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Formation of Agro-Industrial Clusters as a Condition of Innovation Development of Region Agriculture

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ABSTRACT

Introduction. The concept of the long-term social and economic development of the Russian Federation for the period to 2020 implies the development of all branches, fields of activities of the agro-industrial complex, making the agricultural commodity producers more efficient and competitive in the domestic and foreign markets and it is one of important elements in strengthening the positions of the Russian Federation in the world market.

Methods and materials. The theoretical research aspects devoted to the cluster management and its implementation in developing the agrarian sphere were covered in the papers written by the domestic and foreign researchers, the materials of regional, all-Russian, international conferences and symposia, the periodical press. The authors of the paper used the following methods of scientific research: a systemic approach method, historical and logical methods, method of analysis and others.

Results. The research provides insight into the concept “cluster”, reflects the position of academic economists on cluster structures formation in the country economy, considers and analyses the main signs of the cluster formation, discloses the role and describes the necessity of using the cluster system in the agrarian sector of the economy.

Discussion. The cluster approach issues in the Russian economy have been studied since the end of the 1920-s. Having applied the cluster approach to the agriculture development the scientists stressed that it was important to unite agricultural commodity producers having different specializations. At the second half of the XX century various institutional structures were created, their activities objective is a theoretical development and research of the economy clusterization fundamentals but also the practical application of theoretical aspects in real activities of the existing organizations. At present the cluster system is used in the economic agents activities with the use of modern high-end technologies in order to obtain a maximum positive effect and increase a share of the domestic goods producers in the market and to make them more competitive.

Conclusion. Application of the cluster technologies in different economic spheres gives rise to expensive discussion by the leading academic economists, but implementation of this system in the agriculture does not find a positive response from the agricultural commodity producers of the Russian Federation.

Key words: agro-industrial cluster, innovations, investment and innovation development, competitiveness, cluster approach, region, agriculture, social and economic development.

INTRODUCTION.

The financial crisis and the instability, to which it gave rise, in the country social and economic development aggravated a number of problems related to the government support for the agricultural commodity producers, government regulation of the market prices for the primary resources and the price instability for the agricultural products connected with the dishonest activities by dealers of the agricultural raw materials. As a result, there is investment insolvency, and, frequently, the agricultural commodity producers cannot implement the reproduction processes, which leads to deterioration of the agricultural products quality. The application of cluster systems is a promising area to make the national economy and its branches more competitive and attractive financially in the market economy environment. Under the international sanctions and food import embargo in the Russian Federation, there is an intense interest in the application and implementation of the cluster approach in the agriculture functioning and regulation of the social and economic development of the entire region. The necessity to develop the competitive advantages of entities of the Russian Federation by means of creating the network of territorial-production clusters in present-day conditions is shown by the Concept of long-term social and economic development of the Russian Federation for the period to 2010, which was approved by the decree of the Russian Federation Government dated November 17, 2008 No. 1662-r. [13]. Within this concept the Government marks out the overriding priorities of the social and economic policy, which include assurance of the structural diversification and innovation development, enlargement of the global competitive advantages in traditional branches, in regards to switching over of the agriculture to stable development mode with significant

strengthening of Russia positions in the world food markets. Apart from that, it is worth noting that the issues of organizing the clusters in the sphere of the agricultural products manufacturing are not researched significantly with account taken of international standing of Russia under the sanction pressure, and assurance of making the Russian agro-industrial complex and its separate branches more competitive, which confirms that the problem analyzed is of great importance.

METHODS AND MATERIALS.

The theoretical research aspects devoted to the cluster management as one of the conditions of innovative development and its implementation in the agrarian sphere functioning were covered in the papers written by the domestic and foreign researchers, the materials of regional, all-Russian, international conferences and symposia, the periodical press.

The authors of the paper used the following methods of scientific research: a systemic approach method, historical and logical methods, a method of analysis and others. It should be noted that it is difficult to use a number of methods of estimating the innovative activity of agricultural enterprises, because the statistic research base is extremely limited. This situation is caused by the fact that the agrarian sector belongs to the low-tech economic sphere, sociological surveys of innovative activity of the agricultural organizations were not carried out practically.

RESULTS.

The modern agriculture is characterized by some surge of production and largely depends on successful functioning of other branches of the national economy. The agro-industrial complex represents an aggregate volume of the national economy branches related to development of its

production and bringing the agricultural products to the consumer. In the market economy environment the sustainable development of the agro-industrial complex is considered as a complex generalizing criterion of successful activities of the country economy, its separate branches, since effective activities of the agro-industrial complex serves the interests of producers, consumers and potential investors to the fullest extent possible.

In the Russian Federation, according to the results of 2017, with account taken of checking the data on making some kinds of the agricultural products, the agricultural goods production volume increases by 2.4%. For 9 months of 2017 the production of cattle and poultry for slaughter was by 5%. In terms of entities of the Russian Federation, in particular in Nizhny Novgorod region, the production volumes are growing not on all economic agents (Table 1).

According to the results of work in 2016, in Nizhny Novgorod region, in all the categories of farms, the agricultural products was made in current process to the amount of 74.5 billion

Table 1 – Indexes of manufacturing the agricultural products on categories of farms of Nizhny Novgorod region (in comparable prices, as a percentage over the previous year)

| Year | Agricultural products | | | Plant products | | | Livestock products | | |
|------|----------------------------|------------------|---|----------------------------|------------------|---|----------------------------|------------------|---|
| | Agricultural organizations | Population farms | Farm enterprises, self-employed entrepreneurs | Agricultural organizations | Population farms | Farm enterprises, self-employed entrepreneurs | Agricultural organizations | Population farms | Farm enterprises, self-employed entrepreneurs |
| 2012 | 91.9 | 111.6 | 101.7 | 82.8 | 124.0 | 98.4 | 99.1 | 90.3 | 109.2 |
| 2013 | 97.7 | 102.6 | 103.7 | 89.4 | 105.9 | 95.0 | 103.3 | 97.4 | 117.8 |
| 2014 | 107.9 | 99.3 | 111.3 | 118.2 | 101.9 | 115.2 | 102.0 | 94.6 | 105.9 |
| 2015 | 103.4 | 99.1 | 117.4 | 101.7 | 100.3 | 123.1 | 104.4 | 96.2 | 108.7 |
| 2016 | 103.2 | 97.7 | 90.2 | 98.2 | 100.0 | 89.2 | 106.2 | 92.5 | 91.9 |

*drawn up by the author according to www.gks.ru

The specific weight of pedigree cows makes up about 23%. The milk yield per a cow in pedigree stock-breeding farms made up 6649 kg. 163 million rubles were sent to finance the programs of development of the pedigree stock-breeding from the regional and federal budgets in 2016. 1165 head of pedigree young animals of neat cattle were bought.

Due to the soft lending vehicle implemented by the Ministry of Agriculture of the Russian Federation, the Russian agriculturists received the funds to implement the projects for constructing 90 dairy farms, which made it possible to increase the total number of milk cattle in the Russian Federation as a whole by almost 100 thousand cows, and the milk production – by 0.5 million tonnes.

The level of supplying the population of any region with products depends on their production in that area, on bringing the products from other entities of the Russian Federation and export. The modern level of development of the Russian Federation agriculture makes it impossible to supply the population

Russian rubles, which makes up 101.3% on 2015. The main areas of development of the plant growing in the region are the production of grain, potatoes and vegetables, the elite seed production, fodder production, and preservation and restoration of the soil capabilities.

The production of grain and leguminous crops in 2016 made up 1 million 200 thousand tonnes in the initial weight, in the weight after completion the figure was 1 million 128 thousand tonnes, or 98% on 2015, which became a consequence of the summer drought, which adversely affected the crop capacity of the spring sown cereals.

The dairy cattle breeding is the main area in the livestock sector.

The gross milk yield in 2016 made up 602.7 thousand tonnes. The milk yield per 1 forage-fed cow in the agricultural organizations made up 5211 kg, which is 150 kg (or 3%) higher than the level of 2015, and it is the highest figure achieved in Nizhny Novgorod region. The pedigree stock-breeding exerts great influence upon development of the dairy cattle breeding. Forty three pedigree stock-breeding enterprises operate in the region.

with their own products, it is necessary to increase the production of the agricultural products both on a nationwide scale and at the regional level (Table 2).

Table 2 – Milk processing and manufacturing of the dairy products in the Volga Federal District and Nizhny Novgorod region

| Indexes | Nizhny Novgorod region | | | | The Volga Federal District | | | |
|---|------------------------|-------|-------|-----------------------|----------------------------|--------|--------|-----------------------|
| | 2014 | 2015 | 2016 | 2016 В % к 2014 | 2014 | 2015 | 2016 | 2016 В % к 2014 |
| Volume of production of marketable milk, thousand tonnes | | | | | | | | |
| -population farms | 52.0 | 49.0 | 48.0 | 92.3 | 1496.7 | 1450.0 | 1408.7 | 94.1 |
| -Farm enterprises and self-employed entrepreneurs | 48.9 | 50.5 | 46.3 | 94.6 | 462.8 | 513.3 | 543.8 | 117.5 |
| - agricultural organizations | 409.1 | 408.6 | 404.9 | 98.9 | 4224.0 | 4364.1 | 4492.2 | 106.3 |
| Production of whole-milk products in terms of milk, total thousand tonnes | 310.5 | 322.4 | 354.1 | 114.0 | 2699.6 | 2850.0 | 2981.4 | 110.4 |
| Production in physical volume, thousand tonnes | | | | | | | | |
| -cheese and cheese products | 3.4 | 3.8 | 3.6 | 105.9 | 94.9 | 124.6 | 122.2 | 128.8 |
| -butter | 5.9 | 4.4 | 4.4 | 74.6 | 80.5 | 77.3 | 76.5 | 95.0 |
| -powdered milk | 4.0 | 1.0 | ... | ... | 75.5 | 62.3 | 59.8 | 79.2 |
| Production in terms of milk, thousand tonnes | | | | | | | | |
| -cheese and cheese products | 30.1 | 33.6 | 31.7 | 105.3 | 834.7 | 1096.1 | 1075.3 | 128.8 |
| -butter | 118.5 | 89.7 | 88.1 | 74.3 | 1625.1 | 1560.1 | 1545.1 | 95.1 |
| - powdered milk | 29.4 | 7.4 | ... | ... | 551.1 | 454.6 | 436.5 | 79.2 |

* drawn up by the author according to www.gks.ru

When analyzing the data on production and processing of the dairy products in the Volga Federal District and Nizhny Novgorod region, which are represented in Table 2, it is possible to conclude that the volume of production of the marketable milk in Farm Enterprises and agricultural organizations in 2016 is 17.5% and 6.3%, respectively, more than in 2014. In the population farms in the period analyzed the marketable milk production was reduced by 5.9% and made up 1408.7 thousand tonnes. The whole milk products manufacturing in the Volga Federal District as a whole increased by 10.4% and made up 2981.4 thousand tonnes in 2016, which is 3.6% less than the figure in Nizhny Novgorod region. Production of cheese and cheese products tends to increase. So, in 2016 Nizhny Novgorod region produced 3.6 thousand tonnes of cheese and cheese products, which is 5.9% higher than the level of 2014. In the Volga Federal District as a whole the production increased by 28.8%. A negative tendency in terms of the federal district and Nizhny Novgorod region is a reduction of

production volumes of the butter and powdered milk, which is significant in comparison with 2014.

While implementing the Federal Law No. 264-FZ dated 29.12.2006 (revised 28.02.2012) “On Agricultural Development” the Government Resolution dated July 14, 2012 No. 717 accepted the Governmental Program “Development of agriculture and regulation of the markets of agricultural products, raw materials and food for 2013–2020”, which established the plan of measures favoring the growth of the dairy products competitiveness in the Russia Federation in order to decrease those products import, which is expected to have a positive influence on the level of the milk and dairy products consumption by the Russian people [8]. So, the size of consumption of the agricultural products depends on national traditions, the standard of well-being, provision of the population with the necessary food and other factors. In 2016 provision of the Russian population with milk and dairy products made up 262 kg per man per year, but, in accordance with the healthy nourishment requirements,

which are established by the Ministry of Healthcare of the Russian Federation, it is necessary to consume 325 kg. The domestic milk share in the total consumption has already approached 82%. The similar situation in supplying the population with food and size of its consumption is emerging also in separate entities of the Russian Federation (Figure 1).

The figure shows that the volume of production of milk and dairy products in Nizhny Novgorod region for the period from 2012 to 2016 decreased by 9 kg and in 2016 it made up 239 kg, which is 8.8% less than countrywide. The domestic milk share in the total consumption has already approached 82%.

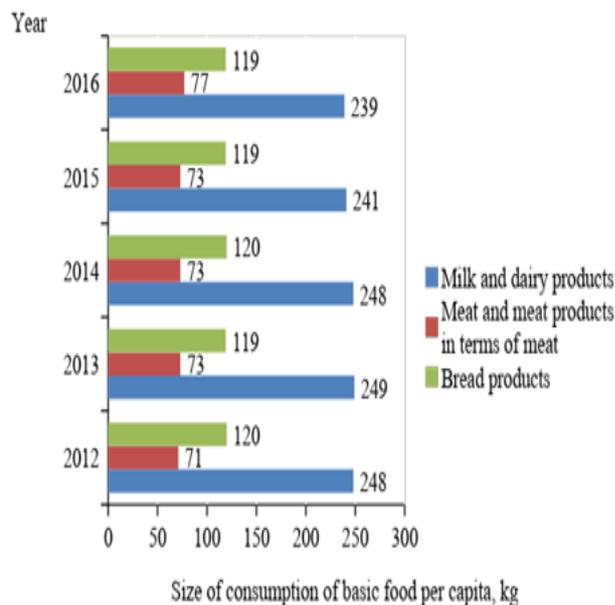


Figure 1 – Consumption of the basic food per capita per annum in Nizhny Novgorod region

The consumption of meat and meat products in 2016 makes up 77 kg per capita, which is 8.5% higher than the level of 2012. In the total volume, on the whole, consumption of the basic food in Nizhny Novgorod region decreased by 1.9%.

Saratov region became the leader on the consumption level decrease, where this figure decreased by 9.8% for a year. The Republic of Mari-El ranks second with the 2.6% consumption decrease. On the whole, inhabitants of the Volga Federal District consumed 263.2 kg dairy products on the average per man in terms of milk in 2016. This

figure is 3.2% less than in 2015, when the consumption level made up 272 kg per capita.

Increase in the production volume of the agricultural products and its processing products, provision of the population with the food depends on efficient operation of the agricultural commodity producers as well as the agricultural raw material processors, the government authorities. In view of this, in order to achieve the interests of all the market participants, it is reasonable to unite all the participants into groups (clusters).

Recently, many academic economists including E. Monastursky, A. Tatarkin, E. Kutsenko, G. Boshu, S. Kotlyarova, O. Romanova, M. Afanasiev and others actively analyze a paradigm of the cluster building of the economic entities interaction, which implies an optimal combination of competition and unification of the economic agents under mutually beneficial terms within the regional development. Peculiarities of forming the agro-industrial clusters in the agro-industrial complex, as an innovation constituent part of economic security of the region, was examined in the papers by Batov G. [3], Golova I. [6], Golovin M. [7], Ditkovsky K. [10], Kireev N. [12], Pronyaeva L. [17], Stepurenko E. [22], Fartash et al. [26], and Davoudi et al., [27]. However, there is no single definition of the economic concept “cluster” in the modern scientific literature.

So, D. Kiotov defines the cluster as a totality of the basic infrastructure elements, which are interrelated in the course of creating the added value, in which he includes: suppliers, producers, consumers of goods and services within the national economy, research institutes and others [12, p. 59].

V. Tretiak means, by the term “cluster”, joint rational activities of enterprises producing and implementing the complementary goods within the industry and geographical affiliation.

T. Mirolubova believes that the cluster is a network of independent economic subjects (suppliers, producers, competitors and others) and related institutions (educational establishments, infrastructure enterprises, government agencies and others), which are united within a certain area and interrelated by a

chain of mutually advantageous relations, which export their goods and services to the consumers outside the region [7, p. 16].

E. Ivanova defines the concept “cluster” as a group of interrelated enterprises, specialized services and technologies, research institutes making a chain of creating the value, acting in the adjoining economic spheres and strengthening the competitive advantages of each other and of the cluster as a whole [11, p. 264]. N. Solomatina and L. Slavnetskova believe that a cluster approach is a good tool to stimulate the development of the innovation meso-level systems under the conditions of integration [16, p. 62]

In the modern economic literature the concept “economic cluster” implies the groups of efficient organizations, as a result of unification of which the competitive advantages are

Table 3 – The basic elements of the clusters identification in the economy [21]

| Sign (element) | Characteristic |
|---|--|
| 1. Availability of competitive enterprises | Presence of efficient economic subjects in the market |
| 2. Availability of competitive advantages of a region | Competitive advantages of using the unique resources and possibilities in all the branches of the region economy |
| 3. Closeness and geographical concentration of the business subjects | Possibility of active interaction between the main cluster participants |
| 4. Wide set of participants and availability of connections between them inside and outside the cluster | Availability, within the cluster, of enterprises of different economic branches, which make it possible, during their interaction, to perform efficient work in order to achieve the common interests (often to achieve a maximum economic effect in the form of profit) |

Therefore, the most important aspect identifying the cluster unification in the market economy conditions is efficient activities of the subjects, which belong to it on a voluntary basis, which are aimed at increasing the competitiveness in the domestic and foreign markets. On the basis of the cluster identification elements, it is possible to formulate the following definition of the agro-industrial cluster.

The agro-industrial cluster is a voluntary unification of the agricultural commodity producers and the processors of raw-materials, which is based on joint, mutually advantageous production and sale activities in order to increase their competitiveness and investment attractiveness. G. Alieva believes that an innovation cluster, in which the process of appearance, development and implementation of

achieved in different markets (regional branch, national and world markers).

In the variety of the authors’ opinions on the concept “cluster” it is possible to single out the conceptual differences of each definition. So, some authors single out availability of a synergistic effect as a result of joint activities as a peculiarity of the cluster differing it from the manufacturing complexes. Other authors define the cluster as concentration of geographically-neighboring and interacting subjects. Still other authors, as the key aspect of the cluster, single out its belonging to the development of competitive advantages and implementation of both cooperation and integration between the economic entities.

The clusters identification in the region economy, which is described by M. Porter, includes the elements represented in Table 3.

innovations takes place, is of great importance to success of any activities [1, p. 282].

I. Shetinina [25, p. 120] and T. Shilshenko [23, p. 29] believe that the basic prerequisites of the agro-industrial cluster under conditions of international sanctions and economic instability in the country are:

1. Availability of a leader-organization within the region, which implements the investment and other strategies in its activities;
 2. Territorial closeness of the main body of economic entities belonging to the cluster;
 3. Long-term coordination of the cluster participants in the innovation production processes and others.
- V. Rotova and L. Korshunov believe that an advantage of the cluster analysis is a possibility, within this kind of analysis, to break the objects,

according to a set of parameters rather than one parameter. [19, p. 149].

The authors offer a model of the agro-industrial regional cluster, which implies unification of efforts of the agricultural commodity producers, the organization processing the agricultural raw-materials and the representatives of infrastructural sections on the basis of implementation of innovative activities, which will make it possible to achieve a positive synergistic effect as a result of their joint functioning. The organization and economic model of the regional agro-industrial cluster is represented on Figure 2.

This model includes such elements as the coordination center, which is the managing center of the agro-industrial cluster of the region, the cluster core including the agricultural commodity producers and the organizations processing the agricultural raw materials, the government agencies, which are meant to regulate the legal activities of the cluster and the subjects belonging to it. The infrastructure and the raw materials suppliers are an integral part of the efficient functioning of the cluster system.

of the center is distribution of the obligations and liability between the unification parties and main participation in the enterprises development, their efficient functioning as a whole. Apart from that, the cluster coordination center should fulfill the distribution and controlling functions in relation to the money flows, with account taken of implementation of the innovative activities in the productive process within the Concept of long-term social and economic development of the Russian Federation for the period to 2020.

The joint activities of the agricultural and processing organizations in regards to production and processing of the agricultural products will be the cluster core. The cluster government agencies are authorized to determine the circle of the cluster potential participants and they are meant to regulate the regulatory activities of the cluster unification participants. The government participation should represent a totality of economic relations in the sphere of forming and using the budget funds to implement programs in the spheres of production and processing of the agricultural

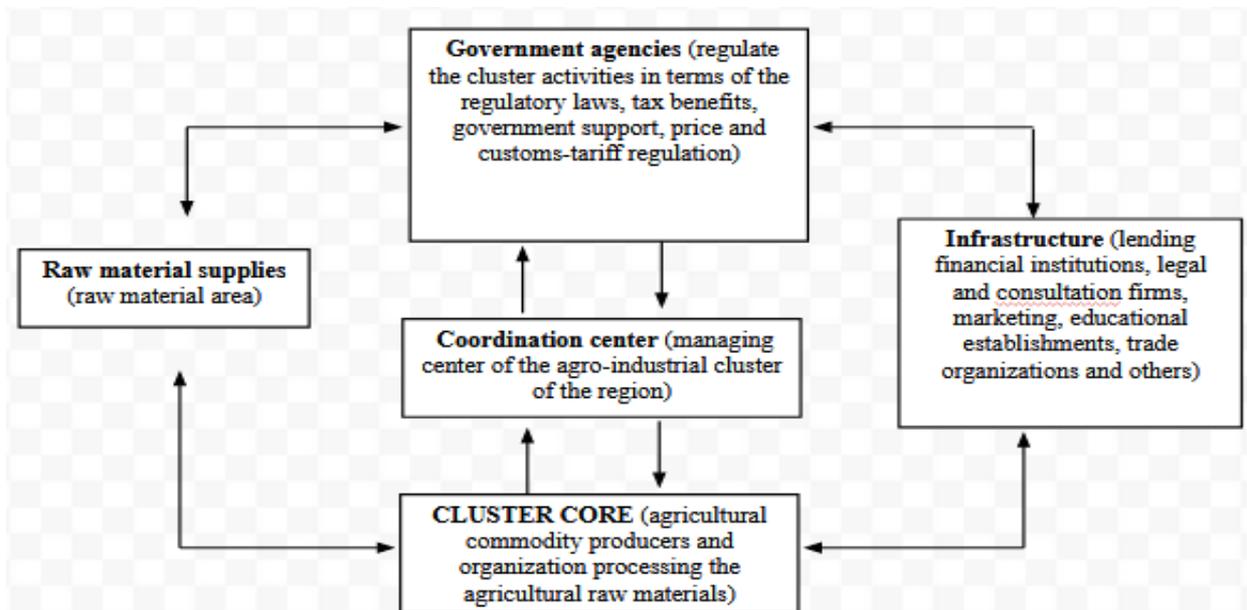


Figure 2 – Interconnection of the subjects of the regional agro-industrial cluster

The basis of the organizational and management activities between the cluster formation elements is the coordination center or the managing center of the agro-industrial cluster. The principal task

raw materials. Within the cluster, the goal congruence, the coordination of interactions and the compatibility of interests of the horizontally and vertically integrated undertakings, and the interested participation in scientific centers and associations, the territorial closeness and the wish to establish the long-term and stable

interrelations favor the process of information exchange between the participants.

When this cluster is implemented, the infrastructure is a totality of the good-supply, financial, mediation and service organizations, which, in our opinion, will favor the competent running of business and will be a connecting link while promoting the finished products from the commodity producer to the ultimate consumer. Adequate support from the regional authorities in the area of assistance to form the cluster system; organization of information support of the cluster development; assurance of implementation of the cluster programs aimed at making the products more competitive; assistance to form the favorable economic conditions of further cluster development is meant to be of importance to the cluster formation and development.

DISCUSSION.

A paradigm of making the economy more integrated is directly related to a process of the society change of the end of XXth – the beginning of the XXIst centuries, which entailed an extreme necessity to increase the innovation spirit in the economy and became possible only when the interrelations between economic agents are improved, where the cluster management system is expected to play a pivotal role.

M. Porter was the first to introduce the concept “cluster” into the economic analysis and he characterized it as “a geographically-concentrated group of interrelated companies and organizations, which act in a certain sphere and which are characterized by common activities and which complement each other” [14, p. 166]. The theoretical aspects of the cluster approach on the basis of simulation of the investment attractiveness of agro-industrial regions were formulated in the papers by A. Verzilin [17, p. 285], A. Derevyankin [9, p. 17], O. Morozova [15, p. 237] and others.

The economy clusterization phenomenon, as a kind of making the activities of organizations more competitive, becomes apparent in 50% of the world countries and is widely used in the USA, Finland, Germany, India, Hungary,

Kazakhstan and others. In all, according to the European cluster observatory, the EU countries have about 2100 clusters, in which 38% of the labor force were employed [18]. 11.5% of clusters out of their general number carry out their activities in the agro-industrial sphere. It is necessary to note that of 31 European countries, 26 countries (or almost 84%) have national cluster programs.

In Russia the scientists of the Russian Academy of Agricultural Sciences developed the Concept of the agrarian clusters development, which is based on the systemic-synergistic approach, where the agrarian cluster implies the interrelated forms of activities in order to simultaneously solve the business problems and the implementation of state-of-the-art technologies in the production activities [5, p. 30]. Within the Concept the approaches are determined to formation of the agro-clusters in the Russian Federation agriculture, which takes into account the production peculiarities in the agro-industrial complex, which include the seasonal production variability, as a result there is a long period of recoupment of expenses and the problems of pricing for the agricultural products, which demands the government to pay a great attention. This Concept cannot be promoted without using the innovation technologies, while their rational application in the activities of organizations on the basis of the cluster system will assure the advantage in the competitive battle and the sustainable development of the agricultural commodity producers and the entire agrarian sector of the economy.

The innovation processes, which are implemented in the agriculture, have their own specific features, which is caused by the regional, branch, technological, organization and other features. O. Anichkina [2, p.37], Yu. Petrova [16, p.59], D. Sidorova [20, p.30], N. Shishkina [24, p.91] hold this opinion. Apart from that, it is worth noting that the agriculture innovation development is impossible without investments by the government agencies and without increase in readiness of heads of the agricultural organizations to carry out the innovative activities.

The innovative activities of the agricultural organizations in the Russian Federation as a whole are characterized by low intensity. So, the

specific weight of the enterprises, which implement the technological innovations in their totality made up only 3.4% in 2016 (Table 4).

Table 4 – The indexes, which characterize the innovative activity of the agricultural organizations in 2016*

| Indexes | Agriculture | including | | |
|---|-------------|---------------|------------------|--|
| | | Plant growing | Livestock sector | Plant growing in combination with livestock sector (mixed agriculture) |
| Level of innovative activity (specific weight of the agricultural organizations implementing the technological innovations in the total number of organizations), % | 3.4 | 3.7 | 3.9 | 1.46 |
| Innovation activity of organizations (specific weight of the organizations implementing technological, organizational, marketing innovations in the reporting year, in the total number of the organizations surveyed), % | 4.0 | - | - | - |
| Monetary and material expenses for technological innovations, million Russian rubles | 14829.5 | 6276.1 | 5669.3 | 2884.1 |
| Specific weight of expenses for technological innovations in the total volume of the goods shipped, work and services performed, % | 0.9 | - | - | - |
| Specific weight of organizations implementing organization innovations in the reporting year, in the total number of the organizations surveyed, % | 0.9 | - | - | - |
| Specific weight of the organizations, which implement the marketing innovations in the reporting year, in the total number of the organizations surveyed, % | 0.4 | - | - | - |
| Research and development expenses, % | 12.9 | 15.5 | 15.4 | 9.7 |
| Expenses for acquiring the machinery and equipment, % | 50.3 | 40.0 | 77.3 | 21.4 |
| Intensity of expenses for the technological innovations (specific weight of the expenses for technological innovations in the total volume of the goods shipped, work and services performed), % | 0.9 | 1.1 | 0.6 | 0.13 |
| Own-produced goods shipped, works and services performed using own resources, million Russian rubles | 1592909.8 | | | |
| including | | | | |
| Volume of innovative goods, work, services, million Russian rubles | 22222.9 | 6542.0 | 14936.5 | 744.4 |
| Specific weight of the innovative goods, work and services in the total volume of goods shipped, work and services performed, % | 1.4 | 1.1 | 1.6 | 0.47 |

*drawn up by the author according to www.gks.ru

The maximum value of the innovative activity level is represented by the livestock sector – 3.9% and plant growing – 3.7%. In comparison with the European countries the Russian agricultural commodity producers fall far behind in terms of the innovative activity level. The gap between the innovative

activity levels of the agricultural organizations in the Russian Federation and Norway is 60%, Denmark – 40.8%, Spain – 8.9% and others.

When analyzing the expenses of the agricultural organizations for technological innovations by kinds of the economic activities it is obvious that research and developments of new products, services and methods account for the greatest share in this sector in the Russian Federation as a whole – 43.6%. This figure is 9.6 and 8.3 percentage points more than in the Volga Federal District and in Nizhny Novgorod region, respectively. In the Volga Federal District the investment in acquiring the machinery and equipment prevail – 41,6% (Table 5). On the whole, in 2016, the share of the foreign equipment in the total number of the equipment in agricultural organizations made up: by tractors – 67.8%, by combine harvesters – 22.1%, by forage combine harvesters – 20.7%. This is explained by the fact that the old Soviet equipment goes out of use, new Russian and foreign machines are acquired.

Table 5 – Specific weight of the agricultural organizations expenses for technological innovations by kinds of the economic activities and in terms of the economic subjects in 2016*

| Indexes | The Russian Federation | The Volga Federal District | Nizhny Novgorod region |
|---|------------------------|----------------------------|------------------------|
| Expenses for technological (food, process) innovations | 100 | 100 | 100 |
| of which | | | |
| -research and development of new products, services and methods of their production (delivery), new production processes | 43.6 | 34.0 | 35.3 |
| -design (activities to change a form, appearance or ease of using the products or services) | 1.4 | 1.4 | 2.4 |
| -acquisition of machines and equipment related to technological innovations | 36.3 | 41.6 | 30.9 |
| -acquisition of new technologies | 1.3 | 1.8 | 3.4 |
| -acquisition of software | 1.2 | 1.9 | 0.5 |
| -engineering including the preparation of feasibility studies, production design, pilot production and tests, installation and commissioning operations, other developments (which are not related to the scientific research and developments) new products, services and methods of their production (delivery), new production processes | 7.6 | 9.6 | 4.6 |
| -training of the personnel related to innovations | 0.2 | 0.2 | 0.1 |
| -marketing research | 0.08 | 0.03 | 0.01 |
| -other expenses for technological innovations | 8.3 | 9.5 | 2.7 |

*drawn up by the author according to www.gks.ru

Shares of expenses for other “intellectual” kinds of the innovation activities – acquisition of new technologies, software in the aggregate in the Russian Federation makes up 2.5%, which is 1.4 and 1.2 percentage points less than in Nizhny Novgorod region and the Volga Federal District, respectively.

Engineering including the preparations of feasibilities studies, the production design accounts for a high share of innovative expenses of the agricultural organizations. This item of innovative expenses in the Volga Federal District accounts for 9.6% of costs for the technological innovations, 8.3% in the Russian

Federation and only 2.7% in Nizhny Novgorod region.

The food production as a whole belongs to the low-tech economic sectors: a share of enterprises implementing the technological innovations is 10% (in the entire manufacturing industries the figure is 11.8%). Adoption of the technological innovations is restrained, in a sense, by the high capital expenses. The innovative passivity also applies to less unprofitable organizational and marketing innovations. In 2016 they were used only by 5.0% of the food industry enterprises (in the entire industry – 3.9%, in the hi-tech spheres – 11.3%). Therefore, the expenses for

technological innovations in the Russian Federation are less by a several-fold factor than in the foreign countries, and in 2016 the expenses made up 1284590.3 million Russian rubles.

In view of the above, it should be noted that refurbishment of the Russian agro-industrial complex and its switching over to an innovative model demand the government to pursue the active innovative policy. The innovative policy, which is pursued in the Russian Federation, should be aimed at laying the groundwork for successful development of the innovative activities and at assuring the scientific and technical progress acceleration, at making the work more productive in the agriculture. This implies both increase in the budget support for the innovative activities and the formation of such development institutes as industrial parks, venture funds, business incubators, agro-industrial clusters etc. The enumerated integration formations are expected to favor the strengthening of the cluster management mechanism in order to make the branch and the entire economy more competitive. The state innovative policy must be a part of the state program of development of the country agro-industrial complex and must be formed at the governmental level.

CONCLUSION.

Thus, the mechanism of cluster management to make the agricultural enterprises more competitive is essential to the regional and inter-branch governance, which favors the stimulation of the basic integration processes at different levels (macro-, meso-) of the economy.

Superiority of the cluster method consists in an innovation approach and, as a consequence, the growth of the work productivity in the medium and long term, in comparison with the stand-alone agricultural organizations. Flexibility and possibility to quickly react to fluctuations in the market economy environment are fundamental in the course of forming the competitiveness of the agricultural commodity producers. It should be noted that integration of the cluster formation participants makes the activities more efficient

and results in the so-called synergistic effect from their interaction.

Summarizing the above, it should be noted that the cluster approach in the agro-industrial complex at the regional level, which is based on forming the stable vertical and horizontal connections, the use of a lever of the state private partnership with the application of the state-of-the-art innovative technologies in the modern conditions of the economy functioning, is efficient only if the government assures the effective legal regulation.

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