Agricultural holdings: current state and prospects for digital transformation

Maria Glyzina1*

1Don State Technical University, 344010 Rostov-on-Don, Russia

Abstract. An integrated approach is applied in the paper to consider the essence of regional agricultural holdings, characterize their types and possible options of organizational structure. The main advantages of agricultural holdings amongst other forms of management used in national agricultural sector are systematized, the problem field of their current operation is identified. The major strategic directions for improving business processes of agricultural holdings as vertically integrated structures in conditions of innovative economy and its digital component are defined. One of the main areas of the ongoing systemic transformations is the creation of vertically integrated forms of management (agricultural holdings), which by their nature react flexibly to changes in the agricultural market, have great socio-economic importance and demonstrate high performance.

1 Introduction

Currently, a large-scale modernization of national agricultural sector is carried out in Russia in order to ensure sustaining higher economic growth, increase the level of competitiveness of the national agricultural business in addressing the problem of import substitution of the main types of agricultural products and achieving sustainable trends in the functioning of rural settlements.

One of the main areas of the ongoing systemic transformations is the creation of vertically integrated forms of management (agricultural holdings), which by their nature react flexibly to changes in the agricultural market, have great socio-economic importance and demonstrate high performance.

The activities of agricultural holdings in the national agro-food complex provide an optimal level of intersectoral cooperation, achievement of economies of scale, raising the technological level of agricultural production, reduction in the costs, and implementation of the main strategic directions for achieving the country's food security.

Agricultural holdings play a crucial role in the process of implementing innovations in the agricultural sector, including advanced technologies of soil tillage, efficient ways of using mineral fertilizers and also agricultural management information technologies.

Despite such positive features of agricultural holdings, certain problems and negative trends have emerged in their activities in recent years, which should be addressed as a

* Corresponding author: mariglyzina@mail.ru
matter of priority. Among the main ones are: - concentration of agricultural land in agricultural holdings, which poses a direct threat to the further development of small and medium-sized agricultural businesses, - a clear focus on the sale of agricultural products for export, - rise of unemployment due to the increase of technical equipment of agricultural production and switch mainly to monoproductions, - widespread use of GMO, - increased rate of agricultural sector monopolization, which creates an opportunity for several owners of corporate plan to form the level of prices for basic foodstuffs.

Digital technologies have not yet been properly developed in agricultural holdings, since their application is not massive, but is limited to individual examples. The level of implementation of innovative solutions relevant to the conditions of the mature agricultural market is low, which reduces the synergistic effect obtained from the activities of the agricultural sector in the national economy system.

2 Materials and Methods

The problem of establishing and developing agricultural holdings is currently one of the most popular in the overall range of topical issues related to the development of the national agricultural sector [1-6]. First and foremost, it concerns the essence of agricultural holdings as a structural element of modern forms of management used in all sub-sectors of the national agricultural sector with their inherent specifics.

The study found that in the world and national literature there is no officially accepted definition of agricultural holding at all levels of management. Most often, it refers to quite specific, legally designated forms of enterprises. In the Russian Federation, the current draft law "On holdings" has not yet been adopted.

The exploration of various approaches to the definition of agricultural holdings, presented in the works of Russian scholars [7-9], allows to determine them as vertically integrated structures which combine under a single leadership such heterogeneous business processes as procurement of agricultural raw materials, manufacture of final products, as well as attracting additional investment resources from both legal entities and individuals for creating and implementing initiative projects to develop corporate economic potential. At the same time, an agricultural holding as a structure is represented by different legal entities which are connected by a system of contractual relations, with the parent company playing a leading role in relation to subsidiaries of such vertically integrated structure.

Types of agricultural holdings can be distinguished according to different criteria, depending on the specifics of their organization and operation (Figure 1, composed by the author).
In Russia, agricultural holdings were created under the following circumstances.

1. Following the economic crisis of 1998, the Russian market was cleared for the activities of national agricultural producers for the reason that food import became unprofitable.

2. Integration into an agricultural holding provides an opportunity for individual agricultural enterprises to overcome unprofitability or low profitability and shift to a better development path.

3. The bankruptcy of some agricultural producers offered a real opportunity to investors to acquire their movable and immovable property at significantly lower prices.

4. The Land Code adopted in 2001-2002 guaranteed private ownership of land and provided ample opportunities for its purchase and sale, which, in turn, was a powerful incentive for the implementation of integration processes in agriculture.

5. The strategy was implemented for diversifying financial risks which were intensified due to the sharp increase in prices of fuel and lubricants and decrease in prices for agricultural products, including grain, poultry, pork.

A systematic study of agricultural holdings is complicated by the fact that in Russia there is no reliable statistics on agricultural holdings. However, certain approaches are suggested that do not yet have institutional confirmation. Thus, the Center for Agricultural Policy of the RANEPA (Russian Presidential Academy of National Economy and Public Administration) conducted a study, during which a methodology was developed for identifying agricultural holdings and forming a system of statistics on them. For this purpose, the database of the Ministry of Agriculture on 20,000 agricultural enterprises was used. The founder of each agricultural enterprise was taken into account, and they were grouped. If the share of any founder accounted for more than two companies, such a structure was recognized as an agricultural holding. It is significant that the researchers took into account only the ultimate owner [10].

Thus, we can conclude that the formation of an adequate legislative framework on the activities of Russian agricultural holdings is required. Currently, their functioning is

---

**Fig. 1. Types of agricultural holdings.**

<table>
<thead>
<tr>
<th>Types of agricultural holdings</th>
<th>Vertical (companies combined into a single production chain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on production integration</td>
<td>Horizontal (combination of homogeneous businesses)</td>
</tr>
<tr>
<td>Based on the form of ownership</td>
<td>Diversified (combination of agricultural enterprises which are not in any way related)</td>
</tr>
<tr>
<td>Based on the type of dependency</td>
<td>State-owned</td>
</tr>
<tr>
<td></td>
<td>Private</td>
</tr>
<tr>
<td></td>
<td>Property (based on a controlling stake)</td>
</tr>
<tr>
<td></td>
<td>Contractual (relationships are shaped under a certain contract)</td>
</tr>
<tr>
<td></td>
<td>Organizational (relationships arise in case of one-time circumstances)</td>
</tr>
</tbody>
</table>

---

indirectly regulated by a number of legal acts, which significantly reduces the ability of these corporate structures to exercise their rights and duties. It cannot be considered as a positive development in the general system of state management of the country’s agricultural sector. In addition, business processes of agricultural holdings do not have a clearly defined legal scheme, which reduces the effectiveness of managerial decisions taken in different areas of their operating, investment and financial activities.

The development of a comprehensive legal and regulatory framework for agricultural holdings will improve their performance, have an impact on the economic situation in the country as a whole and ensure the attraction of additional investments needed for their current and strategic development in difficult conditions of macroeconomic instability and turbulence of external environmental factors.

3 Results

The development of the modern agricultural sector in Russia takes place in difficult conditions of instability of foreign economic situation, extension of the system of sanctions, devaluation of the national currency. Despite these factors, in order to ensure national industrial security, the priority task of the country’s agro-industrial complex is to develop a highly competitive agricultural sector as part of the national economy, build its export capacity, increase investment attractiveness and solve social problems of the development of rural settlements.

An important role in addressing these issues is played by the forms of management that are now used in agricultural production in different regions of the country in the new economic context. The very concept of “form of management” is ambiguously interpreted in the works of Russian scholars. Such categories as “legal organizational forms”, “agricultural enterprises” and “economic structures” are used along with “forms of management” synonymously.

The viewpoint of T.P. Maksakova is fair, since she believes that the forms of management, when considered at the micro level, represent both a system of objective economic relations determined by property relations, and a set of interrelated methods of conscious regulation of internal and external business processes by economic entities [11].

The legal organizational forms of economic entities operating in the regional agro-industrial complex are the way of securing, i.e. forming and using by the company of its property, and the legal status and business goals arising from this provision [12].

In accordance with the specified regulatory act, the classification of economic entities in the agro-industrial complex by legal organizational forms is presented in Figure 2.
Agricultural holdings are not legal entities but large vertically integrated structures. In other words, they are agricultural companies with an integrated structure and a full cycle of production and processing of agricultural products. They have considerable in value assets in the Russian Federation, including arable land, livestock, grain elevators, reservoirs for cultivating fish, facilities for the production of mixed fodders, as well as infrastructure organizations.

The structure of an agricultural holding reflects its specifics and is shown in Figure 3, composed by the author.

---

**Fig. 2.** Classification of agro-industrial enterprises by legal organizational forms, *Source: https://www.consultant.ru/document/cons_doc_LAW_139192*
The general features of the modern Russian agricultural holdings include [13]:
- increased specialization of structural units, when the parent company carries out financial, investment, marketing and commercial activities, and subsidiaries and branch network are responsible for production, processing, and storage of agricultural products,
- agricultural production takes place on lands which are located in different regions of the country.

At present, 61 agricultural holdings operate in the country. Each of them, on average, has more than 100 thousand hectares of agricultural land. 4 of them are located in the Rostov region [14]. The best-known agricultural holding in the region is “Yug Rusi”. It is composed of “AgroSoyuz Yug Rusi”, “Yug Rusi” Trading house, OOO “Yug Rusi Trading” (LLC) and OOO “Yug Rusi Agro” (LLC). “AgroSoyuz Yug Rusi” includes more than 20 agricultural enterprises located in the Rostov and Volgograd regions, as well as in Krasnodar Krai, which represent about 200 thousand hectares of agricultural land [15].

“Yug Rusi” Trading house sells the products of the agricultural holding under the well-known trademark “Zolotaya Semechka” (“Golden Seed”), for which the distribution network was developed with facilities located throughout the Russian Federation and in foreign countries.

Despite a number of negative aspects in the activities of Russian agricultural holdings (impeding the development of small farms, monopolization of the agro-industrial complex, rising unemployment in rural areas, export of significant volumes of agricultural products), they have obvious advantages over other forms of management. Advantages of agricultural holdings in comparison with other forms of management in the agro-industrial complex are presented in Figure 4.

All researchers of the phenomenon of national agricultural holdings associate the prospects for their further development with the intensification of innovative activity in all structural divisions that form them. Under modern conditions, the level of competitiveness of agricultural holdings directly depends on using the results of innovative activity, which allow increasing the amount of value added due to a significant increase in productivity, despite the scarcity of all types of resources used in the agricultural production.

In addition, a strategically important area for developing agricultural holdings is the introduction of digital technologies. Statistical data show that the index of digitalization and intensity of digital technologies’ use in the agricultural sector amounted to only 23 conventional units in 2021, which is the minimum value throughout the economy, where the average is 32 [16].

The departmental project “Digital Agriculture” includes the use of the following digital technologies [16].

![Organizational structure of an agricultural holding](image-url)
1. Big Data. There is always a constant need for the use of big data in different sub-sectors of agriculture, so this digital technology will be widely used by agricultural holdings.

2. Blockchain. Blockchain technology is used in the agro-industrial complex to implement distributed databases in purchase/sale and land lease transactions.

3. Smart Farming. It is used to control the accuracy of the process of introducing fertilizers, as well as to predict the occurrence of adverse natural phenomena.

4. Quantum technologies. These technologies are still in the formative stage in terms of their application in agriculture.

5. Internet of things. These technologies have already found application in the agricultural sector.

6. Robotics. In the near future, machines and robots will be replacing employees with different skills.

7. Wireless communication. These technologies are of particular interest to the agro-industrial complex due to the fact that its infrastructure and production facilities are geographically distant from each other.

8. Virtual and augmented reality. These technologies are used in the process of training workers of the agricultural sector.

**Fig. 4.** Advantages of agricultural holdings in comparison with other forms of management in the agro-industrial complex.

The application of digital technologies will allow agricultural holdings to gain considerable benefits in terms of communication with suppliers of various types of
resources, access to information, effective partnership mechanisms, access to educational, financial and legal services, access to reliable markets and consumers.

Nevertheless, there are basic conditions, the fulfillment of which is necessary for implementation of systemic digital transformations in the agro-industrial complex, including agricultural holdings:

- availability of infrastructure and connectivity (mobile communications, network coverage, Internet access, adequate power supply),
- skills of working with digital technologies, computer literacy of agricultural workers, education in the field of information and computer technologies,
- financial support for digital transformation of business processes in the agro-industrial complex,
- state institutional and political support for the digitalization process,
- developing digital culture of entrepreneurship.

Thus, we can conclude that the process of digitalization of modern agricultural holdings is only in its infancy. The programs for digitalizing national agricultural sector adopted at the legislative level are not fully developed and are mainly aimed at the digitalization of already established technological processes of agricultural production, and not at their radical digital transformation. An urgent need is to develop an optimum digital ecosystem based on the development of a large-scale network of digital platforms throughout the entire cycle of agricultural holdings’ activities. It also seems necessary to develop financial and institutional support for the digital transformation process for the agro-industrial complex using different types of state selective support.

4 Discussion

One of strategically important areas of modernization of Russian agriculture is development of vertical integrated forms of management, called agricultural holdings. In practice, they demonstrate a high level of efficiency and the resource capabilities for implementing innovative transformations throughout the chain of agricultural production. For system analysis of such corporate structures operating in the national agricultural sector, it is necessary to carry out an appropriate institutionalization of their activities in accordance with current economic realities. This will solve a whole range of problems related to their organizational structure, reducing the negative impact on the development of small and medium-sized agricultural businesses by improving the pricing of agricultural products, and also intensifying the introduction of digital technologies in agricultural production with extensive state support for ongoing and future transformations.

5 Conclusions

Further sustainable development of agricultural holdings established as a result of integration transformations in the national agricultural sector involves the widespread introduction of digital economy tools in agricultural production and its infrastructure support. To solve this complex task with the use of a systems approach, it is necessary to overcome current barriers, the main ones being: underdevelopment of communications and IT infrastructure, lack of IT solutions adapted for the agro-industrial complex, limited financial capacity of companies within agricultural holdings regarding acquiring modern equipment and production technologies, an extensive network of intermediaries in the sale of agricultural products, staff shortage for implementing digital transformation of agricultural business processes.
References


7. I. Bogdanova, O. Dymchenko, Production quality and safety management in the corporate-type integrated structures in the agro-industrial complex, in E3S Web of Conferences 175, 13013 (2020) https://doi.org/10.1051/e3sconf/202017513013


