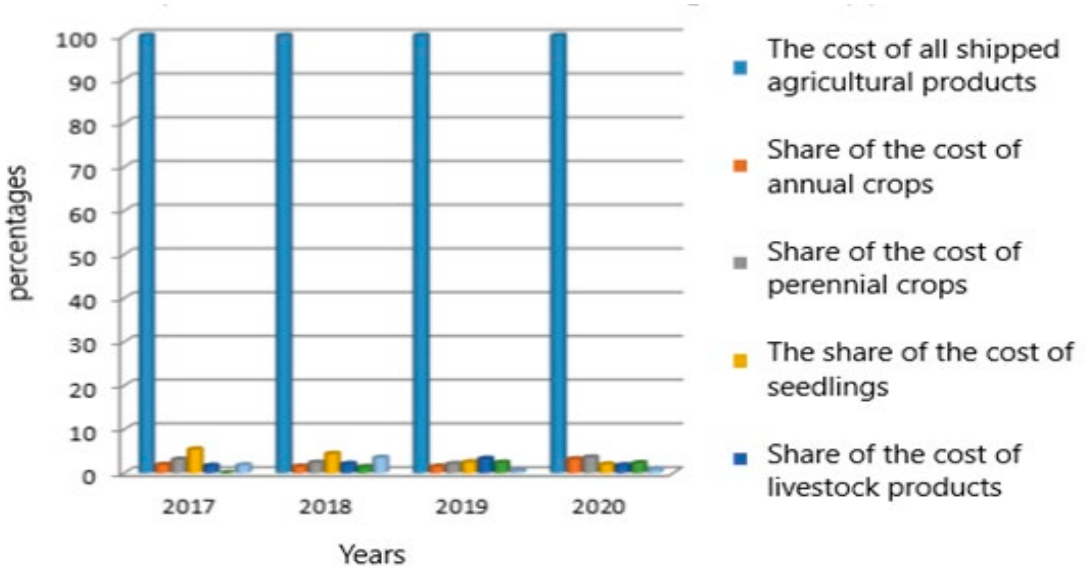

Figure 1. Histograms of the proportion of innovative agricultural products value in the total volume of shipped products in the Russian Federation for 2017–2020

The insignificance of innovative products share in the total volume of shipped agricultural products in Russia, as shown by the histograms in Figure 01, indicates the absence of investment activity by agricultural organizations. In addition, it indicates the non-implementation at the regional level of the state policy that promotes the renewal of agricultural machinery and the introduction of modern technologies for growing and processing agricultural products. This is despite the fact that such equipment and technological developments, already available in the country and in the world, are recognized as advanced scientific developments (Gorelov & Korableva, 2017). Inefficient regional financial policy and the economic lag of the agricultural sector in Russia are the main reasons for the technological underdevelopment of the agricultural sector of the Russian economy in comparison with the agricultural sectors of the economies of economically developed European countries.

In order to investigate the problem of transforming the agricultural industry towards intelligent digital basis, it is necessary to analyze and determine the capabilities of the economy to introduce scientific developments and the application scale of scientific developments in the agricultural production process.

Digitalization of the economy is not a large-scale act that simultaneously covers the entire economy. Digitalization is a process of gradual introduction into the production process, simultaneously with the introduction of scientific developments into this process. If new scientific developments are not being introduced into the economy of a country (region) or poorly implemented, then the successful digitalization is out of the question. Let us consider the state of the agricultural sector digitalization of the Russian economy from that standpoint.

The digital economy is characterized by high quality of the economic activity results, accelerated rates of the production process (Voronin et al., 2019). When one considers these qualitative and quantitative characteristics from the agricultural production perspective, it should be borne in mind that numerous types of products in this industry makes the process of introducing digital technologies into the economic activities of this sector very diverse (Anfinogentova et al., 2016). Scientific research of

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agricultural crops types, development of technical means and technological methods of their production, depends on the physiological characteristics of each specific type of product.

Thus, the production of all types of agricultural products presents itself as an area of active application of digital technologies (Hegazy & El-Sheikha, 2021). The fact that nowadays, the main factors of agricultural production, along with labor resources, are land and climatic conditions should not be also overlooked. Practice shows that the Land and climatic conditions are, in many regions of our country, as well as in other countries of the world, aggressive environments, dangerous for the cultivation of many vital agricultural products. An aggressive environment can minimize the results of introduction of scientific developments into the agricultural production sector. However, it should be kept in mind that science-based policy can help the state in addressing the issue of an aggressive environment for growing agricultural products by reducing the influence of these factors on the production process of these products.

This is possible only through the scientific organization of labor in the agricultural sector. In world practice, there are quite a lot of examples of the transition from the method of using large areas of agricultural land to the greenhouse form for organizing the production of various types of crops. The large-scale use of greenhouse production based on modern technologies for growing agricultural products makes it possible to transform the economy of the agricultural sector from a state dependent on aggressive natural and climatic conditions to a state of independence from these conditions, to conditions that allow the effective use of scientific developments, providing the quality improvement of grown products and increase the number of these products.

The innovative development of the economy, respectively, and the agricultural sector, should be carried out on the basis of intelligent digital technology, allowing proper calculation of substances proportions necessary for the correct formation of the high-quality products structure, in the case of food production and human diet.

An intelligent digital economy is the state of the economy in which the quality and quantity indicators of final product is a material for keeping records of subjects (Bhattacharjee & Saravanan, 2016). Enterprises have conducted the accounting for the source and final material for a long time.

Accounting is a digitalization tool of the economy, just as digitalization itself is a tool for successful economic organization. This raises the following question: accounting as a tool of the digital economy has existed so far, then why have many countries, including our country, failed to establish a developed economy? The response to that question lies on the plane of the production process organization, which directly depends on the economic policy implemented in the country.

Russia has gone through a period of planned economy in Soviet times, in which all expenses, income, production activities results, property were accounted for both at the level of economic entities and at the total economy level. It should also be emphasized that quantitative characteristics of economic activity were accounted, and the quality of produced products and provided services were not the subject of the accounting policy implemented by business entities. There was no clear mechanism for product quality and product quality control accounting. Therefore, the Soviet system of material goods production can be called costly and irresponsible for the quality of the products produced.

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Modern Russia, during the reforms of the 1990s, passed the stage of barbaric seizure of state resources, which lasted over the period 1991–2000. The economy of the country experienced a protracted crisis. The privatization of property and land resources in the agricultural sector has led to the collapse of production ties between organizations in this sector and the halt in agricultural production. The market was saturated with imported agricultural products.

From the beginning of the XXI century to the present day, Russia has been undergoing a stage of economic recovery with the use of elements of a market management system. The recovery is also taking place in the field of agricultural production. It is primarily related to the development of a multi-layered agricultural economy (Krylatykh & Lishchenko, 2015). Although such an approach to the organization of agricultural production is not effective, as the practice of the agro-industrial complexes development of economically developed countries shows (Lowder et al., 2016).

In addition, this stage is characterized by the restoration of the agricultural land fund in order to produce a sufficient amount of agricultural products to lead the country out of imports dependence on these products. Measures taken in this direction intensified due to the economic sanctions announced by Western countries against our country. At the moment, the Russian state has coped with the task of import substitution for agricultural products, ensuring the food security of the country.

Nevertheless, the task of creating conditions for transforming the agricultural sector to an intelligent digital basis has not been solved yet. One of the main problems, in our opinion, for solving this problem is the presence of a multi-layered system of agricultural production.

Table 2. Output of agricultural products by categories of farms in the total volume of agricultural products produced in the Russian Federation for the period from 2015 to 2020, bln rub

Agricultural products	Years							
	2017		2018		2019		2020	
	Sum	As a % of the total sum	Sum	As a % of the total sum	Sum	As a % of the total sum	Sum	As a % of the total sum
Total amount of agricultural products	5109	100	5349	100	5801	100	6469	100
Total amount of agricultural products produced by large agricultural organizations	2819	55	3022	56	3348	57	3787	58
Total amount of products produced by households	1655	33	1657	32	1660	27	1718	26
Total amount of products produced by peasant (farm) enterprises	636	12	670	12	793	16	964	16

The data in table 02 indicate the presence of different categories of farms. In addition, during the study period, the products produced by population households and peasant (farm) enterprises that poorly introduce modern technologies into the production process do not decrease. For example, in 2020, the share of products produced by households and peasant (farm) enterprises in the aggregate is 42 %, and for large agricultural organizations 58 %. Such a situation with the production of agricultural products

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suggests that the prerequisites for the transition to innovative agricultural production have not been created in Russia yet.

Based on the data provided in Table 02, histograms reflecting the dynamics of the products share produced in the Russian Federation by different categories of enterprises have been compiled. These histograms are presented in Figure 02.

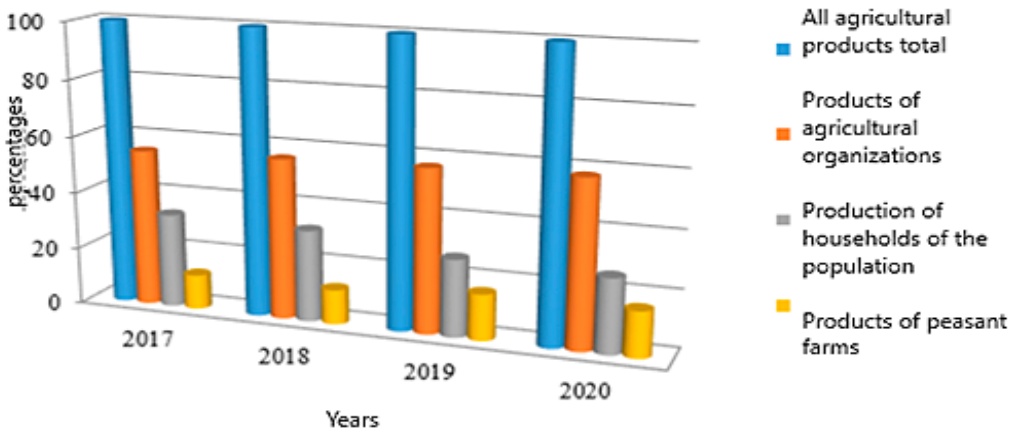

Figure 2. The dynamics of agricultural production share by all categories of enterprises in the Russian Federation

The histograms in Figure 02 show that the share of agricultural products produced in the population households and peasant (farm) enterprises is almost half of the total volume of agricultural products produced in the country. It should be said that, within the introduction of new technologies, it is positive that the share of products produced by the population households tends to decrease, the products produced by large agricultural organizations tend to increase.

6. Findings

The study of the agricultural sector state of the Russian economy, conducted in the context of ensuring the state food security, showed that the agricultural sector is a sphere of scientific research, and numerous products of this industry makes the process of introducing scientific developments and digital technologies into the economic activities of this sector very diverse.

The study of the issue addressing the introduction of modern information, intelligent technologies in the process of agricultural production reflects the slow pace of the introduction of scientific developments in agricultural production. For this purpose, the data characterizing the innovative activity of organizations in the agricultural sector of the Russian economy are analyzed. In general, it could be said that in the agricultural sector of the Russian economy, the production development of the innovative products is at an early stage.

The study of the issue related to the consideration of agricultural production as one of the knowledge-intensive industries has shown that sufficient measures have been taken in the Russian Federation at the federal government level to prepare the economy, in particular its agricultural sector, for

the transition to innovative production, which is based on modern digital technologies. The process of producing agricultural products by extensive methods is still ongoing at the level of regions, relevant ministries, and departments.

The issue addressing the problem of determining the main development vector of the agricultural industry has been investigated, taking into account the prospects for the development of this industry in Russia. The transformation of the agricultural industry to an intelligent digital basis is considered as the main development vector of agricultural production.

The pace of transforming the agricultural sector of the Russian economy towards an intelligent digital basis depends on a number of problems that hinder this process. The main problems of innovative development of the agricultural sector are the complexity of the agricultural production organization and the application of a predominantly extensive type of production development.

7. Conclusion

In the Russian Federation, the process of the agricultural sector development has the same vector as in countries with developed economies. However, the measures developed at the federal government level to transform the agricultural sector into an intelligent digital basis are poorly implemented at the regional level. The production of agricultural products is carried out on the basis of old technologies. The technological underdevelopment of the agricultural sector of the Russian economy in comparison with the agricultural sectors of economically developed European countries is due to the inefficient regional financial policy.

In order to carry out the transformation of the agricultural industry to an intelligent digital basis, it is necessary to have the appropriate financial and economic opportunities to introduce scientific developments into the agricultural production process.

The study shows that from the beginning of the XXI century to the present day, Russia has been undergoing a stage of economic recovery with the use of elements of a market management system. The recovery is also taking place in the field of agricultural production. It is primarily related to the development of a multi-layered agricultural economy. Although, such an approach to the organization of agricultural production is not effective, as evidenced by the practice of agro-industrial complexes development in economically developed countries.

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