FEATURES OF MODEL BUILDING FOR AN INTER-SECTORAL AGRO-INDUSTRIAL CLUSTER AS A QUASI-INTEGRATED STRUCTURE

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Abstract: In the context of the actual global economic crisis and the prolonged economic and technological sanctions of the EU countries, the USA, Canada, Australia, etc., one of the most important tasks of the Russian national economy is to ensure food security of the country. In the depressed North Caucasian agrarian-oriented republics, there are still quite significant economic risks that reduce the sustainability of the effective agriculture development and the ability to quickly solve problems to accelerate import substitution. At the same time, we were convinced of the need for further elaboration of theoretical principles and practical recommendations intended to building effective models for the economic development of clusters in the regional agro-industrial complex of depressed agrarian-oriented territories.

Keywords: world economic crisis, world medical crisis, economic and technological sanctions, globalization, agriculture, depressed republics, clustering, organizational and economic mechanism.

1 Introduction

One of the most significant founders of the methodology for constructing a cluster model for managing territorial industrial complexes is M. Porter.

In the future, his methodology was recognized and very actively developed by such world-class researchers as M. Enright, T. Andersson, K. Ketels, G. Lindqvist, O. Salwell, E. Feather, etc. It should also be noted that the complex of principles and fundamental provisions for the formation of cluster policy was further developed in the proceedings of the European Cluster Observatory, and the European Cluster Association.

Similar scientific and practical institutions have also been created in Russia, such as the scientific and methodological, analytical and consulting centre “Russian Cluster Observatory”, etc.

Globalization and the latest global economic crisis convincingly say that increasing in the competitiveness of the Russian national economy is possible only with the use of the innovative investment approach to its development and the active mobilization of the scientific and technological potential of high-tech industries.

World experience in the development of national economies suggests that the criteria for their sustainable economic growth are exclusively the volumes of high-tech sectors and the innovative potential of these countries. And this is natural, because it is the knowledge-intensive and high-tech industries that are the vanguard for the implementation of a significant part of breakthrough innovations and technologies that provide the country with sustainable and advanced socio-ecological and economic development. [Afanasyev M., Myasnikova L. 2005, Kuidius V. A. 2012, Misakov V. S. 2007]

In our work, we proceed from the fact that the problems of increasing the sustainability of the economic development of the domestic agro-industrial complex must be solved simultaneously with the tasks of ensuring the country's economic (food) security. This approach involves exclusively innovative development of the national agribusiness and the formation of competitive advantages of Russian farmers in the relevant world markets.

2 Research Methodology

The methodological foundations of this study were the basic principles of institutional theory, the development of leading foreign and Russian scientists in the field of developing a program-oriented approach to managing cluster formations in regional agribusiness, problems of constructing a model of an intersectoral agro-industrial cluster as a quasi-integrated system.

During the study, a systematic and multidisciplinary approach to the processes under study was used. Such general scientific methods as analysis and synthesis, deduction and induction, comparison, and generalization were also used.

3 Results and Their Discussion

Analysis of the current negative situation in the agro-industrial complex of the depressed Russian southern republics requires the prompt resolution of the problems concerning the formation and use of high-tech agro-industrial sectors in order to ensure accelerated import substitution and food security through the introduction of resource-saving technologies for agro-industrial production and deep processing of agricultural (crop and livestock) products.

The biotechnological industry can be considered as the most promising direction for the development of high-tech sectors in the agricultural economy of the North Caucasian agrarian-oriented republics, because their development involves the active use of renewable biomass sources (plants, forest resources, microorganisms, etc.). This approach also allows significantly reducing the harmful effects on the environment with all its derivatives.

The development of high-tech industries in the agricultural sector will create favourable conditions for development in the studied region of a group of highly productive agricultural formations, attract investment in the emerging regional agribusiness high-tech sector, to increase the innovative activity and attractiveness of agricultural organizations in the South of Russia, to form the North Caucasus regional market for high-tech products (innovations), significantly to reduce the transaction costs of innovation processes, and to reduce the possible risks of engaging breakthrough technologies in the agricultural sector.

Analysis of specialized literature allowed us to identify more than twenty models of innovative development of the Russian Federation regions, including such as the Tomsk model, Belgorod model, the model of the Stavropol Territory, etc. [Saussine L. L. 2015, Kuidius V. A. 2012]

Any of these models is focused on providing the corresponding region with a new influx of investment, a significant increase in business activity, etc., which positively affects the socio-economic development of the territory, the level and quality of life of the population.

In the republics of the North Caucasus, there are also germs of innovative activity in the form of separate science parks and technopolises, and even special economic zones. The region is clearly aware that the development of republics on the basis of

innovation is both extremely complex and also necessary and long-term process, involving the mandatory participation of federal and regional authorities and administrations. At the same time, state policy in this area should strictly determine the vector of development of high-tech sectors of the economy, stimulate the active participation of private capital in the development of the region under consideration and create conditions for its mobile investment; it clearly articulates the obligation of government agencies to participate in the processes of innovative development of regions reflected in the relevant regulatory legal documents.

It is clear that in modern realities the depressed republics are not able to do without a complex of supporting and stimulating factors initiated by federal structures.

The formation of a scientific, technological and industrial complex implies the mandatory presence of a critical mass of specialized production structures and scientific institutions, the use of which allows the large-scale creation of a demanded innovation chain and providing access to new markets for high-tech products.

It should be noted that almost all depressed republics have real competitive advantages: they have modern research potential, extremely advantageous natural and geographical location of territories, quite developed transport, communication and other infrastructure, many objects of historical and cultural heritage, ethnical traditions of certain types of activities, and high educational level of citizens of the republics.

The development of high-tech sectors of the agro-industrial complex depends on a complex of multidirectional factors, including political and legal conditions (geopolitical situation in the region), resource factors, organizational factors, information factors, etc.

When building a model of a high-performance cluster in the agricultural sector, we laid at the heart of our study the so-called "competitive advantage diamond" by M. Porter. He proposed to consider any cluster as a result of the synthesis of four groups of factors forming the aforementioned "diamond":

- Factor conditions;
- Related and supporting industries;
- Competition conditions and company strategies;
- Demand conditions. [Porter M.E. 1993]

Despite their simplicity, the presented elements of Porter diamond, nevertheless, allow us to understand quite accurately the reason why clusters are more competitive than individual even advanced companies.

Methodological approaches to the analysis of the Porter competitive advantages formation are very actively and successfully applied in many countries when clustering separate companies in agriculture, pharmaceuticals, biotechnology, industry, etc. [Erokhin M. A. 2011, Saussine L. L. 2015]

As an example, we note Israeli agricultural clusters, the wine cluster in Macedonia, and the textile cluster in South Africa, etc. [Achenbach Y. A. 2012, Ukrainian V. N. 2011]

At the same time, we consider it appropriate to quote O. Solwell's statements that the group of factors proposed by M. Porter should be considered at the regional level, when the need to create a cluster is determined by the environment and at other levels, including at the macro level, and at the level of economic relations between enterprises within the cluster. [Porter M.E. 1993] We believe that this amendment is fair, because it allows us to use a new and more expanded classification of factors.

In the course of our study devoted to the theory of new forms of production location and organization (taking into account geographical features), we got acquainted with representatives of American, British and Scandinavian scientific schools; we compared them with the basic principles of the founder of the Soviet school of economic regionalization and industrial geography I.N. Kolosovsky and found a lot in common when building clusters and territorial production complexes.

In accordance with the Concept of Long-Term Socio-Economic Development of the Russian Federation for the period until 2020, a cluster is understood as "a union of enterprises, suppliers of equipment, components, specialized production and other services, research and educational organizations connected by territorial proximity and functional dependence relations in the field of production and sale of goods and services." [The concept of long-term socio-economic development of the Russian Federation for the period up to 2020. 2008]

This approach allows us to highlight the following fundamental characteristics of the planned cluster, including geographic concentration, form of communication between cluster members, specialization, actors, competition and cooperation, critical mass, cluster life cycle duration, and innovativeness.

Modern theory distinguishes two main types of clusters:

- Clusters created according to the functional principle (we are talking about industry or diversified clusters);

- Clusters created according to the spatial principle (we are talking about territorial (regional) clusters). [Achenbach Y. A. 2012, Saussine L. L. 2015]

Agro-industrial clusters are included in the first form; they are diversified and focus on cooperation and competition in specific sectors of the agricultural sector (for example, crop production), as well as between separate branches of the agricultural sector.

A diversified cluster is directly formed of many participants attracted by a variety of resources and activities combined for the production and sale of high-tech products and services. Focusing a critical mass of participants in a cluster allows each of them to gain additional competitive advantages, extract more volume of economic benefits, etc. through the use of general market factors of production. [Misakov V. S. 1985, Semina L.A., Sandu I.S. 2013]

Our proposed North Caucasian diversified industrial cluster will not be spatially linked to any particular territory; on the contrary, it will have the property of expanding its borders, going beyond the limits of the region under consideration. It must be admitted that in the republics attempts were made to form territorial (regional) clusters in the form of a certain spatial agglomeration of economic activity. But contrary to expectations, they did not allow to form the proposed basis for the development of territories, did not contribute to the "overflow" of knowledge and breakthrough technologies, etc.

Exactly the same unsuccessful attempts were made to create the tourist-recreational cluster "Resorts of the North Caucasus"...

When forming a model of a highly productive North Caucasian agro-industrial cluster, we proceed from the fact that specialized industries are characterized by concentration in certain territories and the formation of clusters on the basis of enterprises that are interfaced and simultaneously cooperating and competing with each other, which, in general, allows increasing each other's competitive advantages. [Boush G. D20113, Ivanenko A. A. 2011, Misakov V.S., Bagaev I.Z., Gendugov S.Z. 2015]

Directly, the activities of the agro-industrial cluster occur through the interaction between many diverse enterprises and organizations included in this cluster (agricultural enterprises, scientific and educational institutions, financial institutions, mutual cooperation institutions, representatives of the public sector).

We consider all the components of the cluster formation separately in the form of an elementary unit of a cluster - a cluster unit that is technologically integrated into a cluster functionally connected with other participants in the agro

industrial cluster by the processes of development, production and sale of innovative products. Such an approach allows us to consider an interbranch agro-industrial cluster in the form of a quasi-integrated structure consisting of a group of cluster units connected with subordinate relationships that implement specific tasks that contribute to achieving the goals of sustainable cluster development.

The cluster units themselves act as the main (basic) structural elements of the agro industrial cluster, realizing production and supply, innovation and other functions. The structure of the agro industrial complex is formed by five levels: innovation, production, marketing, design and development and the level of technology transfer.

In the special literature, the given cluster levels are grouped into three blocks according to the principle “core-centre-periphery”:

- A core characterized by an innovative level;
- A centre represented by the production and sales level;
- Peripherals consisting of a design and development level and a technology transfer level.

Here, it immediately catches the eye that in the given structure of the formed diversified agro industrial cluster, the “core” block stands apart. It acts as a concentrated set of cluster units of innovative infrastructure, which determines the nature and vector of activity of the cluster under study as a whole. [Carlin T. V. 2011 . Musaev M. M., Musaeva H. M., Misakov V. S. 2018]

The considered principle of constructing a diversified agro-industrial cluster structure enables designers to predict the process of diffusion of the effect caused by the project activity of the cluster: the effect of the cluster components of the core unit, then the central one, and finally the cluster periphery is gradually and uniformly spreading.

During the distribution process, cluster units are combined and interact through project activities, using all five of the above levels, which, in turn, act as original conductors of information flows in the cluster.

It seems to us that the modified model of building a diversified agro-industrial cluster that we proposed is appropriate to implement in the depressed republics of the North Caucasus, provided that the cluster components of the project activity continuously carry out project activities at all stages of the life cycle of innovative products (technologies). The implementation of this model will not only reveal the strengths and weaknesses of the activity of the diversified agro-industrial cluster as a quasi-integrated system, but will also allow us to develop a vector of priority guides in the context of its levels and cluster units, and also to calculate objectively justified forecast indicators of cluster activity.

4 Conclusions And Proposals

1. An analysis of international and Russian experience in the development of the agricultural sector allows us to conclude that it is necessary and possible to use a cluster approach in the domestic agro-industrial complex based on the formation of high-tech sectors of the agro-industrial complex. We justifiably believe that such an approach will ensure accelerated import substitution and food security.
2. Modern theory distinguishes two main types of clusters arranged along the functional and spatial axes. We have justified that in the depressed republics of the North Caucasus it is advisable to create a diversified agro-industrial cluster that has an innovative focus.
3. In accordance with the purpose of our study, we have developed methodological approaches to constructing a model of a diversified agro-industrial cluster. Its basis is the inclusion principle, which allows developing the project activities of the cluster under study. The algorithm of the processes and stages of the cluster’s innovation activity, cluster units of blocks and levels are described. The efficiency of the biotechnological industry development in agrarian-oriented depressed republics of the Russian South is substantiated.
4. The development of a diversified agro-industrial cluster in the North Caucasus will provide an opportunity to effectively solve not only the sectoral tasks of the labour-surplus region, but will also contribute to the multipolar distribution of "growth points" in the territory of the depressed republics, which will undoubtedly allow the uniform and balanced development of the South of Russia.

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