Cluster initiatives in agricultural sector: current state, problems and prospects of development

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Abstract. Based on the use of complex and systematic approaches, the article develops the problematic field that characterizes the current state of agro-industrial clusters in Russia in all areas of their activities, taking into account factors of the external and internal environment. The main directions for improving the efficiency of cluster initiatives in the country's regions are substantiated, considering positive domestic and foreign experience. A concept model for creating a regional agro-industrial cluster is developed, considering the entire chain of its operation in the region and achievement of a synergistic effect with the engagement of all stakeholders. Creative sources of innovation funding in agro-industrial clusters are suggested, including public-private partnerships, innovative banks, and corporate venture capital funds.

1 Introduction

In recent years, the issues of creating and developing clusters in regional socio-economic systems has been actively discussed in the economic press and various forums, producing different, at times contradictory, approaches and perspectives.

The empirical material gathered allows authors to systematize it in the form of monographs [1, 2], abstracts of dissertations [3, 4], papers in mainstream economic journals [5, 6]. A strong trend to consider the industry specifics of cluster issues has emerged, including in the agricultural sector [7-15]. In a number of regions, the cluster policy is developed and implemented, which is part of the strategic guidelines for regional development. Formalized procedures are developed for introduction and maintenance of a register of clusters, cluster projects and initiatives.

The main barriers to the further sustainable development of clusters in the regions are identified (Figure 1).

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limiting the cluster borders by the borders of one subject of the Federation

the lack of a scientifically grounded methodology for assessing the potential market capacity of clusters of various kinds

disharmony within an integrated technological chain of the cluster between its participants

use of predominantly typical cluster structure

underdevelopment of infrastructure of cluster formations

lack of an adequate communication system between cluster participants

insufficient level of scientific research on key areas of cluster activity

lack of the developed and tested system for effective monitoring of the performance indicators of clusters of various kinds

Fig. 1. Problematic field of creation and development of regional clusters.

Under the conditions of sanctions restrictions, clusters operating in the agricultural sector (agro-industrial clusters) become strategically important in terms of ensuring food security in Russia. Most researchers of this phenomenon rightly and reasonably point out their advantages, the main ones being that they generate a synergistic effect based on significant savings of transaction costs within cluster formations.

Cluster initiatives in the agricultural sector are increasingly gaining extensive state support, and the frequency of mentioning clusters in various legislation documents and innovative programs developed at different levels of government is growing. However, despite all the positive aspects of intensifying clustering processes in various regions of the country, a unified organizational and economic mechanism for creating regional agro-industrial clusters has not been developed so far in the domestic practice of agricultural integration. In addition, public-private partnership tools are poorly used in forming the structure of agro-industrial clusters, in particular when distributing tasks between the public partner and private business.

One can also note the insufficient state regulation of processes taking place within the cluster initiatives, such as the ongoing digitalization of agricultural production in the form of robotic systems for planning yields, applying various fertilizers, using remote sensing for monitoring the crop conditions, local soil sampling in coordinate systems and other innovative solutions in different subsectors of agriculture.

Thus, the major conceptual conclusion can be drawn that the intensification of cluster initiatives, which is currently taking place in the agro-industrial sector of the regions as an obvious reaction to the need to ensure the country’s food security in the context of sanctions restrictions, involves increased government regulation of this process. A nexus of interrelated issues should also be solved, occurring both in the traditional version of agriculture development and its innovative components, focused on the digitalization of business processes in agricultural production and strengthening the intellectual component.

2 Materials and methods
The key provisions of this article have been developed based on the analysis of papers written in Russian and English, published in professional journals, and included in scientometric databases Scopus and Web of Science. These articles discuss the issues of the creation and operation of agro-industrial clusters in the regions of the country over the past five years.

The comparative study and search for the necessary data were carried out using specific keywords, including integration processes, agro-industrial cluster, agriculture, innovative solutions, business processes, government regulation, synergistic effect.

3 Results

As a result of the scientific research, the key problems of the current state and operation of agro-industrial clusters in Russia are identified using complex and systematic approaches. The compounds of cluster initiatives in the regions and their sources are characterized, directions for solving the identified issues are developed in terms of institutionalizing startups in the agro-industrial complex and improving state regulation of digital transformation of business processes in agricultural production along with strengthening their intellectual component.

4 Discussion

A systematic study of the problems of agro-industrial clusters has shown that the basic conceptual provisions for their creation and operation have currently been developed. These provisions represent sufficient theoretical and methodological ground for further improvement of cluster initiatives, using innovation-based approach while strengthening state regulation of regional clustering process.

1. Under current conditions of an unprecedented increase of destructive events in geopolitics, one of the main imperatives for the sustainable operation of business entities in the domestic agro-industrial complex is clustering, i.e., extensive development of cluster initiatives as an alternative to reducing import dependence of the domestic agricultural market.

2. Cluster initiatives in the agricultural sector are a manifestation of the process of agro-industrial integration, seen as the integration of agricultural producers and industrial enterprises based on the consolidation of their actions aimed at achieving a synergistic effect [16].

3. Regional agro-industrial clusters are specially ordered integrated structures designed to systematically solve the acute problem of ensuring national food security and achieving social stability in the country.

4. Participants of agro-industrial clusters can include agricultural and processing enterprises, infrastructure organizations, research and educational institutions, public authorities that ensure the proper conditions for the further development of regional cluster initiatives on an innovative basis.

5. Business entities of various organizational and legal forms and different integration levels, for instance, small and medium-sized businesses and agricultural holdings, can take part in the activities of agro-industrial clusters. In recent years, individual structural units of business ecosystems expressed their desire to participate in agro-industrial holdings as an alternative to traditional business entities.

The further development of clusters in the agricultural sector involves solving at least two issues: developing a unified algorithm for their creation in the regions and designing effective tools for implementing innovation policy in all areas of their activity.
In the author's view, the concept model of creating agro-industrial clusters can be illustrated as follows (Figure 2).

There is no doubt that the further strategic development of agro-industrial clusters has to do with their financial support, above all, in the field of innovation. It is widely recognized that the innovative development of clusters in the agricultural sector at their own expense is not possible, especially in conditions of high rates of inflation. Therefore, it is necessary to create and test new specific sources of investments that have proven themselves positively in international practice and, with some adjustments, can be applied in Russia. These include the following (apart from traditional ones such as investments in securities; direct financial investments by the state, companies; loan, leasing) [17, 18, 19, 20]:

- innovative specialized banks,
- public-private partnership,
- corporate venture capital funds.

Innovative specialized banks are financial institutions that provide short, medium, and long-term loans for the creation and implementation of innovations at any stage of development and introduction. The basis for issuing a loan is the submission of a set of documents by an enterprise, which includes the calculation of project profitability. A positive decision can be made by the innovative bank based on this information. The innovative bank will not only lend, but also open deposits for legal entities and individuals, that is, accumulate funds.

In this case, the state should act as a guarantor for the risks that innovative banks might face when offering targeted loans for the innovative activities of agro-industrial clusters.

Research of the food market conditions in the region

- Estimation of market capacity
- Study of market trends
- Identification of the vacant market niches
- Identification of market concentration degree

Determining the impact of internal and external environmental factors on the possibility of creating agro-industrial clusters in the region using the methods of strategic analysis, including PEST analysis, SWOT analysis, and GAP analysis

Study of the system of state support for agro-industrial clusters at the federal and regional levels

Study of the innovative base of agro-industrial production in the region

Development of a project on creation of an agro-industrial complex in the region, outlining the essential components: initiators, participants, stakeholders, project budget, its financing sources, project viability

Development of a set of programs within the investment project for creating an agro-industrial cluster

Implementation of the project

Project monitoring and adjustment (if needed)
In the context of a lack of budget funds for the development of regional agro-industrial clusters, new sources should be used, based on joining forces of the state and private business in the form of public-private partnerships. This mechanism of the agro-industrial complex development involves interaction between the state and the private sector, when the private partner participates not only in the design, funding, construction of the facility, but also in its subsequent operation for the benefit of the public partner.

The pace of implementation of public-private partnership projects in the country’s agricultural sector remains relatively slow. However, some regions have already gained positive experience with such initiatives, showing the promising potential of this funding source. The main concerns for private investors include the high risk associated with projects involving the creation of agro-industrial clusters, and insufficient personnel training. Another possible problem is related to the unwillingness of the public sector to collaborate with private business representatives in some cases.

The widespread adoption of corporate venture capital funds in financing projects for agro-industrial cluster development has not yet occurred due to insufficient theoretical and methodological elaboration on this matter. In other words, there is a need for theoretical background and practical testing of corporate venture funding.

5 Conclusions

One of the major strategic directions for ensuring the country’s food security in the context of sanctions from the certain foreign countries is the creation of regional agro-industrial clusters. These represent integrated structures which include agricultural and processing enterprises, infrastructure organizations, research and educational institutions. In many regions of the country, cluster policy regulations in the agricultural sector are developed and implemented. Positive experience of cluster initiatives operation is gained. Nevertheless, further sustainable development of agro-industrial clusters and the increase of their strategic role in the regional food market involves resolving a number of issues with the participation of all stakeholders.

First of all, it is necessary to apply a complex algorithm for the creation of clusters in the agricultural sector, which includes a number of interrelated stages. The algorithm ensures thorough technical, technological, organizational and marketing feasibility of the investment project and its subsequent implementation in the form of target programs with state support.

To finance innovative projects, as a precondition for the development of cluster initiatives in the agricultural sector, it is expedient to use both traditional investment sources (net profit, bank loans, leasing) and creative ones, which are not yet widely deployed in Russian practice (innovation banks, corporate venture capital funds, public-private partnership).

Ensuring the country’s food security and achieving the necessary food consumption rates for its residents will only be possible through adherence to these conceptual provisions and improvement of state regulation of cluster initiatives.

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