Agroecological cluster as a system integrator of the Baikal region

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Abstract. The Baikal Region, despite its favorable geopolitical position (between Europe and Asia) and the most famous lake on the planet, located in its territory, is peripheral and depressive. The lag in socio-economic development is due to severe environmental restrictions imposed on economic activities. New business models and process solutions are necessary to enable the transition to a digital economy without harming the environment. Development of a agroecological cluster based on a digital platform will help increase the connectivity of the macroregional space, its integration and the rational use of the resources of the Baikal ecosystem. Due to generation of a synergistic effect that manifests itself in the socio-economic and environmental spheres the agroecological cluster acts as an integrator uniting the subjects of the "state – society – business" triad on the basis of mutually beneficial partnership.

1 Introduction

From the point of view of spatial development, the Baikal Region, which is a bridge between Europe and Asia and the area of intersection of the most important world axes (Christianity – Buddhism, West – East) [1] is of great geopolitical importance for Russia.

Revealing its integrating potential requires a transition to a targeted socio-economic partnership of three constituent entities of the Russian Federation – the Republic of Buryatia (RB), Irkutsk Oblast (IO), Trans-Baikal Territory (ZK) – and presence of a unique Lake Baikal postulates the need for close cooperation in the field of ecology to maintain stability of the Baikal ecosystem.

To transform the so-called "Baikal factor" from a restrictive barrier that impedes development of the regional economy into its competitive advantage, joint efforts of the RB, IO and ZK are required. Active actions of the "regional authorities – society – business" triad to expand and deepen interregional ties and establish effective interaction can launch the process of transformation of three neighboring regions of the Russian Federation into a single Baikal socio-ecological and economic system, which benefits from use of the Baikal brand within the country and for its outside.

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An inter-territorial agroecological cluster (AEC) can act as an integrator, the network structure of which allows it to flexibly integrate into modern production networks and digital industrial systems. AEC unites enterprises of the agricultural sector, companies from the supply, service, infrastructure sectors, public organizations, and etc.; their cooperative and integration interaction makes it possible to arrange the full-cycle agricultural production, which brings a synergistic effect to both the AEC participants and the socio-ecological-economic system as a whole through use of innovative agrobiotechnologies, digital solutions and modern business models focused on the balanced development of all stakeholders and maintaining the stability of ecosystems.

2 Materials and Methods

The theoretical and methodological basis of the study was the fundamental provisions of the theory of regional and spatial economics, general systems theory and the theory of competition. Within the study, an integrated approach was used, including a range of different methods and tools: categorical method, logical-structural analysis, synthesis, general scientific research methods, situational analysis, and etc.

3 Results and Discussion

The prospects of the Baikal Region entirely depend on how long-term vectors of development of the three constituent entities of the Russian Federation (RB, IO, ZK) correspond to the vector of the well-known and recognizable brand of Lake Baikal.

However, different visions of the mission and goals in the strategies of socio-economic development of these regions hinder the integration and effective interaction of regional authorities. The strategic priorities of the RB are closest to the principles of a green economy; IO focuses on the development of human capital, consolidation and attraction of the population, education of regional patriotism; ZK – to improve the level and quality of life of the population as a result of sustainable economic growth. The IO priorities mention the need to preserve the unique ecosystem of the region; for the regional authorities of the ZK, environmental problems, despite their obvious severity, are far from the foreground.

We agree with V.G. Belomestnov, B.B. Sharaldaev, Ch.D. Dashitsyrenov, I.A. Belomestnova, that one of the main mechanisms of influence of regional administrations on the subjects, ensuring the coordination of goals and strategies of the territories, is the organization of economic relations in forms that allow the interests of the subjects to be coordinated with a common mission and strategic priorities for development of the macroregion [2]. This mechanism can be formation of inter-territorial economic clusters, which will ensure coordinated spatial socio-economic development of regions. The authors offer introduction of innovation and integration network clusters (IINC) as the main tool for formation of such clusters. It is believed that production clusters and network regions provide the national economy with the strongest competitive position in the global market, since the synergistic effect of network mobilization makes it possible to respond more quickly to changes in the system of global exchanges.

Wherein, the authors note that the effect of clustering for leveling the level of development of regions is limited, because the complete elimination of socio-economic differentiation is, in principle, impossible: the goal is to increase the

economic activity in the regions as much as possible and, on this basis, to increase their social attractiveness.

T.A. Shibaeva, A.V. Glotko adhere to a similar point of view: the primary task is to find an effective mechanism for managing the region, considering the economy clustering. An effective method is cluster-network management, in which a region with a predominantly cluster structure of the economy is viewed as a constantly forming and changing cluster-network space [3]. Cluster subjects form network connections and interactions around clusters: intra-cluster, inter-cluster, external. Development of network relationships (permanent and temporary) occurs when arranging production and expanding the scope of clusters. Since networkization is becoming a form of integration of interactions, we can talk about emergence of specific hybrid forms of economic entities - cluster-network [4].

Networked cooperation presupposes integration of the interests of all subjects of cluster-network associations and contributes to formation of their overall competitiveness. When managing such associations, the speed of building and saturation of network structures with network interactions at the interregional and international levels is of particular importance.

As one of the promising forms of network structures in the agro-industrial complex, T.A. Shibaeva, A.V. Glotko called the agro-industrial cluster characterized by systemic synergistic interaction of agricultural producers, food and processing enterprises, scientific and educational institutions, regional authorities. Traditionally, clusters are formed within the borders of the constituent entities of the Russian Federation, however, if it is necessary to expand the raw material zone and use the innovative potential of other regions, it is advisable to create interregional integration structures, the functioning of which requires a high level of development of ICT and transport and logistics infrastructure [3].

Considering the environmental risks and threats, in the Baikal region it is advisable to stimulate those activities that cause minimal damage to the Baikal ecosystem and contribute to increase in the level and quality of life of the population, i.e. bring a synergistic effect: in the economic, social and environmental spheres. It is necessary to abandon traditional industrial policies and actively introduce new business models that can integrate into the digital economy. As already noted, clusters, due to their flexibility, adaptability, informality, combination of cooperation and competition, stimulate the processes of business digitalization. So, an interregional AEC, created on the basis of a digital platform, can perform the following functions (Fig. 1).

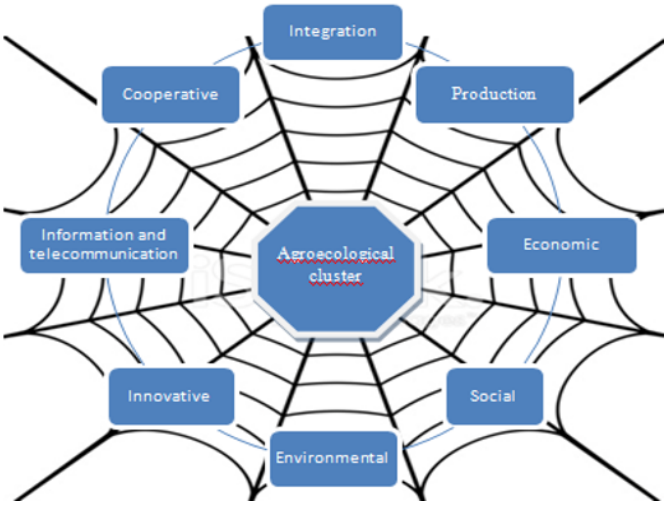

Fig. 1. The role and functions of the AEC in the Baikal Region.

Creation of an inter-territorial AEC will contribute to the gradual transformation of the Baikal Region into the Baikal socio-ecological-economic system based on increasing the connectivity of space as a result of the cluster performing the following functions:

1. Production – building value chains, including suppliers (feed, plant and animal protection products, equipment and technologies, etc.); agricultural producers (rural micro-clusters and clusters of small businesses (MFKh), specializing in production of farm and organic products for the healthy lifestyle market and proper nutrition; agricultural holdings and large agricultural organizations (SKhO) specializing in food for mass consumption); food and processing enterprises (whose main task is to increase the depth of processing, expand the range, develop the production of ethnic cuisine products); organizations providing transport and logistics, trade and intermediary services, ensuring the distribution and sale of products; enterprises engaged in waste processing. The expected result is an increase in production of livestock products by increasing the number of producers, increasing agricultural productivity with introduction of innovative technologies, and a more efficient organization of the sales system based on a digital platform.

2. Economic – at the micro level, saving on transaction costs, increasing profits, profitability, improving the financial condition of cluster members; at the meso-level, growth of GRP, employment, average per capita income, budget revenues at all levels, improvement of the business climate. At the level of enterprises and regions – an increase in competitiveness and economic efficiency. Development of economic activity in rural areas, diversification of the rural economy, business expansion opportunities using Internet communications and CRM systems (for example, Megaplan, Bitrix 24, Simple Business CRM, Microsoft Dynamics, Mango CRM, and etc.).

3. Social – sustainable development of rural areas, consolidation of the population in rural areas, preservation of the traditional way of life, traditions, culture, customs. Development of rural infrastructure by combining efforts of regional and municipal authorities, business, rural community, improving the demographic situation and the quality of life of the rural population. Accumulation of social capital (including using the Internet communities, groups, social networks), professional development of personnel (distance training, continuous self-education using materials posted on the

Internet, consultations, webinars, round tables in an online format). Increasing food security, improving public health while consuming high-quality and safe food (using a digital platform, software and hardware sensors and IoT technology will automatically download information on supplies and track the full path of food through supply chains. Buyers will be able to get all the information they need by scanning the QR code on the product packaging) [4].

4. Environmental – reducing the level of environmental pollution through use of innovative agrobiotechnologies in agriculture, the transition of a part of rural micro-clusters and clusters of small farms to organic livestock farming, waste processing, introduction of innovations and digital solutions in the agri-food complex, environmental education of the population (delivery of information through social networks, arrangement of environmental marathons, competitions for "green projects", and etc.) [5, 6].

5. Innovative – diffusion of innovations, development, distribution and implementation of innovative technologies in production and business processes, development of a regional innovation system in order to modernize the agri-food complex, digitalize the regional economy, implement joint innovative projects aimed at increasing productivity and productivity, resource conservation, rational organization of agricultural landscapes, preservation of the stability of the Baikal ecosystem, transition to an ecologically oriented innovation economy.

6. Information and communication – development of the ICT in the process of digitalization of the agro-industrial complex, increasing the availability of information, arranging the activities of companies on the basis of a digital platform, using viral marketing, promoting the AEC brand, entering the national and world food markets. Growth of network relationships, interaction with partners from other regions and countries, expansion of production and diversification of business due to erasure of boundaries and the ability to work with contractors from anywhere in the world [7, 8].

7. Cooperative – development of horizontal relationships between small, medium and large agribusiness, arrangement of networking between cluster members, regional authorities and society, joint implementation of infrastructure and other projects, attracting investors who prefer to invest in large-scale projects, formation of cluster-network systems as a result of the intersection of "key interests", development of intersectoral interaction, blurring the intersectoral boundaries in formation of the national digital ecosystem. Increase in the number of cluster members, intensive development of relationships, accumulation of social capital and diffusion of innovations lead to an explosive growth in the number of startups and proliferation of network structures.

8. Integration – formation and development of the AEC requires joint efforts of regional and municipal authorities, business and society. Integration of the Irkutsk Region, the Republic of Buryatia and the Trans-Baikal Territory into the Baikal socio-ecological-economic system becomes possible subject to formation of a unified vision of the prospects for development of the Baikal Region, implementation of interregional projects, and achievement of a balance of socio-ecological and economic interests. AEC functioning will contribute to the greening of the agro-industrial complex and transition to an environmentally oriented innovative development of the macroregion by ensuring a synergistic socio-ecological and economic effect at the micro- and meso-levels of the economic complex and localization of restrictions associated with action of the "Baikal factor".

This will undoubtedly serve as an incentive for deepening integration: the cluster can become a pilot project for working out mechanisms for implementing inter-territorial cluster forms of arranging the production and business processes aimed at increasing the connectivity of the Baikal Region. Nevertheless, the AEC is not the only and far from universal instrument for enhancing interregional interaction; its effectiveness largely depends on the level of development of the digital economy and readiness of society for large-scale implementation of fundamentally new technologies in Industry 4.0.

4. Conclusion

The future of the Baikal Region largely depends on the successful cooperation of the three constituent entities of the Russian Federation, in the territory of which the catchment basin of Lake Baikal is located. However, a different vision of the mission and goals of long-term development among regional elites is a disintegrating factor, the influence of which can be overcome through introduction of new business models focused on network interaction [9].

The role of a system integrator can be played by an agroecological cluster, which is characterized by a number of properties common to all clusters (network structure, hybridity, flexibility, adaptability, competition and cooperation, knowledge diffusion, and etc.), as well as capable of generating a synergistic socio-ecological and economic effect on all levels and areas, namely:

a) in the field of economics:

- for actors — profit, profitability, growth of competitiveness;
- for the region — growth of business activity, employment of the population, budget revenues, improvement of food supply, improvement of the system of inter-territorial food ties, development of infrastructural organizations;

b) in the social sphere:

- for the village — providing jobs, incomes, guarantees in the role of a backbone enterprise; fixing people in traditional places of residence;
- for the agro-industrial complex — recovery of the prestige of the labor of agrarians, establishment of inter-sectoral relations, introduction of innovative agricultural production;

c) in the field of ecology:

- for the environment — use of innovative agrobiotechnologies and digital solutions that minimize environmental damage;
- for biocenosis — biodiversity conservation, monitoring the environmental risks, implementation of an environmental safety system.

In the conditions of the Baikal Region, which suffers enormous economic losses due to the current strict protection regimes, the most urgent issues are environmental-oriented economic development, therefore, formation of an inter-territorial agroecological cluster can become a promising area of regional specialization. Development of organic livestock farming, use of digital and biotechnologies will allow inter-territorial clusters to develop intensively, stimulating entrepreneurial activity in the Baikal Region and reducing the anthropogenic load on the Baikal ecosystem. The so-called "Baikal factor", which is currently considered a limiting factor that reduces the economic attractiveness of the region, can be further regarded as a preference for development.

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