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## Formation of Zonal Agro-eco Clusters as a Mechanism for the Development of Rural Areas

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**Abstract:**

*Today, the degree of agricultural development, and, in the future, the level of national food security, the public health and the quality of life, are largely ensured by innovative developments in the field of alternative agriculture, the preservation of natural resources and, above all, the main production facility – land.*

*At the same time, the unfilled market capacity of organic products and the significant land potential for the development of organic farming create all the necessary prerequisites for enhancing the competitiveness of Russian rural producers.*

*The development of agricultural entrepreneurship towards the greening of land use, organic production and development of the domestic market for organic (ecological) products in the format of zonal agro-eco clusters is one of the strategic directions for implementing reforms in the agricultural sector.*

*The paper presents the directions of the formation and development of zonal agro-eco clusters for the production, processing and sale of organic products in the agricultural regions of Russia.*

**Keywords:** Cluster approach, efficiency, rural areas, organic products, land resources, zonal agro-eco cluster, land use ecology, food security.

**JEL Classification:** D40, E27, J43, O13, Q13.

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## **1. Introduction**

Modern society is beginning to realize the current environmental situation in the world. As a result, over the past two decades, agricultural producers have become much more interested in organic or environmentally oriented land use methods that ensure gradual natural restoration of soil fertility and help maintain the balance of natural ecosystems of territories (Grigoruk and Klimov, 2016; Altukhov, 2015; Gabriel *et al.*, 2013). This agrotechnology of agricultural production serves as an alternative to modern industrial land use (Keating *et al.*, 2010; Zhuchenko, 2012; Sycheva *et al.*, 2015; Amadou and Barbier, 2015).

Consequently, the consideration of issues related to the prospects for the development of environmentally friendly agricultural production and the justification of the feasibility of involving fallow and unused agricultural land to produce environmentally safe food becomes relevant. In the authors' opinion, it is possible to ensure a gradual transition to the principles of greening in agriculture and increase the competitiveness of Russian agricultural makers of organic products provided that the local agricultural, scientific and innovative formations (clusters) focused on the production, processing, storage and sale of organic products of the agro-industrial sector, to which the authors suggest using the term "zonal agro-eco cluster".

## **2. Methods**

Unjustified excess of the norms of introduced synthetic mineral fertilizers, excessive use of chemicals for plant protection, failure to comply with a scientifically based system of alternating crop rotations, use of intensive agricultural technologies have led to serious environmental consequences – reduced soil fertility, depletion of the humus horizon, reduction of the populations of animals and birds in areas of intensive agricultural production, release of chemicals into the atmosphere and water.

The formed dilemma of the further development of agricultural production and preservation of the natural environment as the basis for the life of future generations has predetermined the search for alternative options in connection with the sector's development (Gerasimova *et al.*, 2018a; Gerasimova *et al.*, 2018b; Nedelkin *et al.*, 2016; Yemelyanov, 2014a). Thus, over the past three decades, leading foreign studies and agricultural practices, in order to solve territorial environmental problems and improve the quality of food, are gradually shifting to organically-oriented agricultural methods, turning this area of production into a strategically important and significant sector of the economy (Seufert *et al.*, 2012; Polushkina, 2016; Shaytura *et al.*, 2017).

The basis of the research is the works of Russian and foreign scientists on cluster development, economic regulation of the processes of agro-industrial production,

ecological development of regions (Polyakova *et al.*, 2018; Nagimov *et al.*, 2018; Abramov, 2016; Akhmetshin *et al.*, 2017a; 2017b; 2017c; Dmitrieva *et al.*, 2017; Lebedeva *et al.*, 2016; Gurieva *et al.*, 2016; Kamolov, 2017; Zhupley *et al.*, 2018). The systematic approach was taken as the methodological basis, which ensured the complexity and purposefulness of the research. In the process of research, analytical, statistical, monographic methods of research were used.

### 3. Results

According to the definition given by Porter, *"a cluster is a group of geographically neighboring interconnected companies and related organizations operating in a particular area that are characterized by common activities and are complementary to each other"* (Porter, 2009). Based on common interpretations, the authors define a "zonal agro-eco cluster" as a local agrarian, environmentally oriented scientific and innovation integration formation, which includes agricultural production, processing and marketing organizations, scientific and educational production facilities of regional research centers and universities, marketing and analytical, laboratory and certification, tourist and recreational, cultural and educational sectors, exhibition center, along with the developed infrastructure of logistics and storage.

Zonal agro-eco clusters combine all processes related to planning, scientific substantiation, production, processing, storage, sales, certification of ecological products of the agroindustrial sector, i.e. from the moment of origin of the business idea to its realization into the final product in a single cycle. The zonal approach to the formation of agro-eco clusters is conditioned by significant differences regional territories in terms of their natural and climatic potential, soil fertility, population density, level of infrastructure development, road accessibility, availability of markets for products, as well as tourism and recreation potential of the area.

The formation of zonal agro-eco clusters, in the authors' opinion, is of importance for the development of the economy of an agro-industrial region and attraction of investment to the agro-industrial sector (Nedelkin *et al.*, 2017). Moreover, public support for the creation of zonal agro-eco clusters and the awareness of their role in the strategic development of the country's agriculture would be no less important (Yemelyanov, 2014b; Yemelyanov *et al.*, 2018a). Their formation should take place gradually, considering the successive fulfillment of the following conditions:

- 1) assessment of the capacity of the regional and domestic market for organic products, available land, labor, industrial and recreational resources;
- 2) organization of the coordinating council (executive directorate) of the future zonal agro-eco cluster;
- 3) formulation of strategic goals, justification of the functions and requirements for the zonal agro-eco cluster;
- 4) identifying the structure of organizations participating in the zonal agro-eco cluster, forming an organizational framework, attracting potential business partners

(travel agencies operating in the field of agro-tourism, cultural and ethnographic centers, retailers);

5) making out a business plan for the development of agro-eco cluster, evaluation of the effectiveness and payback of the project to create a zonal agro-eco cluster;

6) attracting investors to the implementation of an investment project on the creation and operation of a zonal agro-eco cluster;

7) implementation of the zonal agro-eco cluster project.

The most important function of the agro-eco cluster is its innovative activity in ensuring a gradual transition to agricultural production of organic food. For this purpose, the participation of zonal agro-eco-clusters in the activity of innovation centers operating under regional authorities, research and production institutions and agricultural universities of the region is planned (Yemelyanov *et al.*, 2018b; Osadchy and Akhmetshin, 2015a; 2015b; Tarman *et al.*, 2016; 2017; Ruslan Agarunovich, 2015). It also assumes a partial attraction of investments in order to promote the introduction of scientific research through a system of grant support for innovative projects initiated by regional authorities (Akhmetshin *et al.*, 2017c).

The estimated budget support of zonal agro-eco clusters is possible through an investment tax credit for enterprises participating in the agro-eco cluster; subsidizing part of the bank interest rate on investment loans; federal and regional financing of programs aimed at greening of agriculture; establishing tax benefits for producers and processors of agricultural ecological products by assigning them to a special economic zone. Alternatively, non-subsidized development of zonal agro-eco clusters is possible; in that case, the proportional investments of participants are the sources of the clusters financing (Poltarykhin *et al.*, 2018; Voronkova *et al.*, 2018a; 2018b; 2018c; Yemelyanov *et al.*, 2018c).

It is advisable to include activities supporting zonal agro-eco clusters in regional programs to support agriculture, ensure the environmental safety of land use, increase the innovative activity of territories, reduce tensions in the labor market, etc., (Sycheva *et al.*, 2018a; 2018b; Akhmetshin *et al.*, 2018a; 2018b; Kolesnikov *et al.*, 2018; Kirillova *et al.*, 2018). The ecological state of the foothill zone of Altai Region, its tourist and recreational, as well as land and resource potential were the main criteria for the selection of development area of a zonal agro-eco cluster project. Based on examination of specific socio-economic and land conditions of particular territorial zones of Altai Region, it is possible to create a pilot zonal agro-eco cluster within the black earth zone of foothill plains, foothills and lowlands of Altai. This zone is characterized by high soil productivity and relative ecologically clean territory. Foothill soil zone is in the lower level of the vertical encirclement of the northern, northwestern, northeastern territory of Altai and is spatially located south of the Biya and the Charysh rivers and southeast of the Aley's middle course.

To date, most of the zone is plowed, the largest arable land massifs are located along the submountain and foothill plains and rugged foothills. The foothill soil zone is

characterized by a high degree of modern economic development; arable lands occupy over 50% of the total agricultural land. In terms of soil productivity, the foothill zone exceeds the rest of the soil zones of the region, with the highest indicators of the cadastral value of agricultural land of Altai Region. A record 88% of arable land is located on fertile black earth. Meadow-chernozem, meadow, alluvial and other soils are used for forage. The territory of this zone has all the necessary land and resource and production prerequisites for the creation of a zonal agro-eco cluster under the project name "Altai Foothills". Several enterprises in the field of the production and partial processing of organic agricultural products already operate within the territory of this soil zone enterprises and private farms specializing in the production of environmentally friendly medicinal plant materials (herbs, roots, sea buckthorn) for enterprises belonging to the Altai Biopharmaceutical Cluster – "Evalar", "Altaivitamins", etc.

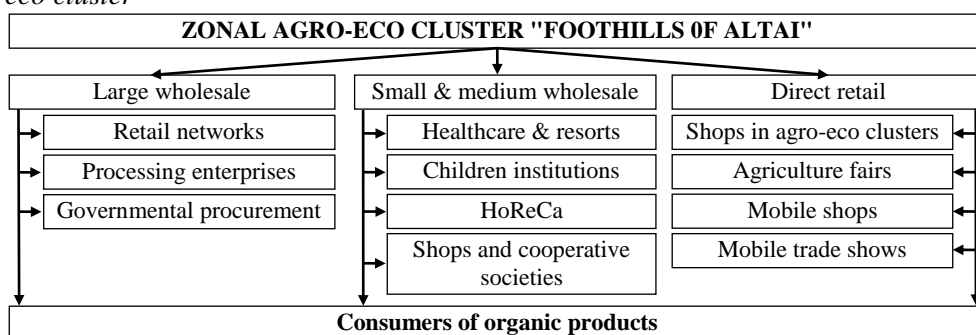
Furthermore, all areas included in this zone are distinguished by a high level of cultural, tourist and recreational potential. The demanded tourist route "Small Golden Ring of Altai" passes through the foothill zone, close to the resort town of Belokurikha, the special economic zone (SEZ) "Biryuzovaya Katun", Lake Aya, research and production center "Biolit", Evdokimov and Zolotukhin museums, Cossack Outpost park, Denisov Cave – a monument of the Upper Paleolithic era, protected by UNESCO, a cascade of waterfalls on the Shinok River, Soloneshensk Regional Museum of Local Lore, Ethnocultural Center in Topolnoye, the Baschelak lakes. The nature of this area attracts many tourists by clean lakes, waterfalls, mineral springs and many other beauties of the ecologically pure and protected foothills of the Altai. The foothill area is characterized by a fairly well-developed level of processing of agricultural products; several shops, retail outlets and restaurants operate along the main tourist routes.

The developed model of the zonal agro-eco cluster includes the following key sectors: production and processing, supply, transport and logistics, service, marketing and sales, which allows building an effective chain "production – processing – marketing of organic agricultural products". Management, coordination, finance and personnel, innovation, research and education sectors have been allocated to ensure the operation of the zonal agro-eco cluster and the development of additional areas of its activity. The draft structure of the zonal agro-eco cluster was the first to include the laboratory certification sector, as well as tourism, recreation, cultural and educational sectors.

For the purpose of effective operation of the "Foothills of Altai" agro-eco cluster, it is necessary to prepare and implement the advanced training in the greening of agriculture for managers, and employees, agricultural enterprises, farms and enterprises processing organic products. The agricultural organization specializing in organic products, participating in of the zonal agro-eco cluster, plan to conduct the field studies. Those will be conducted by teachers of the Altai State Agrarian University and certification centers as well as practitioners in the field of agricultural

production greening. Based on multiple sources, it was revealed that the distribution channels for organic products can be different, including direct retail, small, medium and large wholesale (Yoronkova et al., 2018). In the author's opinion, at the initial stage of operation of the zonal agro-eco cluster, with insignificant organic agricultural production, the scheme of direct marketing, or direct retail sales through stores located in the territory of the Altai Foothill agro-eco cluster, mobile outlets at agricultural fairs in nearby cities and district centers, as well as mobile specialized fairs and trade shows seems the optimal solution (Akhmetshin and Kovalenko, 2018) (Figure 1).

**Figure 1.** Suggested sale channels for organic products of "Foothills of Altai" agro-eco cluster



Direct sales of organic products have sufficient benefits. Thus, the sale of products is possible even with small production volumes; direct contact between the manufacturer and consumer implies the establishment of stable relationships; the trademark "Ecological Products of Foothills of Altai" is a good advertisement that forms consumer interest; flexible pricing, accounting for market situation will allow establishing a sustainable system for marketing organic products. With the increase in production and the establishment of processing of organic products, sales channels are gradually expanding to the level of small and medium wholesale, and then to the level of large-scale wholesale, including the system of government procurement of organic food. It also seems possible to attract consumer cooperatives, operating in most areas, to the sale of organic agricultural products.

The "Foothills of Altai" agro-eco cluster can serve as a practical basis for summer educational work experience of students of the Altai State Agrarian University and agricultural colleges of the region. In the course of work experience in "Foothills of Altai", students will be able to learn about the innovative systems of ecological farming, organic technologies of growing crops and raising animals, basics of processing organic products, as well as certification of organic products and production processes, budgeting at an enterprise making organic products, system for marketing organic agricultural products. The authors consider it necessary to conduct training in agriculture development, focused on the production of organic products for managers and specialists of agricultural organizations.

A significant role in improving the skills of agricultural managers and employees should be assigned to work experience in Russian and foreign agricultural organizations – manufacturers and processors of organic products. However, it should be noted that when forming the budget of the zonal agro-eco cluster "Foothills of Altai", it is necessary to consider the additional costs: laboratory studies of soil quality for environmental safety; preparation of fallow and unused lands for the introduction of organic crop rotations; introduction (if necessary) of organic fertilizers, purchase of seeds of new crops, biological plant protection products, natural mineral fertilizers; certification of systems for production and processing of organic (environmentally friendly) products.

The authors suggest considering the "umbrella certification system" for a complex certification of companies participating in the agro-eco cluster and to minimize the costs associated with the certification procedure; presentation of the agro-eco cluster on the Russian and regional levels through participation in specialized exhibitions, fairs, and advertising campaigns in the media. Organizational principles for the functioning of a zonal agro-eco cluster can be forms of cooperation or vertically integrated structures, where the executive directorate or the leading processing enterprise will act as an integrator.

#### **4. Discussion**

In general, it should be noted that a systematic transition of agricultural organizations to the principles and production of high-quality and environmentally friendly domestic organic food requires successful experience in the functioning of agricultural organizations making organic products, as well as innovative developments in the field of agriculture, which can be implemented at the regional level through the system of zonal agro-eco clusters. All of the above is possible with an appropriate level of coordination of participants and an effective organizational and economic mechanism of state support and stimulation of the development of agriculture-oriented towards organic products, which, in turn, should be considered as an important component of the structure of the domestic food market being at the stage of dynamic development.

Based on foreign experience in the production of organic products, it can be concluded that the development of agriculture, focused on organic products, is a promising and developing direction. Modern society becomes aware of the current environmental situation in the world. This resulted in the increasing interest in organic farming, which contributes to natural restoration of soil fertility and the maintenance of the balance of the natural ecosystem. This agricultural technology serves as an alternative to traditional (industrial) agriculture.

Organic farming is a closed production cycle with a large proportion of manual labor. Agricultural manufacturers of organic products are virtually independent of the supply of antibiotics, growth hormones, chemical plant protection products,

fertilizers, which make their business more sustainable. The authors believe that the activities of the zonal agro-eco clusters can have a significant positive effect on the level of economic, social and environmental development of rural administrative and territorial entities of the region by enhancing the regional market for both organic and traditional agricultural products, full and environmentally balanced use of land resources, development of innovative agricultural technologies, increase in the employment rate of the rural population, enhancing agro-ecotourism development of the local ecological infrastructure, expansion of the taxable field, increasing the sustainability of agricultural enterprises and innovative activity of the region.

## **5. Conclusion**

The Russian producers of organic products need a unique market segment, addressed to consumers who care about their health and the ecological safety of the environment. Consumers of organic products can be children (baby and diet food); people with poor health; patients on rehabilitation; food allergy sufferers; people who adhere to a healthy diet, etc. The demand for organic products in Russia is only 30% satisfied. The formation of a system of organic farming does not mean the abandonment of industrial agricultural production. In the authors' opinion, both organic and industrial farming systems can function effectively in parallel to each other, gradually transforming into an agricultural technology that can meet the current and expected needs of the population for high-quality and environmentally friendly food.

Many Russian regions have the necessary climatic conditions, resource, land and recreational potential for the organization of the system for organic agricultural production (along with the traditional one). Systemic analysis and assessment of the possibility of using international experience in organic farming in conjunction with the established traditions of Russian land use are a prerequisite for strategic development and strengthening the position of agriculture in the national economy.

It can be assumed that agriculture, focused on the production of organic products, acts as a "new philosophy" in the land use system. Potential opportunities for the transition to organic production are higher for small and medium businesses since they imply growing a wide variety of crops (for continuous crop rotation), manual labor is required in producing many crops, and it is more problematic to implement such a pattern of work in a large company.

Furthermore, the innovative techniques and methods presented in organic agriculture, are much faster and easier to implement in small companies, because they easily adapt to innovations. If these farms have the appropriate organic certification and later integrate into the system of the zonal agro-eco cluster, they will be able to create their market by competing with organic products imported to Russia.



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