Management system of grain production cluster of the region

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Abstract. The purpose of the study is to develop an organizational model of the grain production cluster in the Nizhny Novgorod region, which will contribute to the formation of sustainable production and, as a result, increase the efficiency of the industry under study and strengthen food security in the region. The design of organizational structures was carried out by the method of analogies, which include the development of typical management structures of industrial and economic organizations and the definition of boundaries and conditions for their application. A cluster management system was developed, which consists of four blocks: a control block; production unit; processing and storage unit; block of education and science.

Scientific novelty lies in the author’s approach to the development of a control system for the production of grain clusters. The proposed form will significantly increase the level of production sustainability among potential cluster members and strengthen food security in the Nizhny Novgorod region.

1. Introduction

The agrarian sector of the national economy is considered effective only if it provides a stable supply of the country’s population with necessary food. The famous Russian agricultural economist A.I. Altukhov notes that the strategic goal of national food security is to provide the country with safe agricultural products, fish and other products from aquatic biological resources and food. A guarantee of its achievement is the stability of domestic agricultural production, as well as the availability of necessary reserves and stocks of agricultural products, raw materials and food [1]. Nevertheless, in accordance with the rating of countries by the global food security index in 2018, the Russian Federation ranks 42nd.

In shaping the country’s food security, the regional aspect of this problem should be noted.

A. Tatarkin and S. Polbitsin, considering the problems of ensuring food security in the region, define it as the sustainable development of the food system, in which the whole population has physical, economic and social access to food sufficient to meet individual dietary and cultural preferences that ensure active and a healthy lifestyle [2].

Grain production, being the basis of agriculture of the Russian Federation and the most common direction among agricultural producers, providing the main profitability of agricultural enterprises and
serving as a forage base for livestock and poultry farming, needs to improve the management system that would enhance food security [3].

The solution to the issue of sustainability of production development contributes to the development of the region as a whole. The problems of unstable grain production in the region should be solved by improving the organizational structure of management in this sphere of agriculture.

In the new conditions, a cluster approach is increasingly being applied to enhance innovative potential in various sectors of the national economy, which contributes to the accelerated development of its participants. It has already proved its effectiveness and is becoming popular also in the field of agriculture and, in particular, in the grain product subcomplex. In the Nizhny Novgorod region, there have been trends in the formation of a territorial production cluster.

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2. Materials and methods
Research on grain farming is always relevant and promising in view of the specificity of this sector of the national economy. It should be noted studies related to this topic by scientists such as N.D. Avarskey et al. [4], A.I. Altukhov [1], E.F. Amirova [5], L.B. Vinnichek et al. [6] and others. Devoted their work to the formation of clusters in grain farming as a scientific direction in the framework of agricultural science N.A. Golovin [7], S.A. Zhitkov [8], T.M. Khudyakov et al. [9], N.P. Molchanova and I.N. Molchanov [10], J.B. Smagulova [11], A.E. Plakhin et al. [12].

The design of organizational structures in the article was carried out by the method of analogies, which include the development of typical management structures of industrial and economic organizations and the definition of boundaries and conditions for their application. A number of existing organizational models for managing agro-industrial clusters were studied and the author's organizational model was developed taking into account the regional characteristics of the Nizhny Novgorod region.

3. Results and discussion
The use of new techniques and methods in the management of production stability at various hierarchical levels determines the level of development of the agricultural sector and the improvement of the management process [6].

The modern agrarian structure is largely the result of the agrarian policy of the federal government, aimed at supporting agricultural holdings, which receive the bulk of state support, thereby gaining a competitive advantage and crowding out small businesses. In most countries, money is usually given to novice farmers, small farms in order to keep them in the territory, to provide work. In Russia, on the contrary, money is allocated mainly to large businesses, thereby ruining small ones [1].

The goal of creating any agricultural cluster is to solve the above problem through production of products with lower costs, development of a marketing system for products and technological development of participants.

There is already a positive experience of cluster formation in agriculture in the Russian Federation (table 1).

| Cluster                                           | Year of creation | Number of participants | Number of employees | Level   |
|---------------------------------------------------|------------------|------------------------|---------------------|---------|
| Agro-industrial cluster of the Novgorod region    | 2014             | 27                     | 3,869               | Beginner|
| Dairy cluster of the Vologda region               | 2015             | 40                     | 2,336               | Beginner|

Table 1. Successful agricultural clusters in the Russian Federation (according to the Russian Cluster Observatory).
According to the Russian Cluster Observatory, the following clusters in agriculture function successfully: Agro-industrial cluster of the Novgorod region (Novgorod region), Dairy cluster of the Vologda region (Vologda region), Donskoy Dairy Products Cluster for the production and processing of milk products (Rostov Region).

In the grain economy of the Nizhny Novgorod region, preconditions for the formation of a cluster have been outlined.

G.D. Bousch, describing the universal structure of an industrial cluster, identified the following components: provision, maintenance, consumption, research, export, training, production [13]. In the study region, the above components already exist.

The cluster management system should be based on block principles:

1. control unit;
2. production unit;
3. processing and storage unit;
4. block of education and science.

When creating a system of grain clusters in the regions of the Russian Federation, it is advisable to rely on a polycentric production structure [8].

In our opinion, it is important to divide the cluster members into the following categories depending on their level of stability:

1. the core of the cluster;
2. cluster members with an average level of stability;
3. weak cluster members.

This approach will make it possible to make point decisions in relation to the development of participants in the grain cluster of the Nizhny Novgorod region, which will be expressed in a more efficient functioning of grain producers.

The fundamental role in management should be assigned to the Ministry of Agriculture and Food Resources of the Nizhny Novgorod Region. Under his auspices, to coordinate and monitor the development of cluster members, it is necessary to form the Central Council of the regional grain production cluster. Based on the level of sustainability of participants and, accordingly, the various strategic goals of grain producers in the Central Council, it is necessary to distinguish separate project offices of agricultural departments of municipalities that form the core, cluster members with an average level of stability and weakly stable cluster members (figure 1).

The production unit should be headed by the design offices of agricultural departments, which will contribute to better planning of economic activities of agricultural organizations of cluster members, depending on the level of sustainability and the point allocation of resources.

The processing and storage unit should include the main centers of processing and storage of grain on the territory of the cluster, and a management system for the production logistics of grain farming should also be formed. The management of the block should also be assigned to the design offices of agricultural departments, but their composition should be composed of competent representatives of processing, storage and logistics centers of the industry.

The education and science block should remain subordinate to the Ministry of Education, Science and Youth Policy, while the formation of human resources for the agricultural sectors should be carried out in accordance with the requirements of the relevant regional ministry - the Ministry of Agriculture and Food Resources of the Nizhny Novgorod Region. Responsibility for conducting research should be assigned to the Nizhny Novgorod Research Institute of Agriculture, as well as the leading agricultural universities in the region - the Nizhny Novgorod Agricultural Academy and the Nizhny Novgorod State University of Engineering and Economics. Training with higher education should also be carried out by the Nizhny Novgorod Agricultural Academy and the Nizhny Novgorod...
State University of Engineering and Economics, and specialists of secondary vocational education (SVE) by institutions of the SVE level.

Figure 1. The management structure of the production grain cluster of the Nizhny Novgorod region.

There is a need to create an information and consulting center subordinate to the Central Council of the grain production cluster of the region, which should be formed from leading employees of the Nizhny Novgorod Agricultural Research Institute, the Nizhny Novgorod Agricultural Academy and the Nizhny Novgorod State Engineering and Economic University.

4. Conclusions
In 1996, the Food and Agriculture Organization (FAO) Rome Session noted that in order to achieve food security, it is necessary to support educational initiatives, the use of innovations and the widespread use of new technologies, thereby ensuring stable access to food products that meet the human needs for nutrients and poor people; development of commodity production; reducing unemployment and raising incomes to combat poverty; natural resource management and environmental protection. Moreover, the central place in ensuring food security is given to increasing the level of sustainability of agricultural production, raw materials and food [1].

Product clusters are not only a specific form of integration, but also an innovative form of control of the economic space, the boundaries of which are determined by territories controlled by the areas of the cluster association [14].
In general, this form will significantly increase the level of production sustainability among potential participants. The solution to the problem of increasing the sustainability of grain production in the Nizhny Novgorod region, based on improving the organizational and economic system of grain farming by creating an industrial grain cluster, helps to increase the level of food security in the Nizhny Novgorod region, as well as increase the economic efficiency of economic activity of grain producers in the region.

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