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Problems and Perspectives of Formation of Agricultural Clusters for Increasing Food Security of Developing Countries

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Abstract:

The authors of the article develop the proprietary methodology of integral approach to formation of the projects and programs of socio-economic development, which allows differentiating the sub-system of previously viewed indicators as to the level of users' demands. The sense of cluster approach to increasing the competitiveness of agro-industrial complex is analyzed, and the problems and perspectives for formation of agricultural clusters for the growth of food security of developing countries are determined. As a result of the research, the authors came to the conclusion that agricultural clusters are a perspective course of increasing food security of developing countries, as they improve competitiveness of domestic agricultural producers and increase food independence and food self-sufficiency of economic systems. However, implementation of internal cluster cooperation requires reconsidering the existing notions of management, related to the level of methods and control, protection of intellectual property, education, and integration. The created system of relations should allow economic agents to keep balance between self-organizing and manageable behavior, combining innovational diversity and freedom of actions with the necessary level of integration. Intercompany cooperation in this regard should be similar to cooperation of ecosystem elements.

Key Words: *Agricultural Cluster, Food Production, Developing Countries*

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1. Introduction

The global financial crisis, apart from negative influence on the economy and social conditions in many countries, caused the aggravation of the whole range of global problems of development, among which the most important is the threat for food security in developing countries and regions. As a result, there is a complex of economic and social factors in developing countries which emerged under the influence of the crisis.

Thus, the reasons for emergence of the complex of food security problems became the growth of global prices for food and reduction of offer for food products in sales market with inability to satisfy the demand of net importers of food. Implementation of limitations for export of agricultural products by some countries showed the existing disproportions in the global food system, which leads to many food net importers' dependence on several countries-exporters.

This causes the necessity for corresponding measures for prevention of food crisis in case of instability in countries-exporters. For this purpose, the authors offer to create agricultural clusters for increasing the competitiveness of domestic agricultural producers and providing food security of developing countries.

2. Materials and Methods

The existing separate provisions of methodological nature are related to development of criterion of selecting the spheres (types of activity) for clustering, while the algorithm of agricultural cluster formation is poorly substantiated and poorly elaborated in methodological aspect; there is no clear instrumentarium of sequence and interdependence of various types of activity and production spheres in a cluster.

That's why this study develops the proprietary methodology of integral approach to formation of projects and programs of socio-economic development, which allows differentiating the sub-system of previously viewed indicators as to the level of users' demands. For this purpose, they are differentiated in the projects for bodies of state (municipal) power, for bodies of executive power, and for specific economic subjects (Garthwaite *et al.*, 2015).

Based on the results of evaluation of territories' capabilities for sustainable economic and ecological development, the algorithm of their further ranking according to the principles of cluster analysis is formed. On the basis of the analysis and generalization of materials in this research, the principles of cluster formation

are allocated: informational openness, diversification of demand, and geographical proximity.

The sense of the offered methodology consists in the agricultural cluster creation technology's division into several independent stages: selection of the goal and of contextual element of cluster and elaboration of the chain of spheres and types of activities which enter (comprise) a cluster. Comparison of given stages and tasks, which form them, points at the fact that the latter task in creation of sectorial cluster is the most important, at the same time being the least developed, contradictive, and short of methodological level.

The model of organizational & economic mechanism of managing agricultural cluster includes totality of methods of influence for the purpose of achievement of desired level of efficiency of activities and functions of management (analytical, organizational & coordinating, accounting & controlling, and stimulating). Methodological base for managing socio-economic development of agricultural cluster includes: technological support, regulatory support, informational support, marketing support, and organizational & economic support (He, 2015).

Another group of problems is related to development of conceptual model of the system of indicators of agricultural cluster strategic development. Taking competitiveness of agricultural cluster as a possibility to rationally use the current potential for manifesting competitive advantages, it is possible to state that competitiveness is a result of the level of managing agricultural cluster for achieving its sustainable development.

The main directions of agricultural cluster efficiency include two blocks: firstly, increasing the efficiency of activities in view of cluster elements, and, secondly, key directions of increasing the efficiency of cluster on the whole. These blocks allow combining each element of cluster and each direction of efficiency (Greshonkov and Abramova, 2014).

A peculiar feature of conceptual model of the system of indicators of strategic development is aiming for the selection of key indicators of strategy realization which allow taking into account economic, ecological, social, and innovational aspects of development of regional system.

That's why the goal of R&D substantiation of managing socio-economic development of agricultural cluster on the basis of ecologically oriented approach is formation of theoretical and methodological foundations for managing socio-economic development in view of ecological conditions for provision of sustainable socio-economic development.

Hierarchical model of selection of innovational development strategy, which sees infrastructural & cluster approach as the most adequate to existing and perspective resource possibilities of region's development, and complex system of indicators of sustainable functioning and development of region on the basis of strategic landmarks and territorial sub-systems (innovational, economic, and social; sub-systems of human potential development, infrastructure, management, environment and resources) form matrix structure for development and implementation of regional socio-economic policy of development of innovative activities (Jacknowitz *et al.*, 2015).

The sense and content of each block of the developed strategy (technological, regulatory, informational, marketing, organizational & economic support) are determined in specific socio-economic conditions. The developed methodology is strategically oriented. Its implementation conforms to the goal, and the algorithm is closely connected to strategic goals of cluster activities.

In our opinion, the further development of cluster management methodology is related to the use of systemic approach and market principles of management, which acquires special importance under the conditions of necessity for formation of sustainability, reliability, and self-improvement of the system.

Based on organizational & economic mechanism of managing socio-economic development, the combination of functional and territorial principles of structuring the management system in agricultural cluster is implemented, which allows increasing coordination, responsibility, and motivation, as well as eliminating duplication (Chirkina, 2013).

In methodological aspect, the project of socio-economic development of agricultural cluster should be aimed at elaboration of the system of indicators of sustainable development which allows evaluating the tendencies in socio-economic development on the basis of ecologically oriented approach, which will eventually allow increasing the efficiency of management of a region on the whole.

Informational model of cluster is a tool for operative and strategic management, acquires the status of significant competitive advantage, and should be adequate to external environment and to dynamic changes within cluster, which allows ensuring competitiveness of cluster business.

The model covers all theoretical & methodological development: integration of instruments of management depending on the level of management; creation of basic model of forming the system of strategic management of competitiveness;

creation of organizational & functional model of forming the system of strategic management of competitiveness.

The developed program of indicators is presented in the form of three subsystems: for bodies of state (municipal) power, for bodies of executive power, and for specific consumers.

Strategic system of managing competitiveness should naturally enter the existing organizational & economic environment of agricultural cluster and in a certain way be a result of cooperation of the objects of this environment (Maitra and Rao, 2015). Algorithm of implementation of management system can be realized on the basis of organizational map of the process as to various hierarchy levels (high, medium, low). The highest level of management is aimed at implementation of the main task – provision of stable attraction of consumers and clients and provision of sectorial monopoly in the market by means of offering organizational & technical events by functional specialists.

For the medium level, the tasks consists in further specification of technological process with the purpose of determination of optimizing ratio of costs, results, and volumes of production according to the standards of quality and ecological safety. The lowest level conducts the final specification of economic process as to departments and cycles, prompting the latter to reduce expenses (Zageeva, 2014). The system of management, implemented on the basis of viewed algorithm, is connected closely to strategic goals of agricultural cluster activities, allows determining the role of each element in their achievement, with optimal forming and using financial resources. Within the developed strategy of management, there should be created an algorithm which includes conceptual, expert, analytical, and empirical stages; elements of the strategy should be determined, and the model of organizational structure of cluster system should be built.

3. Results

Sectorial cooperation acquires special importance for development of enterprises of agro-industrial sector of economy, as it is related to implementation of one of the perspective directions of development – clusters. The accompanying processes cause changes in the methods of coordination of activities of economic agents and make impact on mechanisms of structure formation in society.

Measures for cluster development suppose strengthening of networks of cooperation between economic subjects – members of cluster for the purpose of provision of access to new technologies, entering external market, centralization of knowledge and assets, and distribution of risks and attraction of investments.

Cluster approach to increasing the competitiveness of agro-industrial complex is based on the uniting the territorial and intersectorial principles of management. In the process of allocating preconditions for emergence of agro-industrial complex, it is necessary to find a complex combination of competition and cooperation (Moskovtsev & Lipatov, 2013).

In regional market, agricultural cluster is an association of economic agents, united by common goals, which allows them to be equal and oppose tough pressure of global competition which strengthens due to Russia's joining World Trade Organization by means of reduction of barriers for import of agricultural production (Popkova and Tinyakova, 2013a).

The goal of creation and functioning of agricultural complex in developing countries on the whole and in Russia in particular is formation of effective high-tech agro-industrial complex, implementation of innovational technologies, and modernization of agricultural production.

The emerging agro-industrial cluster should become a "platform" and the basis of continuous cooperation of all structure elements. This supposes formation of traditional intra-cluster systems of cooperation which are based on the use of single infrastructure, guaranteed supplies of raw materials and production, and consolidated use of various resources.

A mandatory condition for efficiency of functioning of agricultural cluster is favorable conditions for implementation of innovative activities, which can be achieved by development of cooperation within innovational infrastructure, the elements of which should become (Popkova and Tinyakova, 2013b):

- organizational structures of center for innovations (business incubator, engineering center, consulting center, center for technologies transfer, center of intellectual property, center for collective usage) which provide support for small innovational companies;
- financial credit institutions which are capable to satisfy the need for loaned assets during enterprise activities and provide financial support for perspective projects;
- insurance companies which ensure reduction of losses in case of unfavorable situations and, besides, are ready to invest into scientific & technical sphere;
- informational networks (totality of channels of communications and informational blocks) which allow determining the most perspective direction of innovative activities development;

- educational establishments which organize training for entrepreneurs with emphasis on innovational approach, with conferences, seminars, etc.

The existing cooperation agro-industrial complex economy on the territory of Russia possesses cluster characteristics, and is not a variant of usual forms of cooperation and integration, which was confirmed by conducted research.

It is possible to find objective proofs of existence of clusters or their predecessors in agro-industrial complex. Firstly, due to their mentality, Russian enterprises do not always strive for joint activities, open information, and investments for long-term cooperation. That's why the list of cooperation forms, equivalent to cluster activities, can be more limited in the Russian economy. Secondly, more active cooperation is accompanied by higher competitiveness, which proves the profitability of cooperation – even when enterprises do not consider it to be cooperation.

The results of the research show the agro-industrial complex features development of clusters which rather include interdependent enterprises than clusters based on conscious cooperation. On the whole, results of the research show that cooperation between enterprises and educational establishments in the region is very active. Both sides realize that there is a huge potential for development and deepening of these relations and demonstrate interest in cooperation (Popkova *et al.*, 2013).

Russian clusters are peculiar for cooperation with rivals: despite the competition for production factors and competition in the market of final products, companies find opportunities for mutually profitable cooperation – in particular, as to development of infrastructure and cooperation with authorities, which increases the efficiency of activities of all members of relations. It is worth noting that it is true for cluster namely as to cooperation.

As to cooperation of agro-industrial complex enterprises, it was found that, hypothetically, all types of cooperation are viewed as possible in all sectors, including exchange of information as to technologies of production and joint use of results of scientific and research and R&D works. However, there is no complex cooperation in practice – the factor of competition is dominating one, and cooperation is limited by exchange of information as to the state of demand and cooperation for the purpose of development of offers for improvement of economic policy.

4. Discussion

Generalizing results of the research, it is possible to conclude that Russia has preconditions for formation of agro-industrial cluster as a network for actively cooperating enterprises, previously formed networks of cooperation within particular sectors of agro-industrial complex, and educational & scientific establishments with support from regional authorities – in particular, in the sphere of infrastructure development.

At that, scientific & technical and production potential, accumulated in Russia and allowing implementing competitive innovational developments, is not used sufficiently. The share of supplied innovational production in the total volume of supplied production (works, services) constitutes only 1.3 %. The share of active innovational enterprises is rather low, which is caused by the state of investment climate, lack of regional support for innovative activities, and low level of comprehensive innovational system which is capable to provide commercialization of innovational development.

The main reasons for contradiction between existing scientific & technical and innovational potential and results of its functioning are the following (Chirkina & Ioda, 2012):

- lack of regulatory base for innovative activities;
- lack of stimuli for implementation of innovational developments;
- lack of highly qualified staff, capable to realize the processes of implementation of innovational developments into real sector of economy;
- underdevelopment of infrastructure of innovative activities;
- economic entities' lack of finances for implementation of modern technologies, which hinders the manufacture of new types of competitive products;
- low level of development of informational and consultative support of innovational process members

The above problems have to be solved with the help of implementation of corresponding measures within one program, aimed at the development of innovative activities in agrarian sphere.

5. Conclusion

As a result of the conducted research, it was found that agricultural clusters are a perspective course for increasing food security of developing countries, as they raise

competitiveness of domestic agricultural manufacturers and increase food independence and food self-sufficiency of economic systems.

Among the key problems of formation of agricultural clusters for the increase of food security of developing countries, the following ones can be allocated: lack of regulatory base, lack of highly-qualified staff, deficit of economic entities' financial assets, and low level of development of informational and consultative system of cluster members' support.

Thus, implementation of internal cluster cooperation requires reconsidering the existing notions of management, related to the level of methods and control, protection of intellectual property, education, and integration. The created system of relations should allow economic agents to keep balance between self-organizing and manageable behavior, combining innovational diversity and freedom of actions with the necessary level of integration. Intercompany cooperation in this regard should be similar to cooperation of ecosystem elements.

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