
The Organization of the Innovation Transfer in the Agro-industrial Complex of Russia

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Abstract:

The article describes the problem of large-scale modernization of agro-industrial complex, which the authors attribute not to a lack of innovative products in demand but to the complexities of its progress, and imperfection of innovation mechanisms. A particular attention is given to the justification of the need to adjust the existing and create new mechanisms of scientific support, increasing innovation activity of participants in the innovation process, such as agricultural producers, agricultural consulting centers, scientific and educational organizations and other innovative structures, all levels of the agro-industrial complex regulatory bodies.

The paper presents the results of a scientific analysis of the innovative offers market and the state of transfer of innovation in the real sector of the Russian agro-industrial economy, the development of agricultural consulting institute, and proposes a scheme of improving the processes of introduction of scientific and technological achievements. It formulates the priority areas and strategy of innovation activity in the agro-industrial complex with the participation of organizations of agricultural consultancy system.

The authors give the grounds for the organizational and economic mechanism for the transfer of innovations in the agro-industrial production, consisting in the complex of organically related organizational and economic measures which ensure the necessary conditions for the organization and functioning of the innovation development system, i.e. the unity of purposes, synchronicity, proportionality and rhythmicity of all constituent units of a single mechanism of the innovation development.

Keywords: *innovation, innovative process, innovation development, modernization of agro-industry, agricultural consulting.*

JEL Classification: *O10, O13, O14, Q13*

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Introduction

Modern strategy of innovation development of the agro-industrial complex should be aimed at the modernization of production by using:

- * Strategy to maximize the use of national scientific and technological developments;
 - * Borrowing strategy - the creation of innovative products on the basis of foreign innovations and scientific research with the use of potential of national research institutions, and other innovative companies and their accelerated introduction in manufacture;
 - * Strategy for the implementation of innovative products of foreign manufacture.
- Technology of the participation of the agricultural consulting entities in innovative production support implies that:
- * the consulting centers reveal the existence of the innovative proposals available and useful in the region, and determine in situ the need of agricultural producers for the new developments, which can serve as a reference for the science and the basis for drawing up the state order for scientific research projects;
 - * based on innovation products implemented by Russian scientific organizations and / or other carriers of innovation, their databases are created. The agricultural consulting entities distribute the innovative resources by provision of the information through the Internet and other means of communication, the organization of congress and exhibition and demonstration activities, training of consultants, managers and specialists of agricultural organizations, and farmers; and
 - * consultants assist in the development of innovation and can provide monitoring of the use of scientific and technological achievements in agro-industrial complex.

The article proposes the scheme of unification of management structures, intellectual resources of scientific, educational and innovative areas focused on bringing the scientific research to specific customers, assisting in the development of innovation. The scope of the State program of agricultural development and regulation of market of agricultural products, raw materials and food, which is currently implemented in Russia, is to ensure the country's food self-sufficiency and improve the competitiveness of domestic agricultural products in domestic and foreign markets, which is largely expected to be resolved by upgrading the industry.

The national innovation system, the formation of which in the framework of the economic policy of the state is provided in the "Fundamentals of Russian Federation policy in the field of science and technology for the period until 2010 and beyond" (Letter of the President of the Russian Federation of 30.03.2002 No. Pr-576) must ensure the task of implementing the national strategy of innovative breakthrough. It is evident that the performance of designated tasks requires a large-scale modernization of agricultural production, which should be preceded by an adjustment of the existing and creation of new mechanisms of scientific support, increasing the innovation activity of the innovation process participants: agricultural

producers, agricultural consulting centers, scientific and educational organizations and other innovative structures, all levels of the agro-industrial complex regulatory bodies. However, the basic positions are the following:

1. Ensuring economic conditions and legal environment necessary and conducive to the creation of innovation-active production, the interest of producers in obtaining the effect of the production modernization.
2. Creating conditions and prerequisites conducive to building an effective innovation infrastructure, motivation of all participants in the innovation process.

The research objective was the scientific analysis of opportunities of the market of innovative offers and the state of the transfer of innovation in the real sector of the Russian agro-industrial economy, the research of development of agricultural consulting institute, and the development of proposals to improve the mechanisms of introduction of scientific and technological achievements.

The relevance of the study depends on the search for ways and mechanisms of interaction between authorities, research institutions and agricultural consulting centers, as a basis for the provision of mechanisms of transfer of the scientific and technological achievements in production in order to provide a large-scale modernization of the agrarian sector of the economy.

Research method

A systematic analysis of the development of innovative processes in the agricultural sector is the basis for theoretical and methodological research base. There were used the statistical data of the Federal State Statistics Service, the information resources of the Ministry of Agriculture of Russia, the Russian Academy of Agricultural Sciences and the Federal Centre for Agricultural Consulting, as well as the papers of domestic and foreign researchers associated with the innovative processes, introducing the scientific and technical achievements and participating of agricultural consulting organizations therein.

Results

The capacity for continuous improvement, supporting the competitiveness level, the possibility to implement the necessary innovative transformations are several of the most important elements of activities of any enterprises, including the agro-industrial one, and often serve as the decisive factor of its existence in the market conditions (Jens 2003; Van den Ban and Hawkins 1996; Buermann 2000; Kohne 1996; Steele 1975).

In a competitive environment, the successful business development is impossible without the innovation that is without the development, creation and introduction of new or upgraded products and technologies (Demishkevich 2008; Levina 2009;

Sandu 1998; Sokolov 2014; Santo 2005; Schumpeter 1995; Twiss 2002; Anikina, Gukova, Golodova and Chekalkina 2016; Liapis *et al.*, 2013).

Currently, not possessing the capital resources and material assets, but the ability to develop and innovations are becoming the main tool of competitive struggle. Improving the efficiency of agricultural production is possible only through an integrated approach to solving the organizational and technological issues, whose practical form of implementation is the development and implementation of innovative management techniques and the use of scientifically based systems of its organization and management. The innovation and industrial structures, the organizational and economic mechanisms of innovation, the technical methods and tools are the elements of the innovation system. Activation of the process of development of innovative technologies, systems and complexes of modern high-performance machines and equipment is a real and indisputable way of domestic agricultural production recovery (Sandu *et al.*, 2013; Valma, 2014).

This thesis is partly confirmed by the advances in agriculture, yields and gathering of crops of the recent years record for Russia. Technical upgrade of the grain industry should be considered as one of the success factors (along with many others). Modern units capable of providing high-quality soil cultivation and sowing, creating the optimal conditions for seed germination and plant growth are taking over from the outdated tillage seeding machines and harvesting equipment in the field. Unlike "Niva" unproductive domestic harvesters, modern harvesters allow for timely harvest with minimal losses (Bibarsov *et al.*, 2017).

When discussing the problems of modernization, it becomes commonplace to make accusations towards domestic science as the industry providing for insufficient scientific and technical developments. However, in our opinion, this is not entirely true. Studies show that in general the innovations market possesses a lot of effective domestic, borrowed or imported inventions, which under certain conditions could support the domestic agro-industrial complex with the latest technological developments, the modern high-performance and resource-saving appliances and arrangements, high-yielding varieties and hybrids of field crops, highly productive breeds of animals, and means of application of chemicals.

Therefore, the problem is not in the availability of innovative products, but in its promotion, the absence of conditions for the large-scale modernization of the industry and effective innovation mechanisms. Up to 40-50 percent of the total number of scientific and technical developments, which are completed, adopted and recommended for introduction in production, remain non-demanded. At the same time, less than 10 percent of agro-industrial enterprises use technological innovation, and more than 12 percent of agricultural producers use intensive resource-saving technologies. According to scientists of the Russian Academy of Sciences, the application of inefficient technologies is the cause of the shortfall in the

agriculture production for the amount of 200-250 bn. Rub., (Decree of the Presidium of the Government of the Russian Federation dated 07.09.2011).

By analyzing the reasons for the low level of innovation activity, the authors have to recognize the lack of cooperation of scientific organizations with commissioning groups and producers as one of the causes to this. It also will be fair to recognize that science and innovation structures are currently operating without a clear coordination of innovation and its single focus. It becomes obvious that the existing procedure for the transfer of scientific and technological achievements from science to production, the organizational and economic mechanism of the innovations development does not correspond to changing conditions and needs improvement (Levina 2010; Bashmakov, Popov, Zhedyayevskii, Chikichev and Voyakin, 2015).

The organizational and economic mechanism of the innovations development is a set of forms (units) and methods for implementing innovative activities, interconnected and consistently functioning, and ensuring the promotion of scientific and technological developments in the real economy. The organizational and economic mechanism is a complex of organically related organizational and economic measures, which ensure the necessary conditions for the organization, and functioning of the innovation development system, that is, the unity of purposes, synchronicity, proportionality and rhythmicity of all constituent units of a single mechanism of the innovation development.

Research and experience in consulting activities give grounds to assert that the organizational and economic mechanism of transfer of innovation in the field of agro-industrial complex should be improved towards identifying the needs of agricultural producers in the scientific and technical developments, awareness of the availability of effective innovation and consulting support during the innovation phase.

The system analysis of the Russian agro-industrial complex allows to identify the main organizational and economic, and informational and methodological factors occurring in agro- industrial production and preventing the successful development of innovations (Figure 1).

Apart from the state and regional level problems and those related to the overall economic situation, special attention should be given to the problems hindering the modernization of production at the level of agro-industrial enterprises, having a local solution. However, although being local, they also have a systemic nature and require systemic solution (Figure 2).

Thus, in order to ensure sustainable innovative development, it is necessary to create organizational and economic, institutional, and innovative prerequisites (Table 1).

Figure 1. Constraints on the development of innovation in the agro-food complex

Organizational and economic factors

- Imperfect innovations development system;
- Imperfect management of innovative processes;
- Insufficient paying capacity of consumers of innovative products;
- Underdevelopment of innovation and innovative entrepreneurship market;
- Imperfect methodology for determining the innovative activity efficiency.

Information and methodical factors

- Lack of uniform information and technology support system;
- Underdevelopment of the information distribution system;
- Imperfection of methods and forms of innovations development.

The strategy of the agriculture innovative development should be aimed at the modernization of production by using:

- * The strategy to maximize the use of national scientific and technological developments;
- * Borrowing strategy - the creation of innovative products on the basis of foreign innovations and scientific research with the use of potential of national research institutions, and other innovative companies and their accelerated introduction in manufacture;
- * The strategy for the introduction of innovative products of foreign manufacture.

The current national innovation system being formed right now must serve to the task of implementing the strategy of innovative breakthrough in the midterm and for the long run. The above "Strategy of innovative development of AIC" lays the foundations of the current national innovation system, makes significant efforts to develop the sector of research and development, the formation of a developed innovation infrastructure, and the modernization of the agrarian economy based on technological innovation.

Figure 2. Local problems of innovation

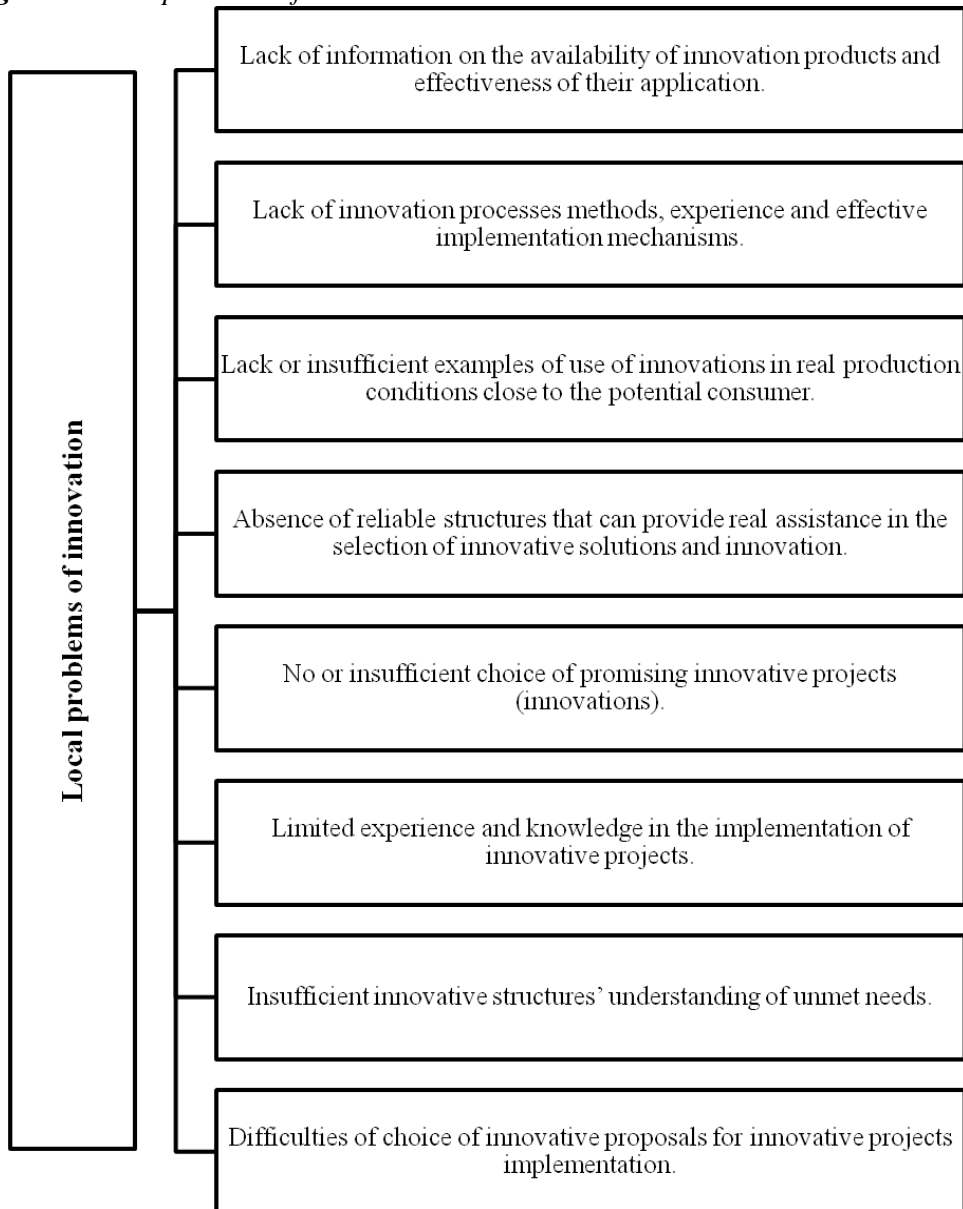


Table 1. *The main problems of sustainable innovative development of agro-industrial production in the Russian Federation*

Item no.	Group of problems	Description of main problems
1	Organizational and economic	- no developed mechanisms of interaction of scientific and promotional units - problems of planning and monitoring of innovative activity - lack of motivation of participants in the innovation process
2	Institutional	- underdevelopment of innovative field - crisis state of the domestic agricultural science
3	Innovative	- the problem of sustainable order of R&D, analytical selection, formation of innovative resources and distribution of innovative products

There are the basic trends of its formation:

- Creation of favorable economic and legal environment;
- Construction of innovative infrastructure;
- Improvement of the mechanisms contributing to the production and use of innovations.

The main problems are highlighted in the formation of the national innovation system:

- Improvement of mechanisms of interaction of participants in the innovation process;
- Creation of favorable conditions for intensification of innovative processes;
- Creation and development of innovation infrastructure facilities, market of innovations and services for their promotion.

The task of the authors was to draw attention to the possibility of participation in the innovation process, which is relatively new for today's Russia, and for actively developing institute of agricultural consulting. The world experience, and more than 20 years of domestic experience give grounds to consider the Institute of Agricultural Consulting as one of the most effective mechanisms for the transfer of innovation from science to production (Sandu 2005; Weitzman 1998; Van den Ban 1999; Frank, Mashevskaya, and Ermolina, 2016; Ovchinnikov, Kozenko, Bichkov, Kabanov and Karpova, 2015).

The main purpose of the development of the agricultural consulting system is to create conditions for improving the competitiveness of products of agricultural producers through the use of modern achievements in science, engineering and

technology in the agro-industrial production. In its essence, the implementation of the system of agricultural consulting is a unique transfer structure and simultaneously the transfer mechanism.

Currently, the agricultural consultancy is developing in most regions of the Russian Federation in varying degrees of intensity. Trends, forms and methods of the main activities of its entities were defined and developed. The prospectivity, relevance and irreplaceability of the Institute of Agricultural Consulting are to develop an innovative component. The Centers for Agricultural Consulting quite successfully address the promotion of modern technologies, promising varieties of field crops, high-performance and resource-saving technology, plant protection products on the demonstration sites, "Field Days", exhibitions, seminars, support of innovative projects. For example, every year the consulting centers organize the following events: the All-Russia Exhibition of Potato in Cheboksary, the exhibitions of achievements and technologies in St. Petersburg, Yaroslavl, Samara, Stavropol, Bashkortostan, Mordovia, "Field Days" in the Kirov, Yaroslavl, Vladimir and Moscow regions, Krasnodar and Stavropol territories and other regions.

Because the innovative component should be the measure of the success of the agricultural consulting institutions, it must be recognized that it is good, but not enough, and the country as a whole has not felt yet an adequate return in the designated direction. This is not a fault, but the prospect (the annually increasing number of innovative events, and the development of innovative projects are encouraging). As an example, the result of the promotion of rapeseed in the Kirov region: while in 2015 (the year of the beginning of the project of the regional center of agricultural consulting on the promotion of oilseeds in the region as one of the crop growing diversification trends) its acreage was about 4 hectares, next year, after the organization of demonstration crops and the "Field Day", where the effectiveness of rapeseed cultivation in the northern part was shown as an example, the area of its planting increased to 19 thousand ha.

We must recognize that today in the agro-industrial complex of Russia, except for organizations of agricultural consulting, there is no other organized structure of innovative trend, covering macro-, meso- and micro- levels, having the opportunity to directly interact with scientific organizations and agricultural producers.

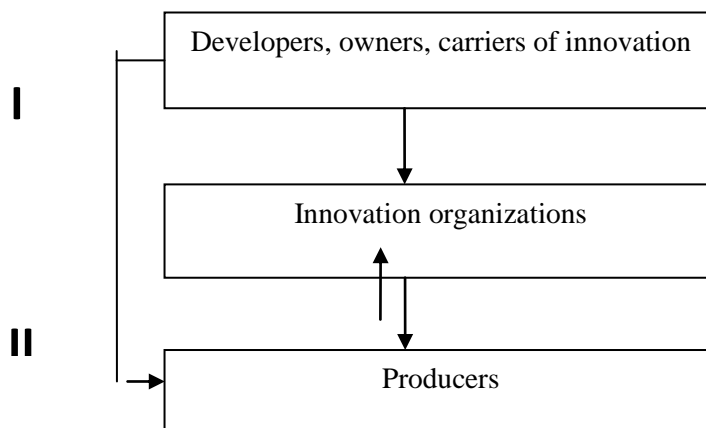
Production requests and the purchase orders of agricultural enterprises must be the basis of scientific support for agro-industrial complex. It is obvious, but in reality, it is not the case. It is absurd, but now the participation of the Russian Ministry of Agriculture in the formation of plans of scientific researches of institutions of the Russian Academy of Sciences does not really up and running. The authors propose to remedy this situation by including the agricultural consulting organizations in the paper.

Possession of information does not always guarantee the possibility of its practical development. For this purpose the consultants should be aware of the real state and the prospects for agro-industrial production, the economic situation and financial possibilities of producers and consumers of innovative products, and must possess the technique of information and consulting activities and assisting in the innovation development. In this connection, the consultant in its activity must adhere to the following conditions:

- * To monitor the problems to be solved with the help of science, together with the producers;
 - * To quickly find alternatives to innovative solution of the problems and to timely inform producers about the possibility of the innovation application;
 - * To stimulate innovative activity and participate in the development of innovations.
- In the selection of a path of innovative solution to the problem of the agricultural producer, the agricultural consulting organization should act as:
- * The source of information about innovative proposals;
 - * The analytical consultant in the selection of innovative solution to the problem;
 - * The intermediary between the developer (owner) of innovative products and an agricultural producer;
 - * The organization, conducive to the development of innovation.

The most commonly used models of innovations transfer are represented by two schemes: direct consumer relationships with carriers (developers, owners) of innovations, and through the innovation organizations participation (Figure 3).

Figure 3. Schemes of innovations transfer in agriculture



In our opinion, the option involving the innovation organization is the most successful model, because it uses information from different sources and offers the most effective innovative products.

The specialists from such organizations are knowledgeable in particular areas and possess the methods of innovation, while using the most appropriate forms of informing and implementation. At the same time, firstly, there is no need for constant distraction of scientists from the direct scientific activity, and secondly, the process of formation of orders for new innovative products is going in parallel with the introduction of innovations.

To date, the innovation activities are considered to be the prerogative of the scientific organizations. It is believed that only the members of scientific and (or) educational organizations can successfully deal with innovation. Without denying the importance of the participation of those first and second in the dissemination of scientific knowledge, we believe that such an assertion is not certain. Science and implementation are the components of the innovation process, in which the main role of the first one is the development of innovation, and of the second one - in the distribution of information about them, and in the assisting in the implementation.

In market conditions the planning and distribution methods of innovative activity management do not quite fitting into the scheme of modernization of the area. There appeared the need to improve some mechanisms of innovation activities management, and to create other innovation introduction scheme applicable to a market economy.

The allocation of innovative activities as a specific and special one for the innovation process is new for the scheme proposed. However, the problems of organization of the innovation infrastructure can be roughly grouped into three main types - the organizational, methodological and economic.

The organizational problems include the issues of the innovation process organization - the study of the needs and the formation of applications for research and development, conducting of R&D, information about innovation and the development of innovations. There is a need in the development of methodological recommendations for the establishment and functioning of innovation infrastructure. The economical problems shall include the issues of innovation forecasting and planning, financial improvement of production, investment in innovation process, increasing the interest of the participants. In our opinion, in modern conditions the scientific and technical activity should be managed through the adoption and implementation of target programs, improving the planning methods of scientific research and development of innovations.

The Federal Center for Agricultural Consulting and the Research Institute of Agricultural Economics propose a methodology for involvement of agricultural

consulting entities in innovation for the production, and have developed the following recommendations:

* It is assumed that the consulting centers reveal the existence of the innovative proposals available and useful in the region, and determine in situ the need of agricultural producers for the new developments, which can serve as a reference for the science and the basis for drawing up the state order for scientific research projects;

* Based on innovation products implemented by Russian scientific organizations and / or other carriers of innovation, their databases are created.

The innovative resources are distributed by the agricultural consulting entities by provision of the information through the Internet and other means of communication, the organization of congress and exhibition and demonstration activities, training of consultants, managers and specialists of agricultural organizations, and farmers; consultants assist in the development of innovation and can provide monitoring of the use of scientific and technological achievements in the agro-industrial complex. On its organizational essence, the proposed scheme (Table 2) represents a system, making an attempt to unify the management structures, intellectual resources of scientific, educational and innovative areas focused on bringing the scientific research to specific customers, assisting in the development of innovation, and it will clearly define the role of agricultural consulting institute in innovation for the industry.

Table 2. Strategic trends for improving the innovation in the agricultural sector

Tasks	Ministry of Agriculture of Russia and regional agro-industrial complex governing bodies, Russian Academy of Agricultural Sciences	Research institutions	Educational institutions	Information and consulting centers	Agricultural enterprises
Development of national and regional innovation policy. Organization of innovative activity					

Identification of need for scientific and technical production					
Placing the state (regional) R&D order					
Development and innovation (pilot projects)					
Staff training and skills development					
Information and innovation provision to the agricultural producers					
Large-scale introduction and support of the innovation development					
Monitoring of innovative activity					

The concept of development of agricultural consulting in Russia provides for a three-tier system (federal, regional and district levels). The main objectives of federal level of agricultural consulting system are the following:

- * Identifying the main trends in the modernization of agricultural production technology and the development of technical means for their implementation;
- * Organization of analytical selection of the most effective innovative products of technical and technological nature, the formation of a database of technical and technological innovation, the development of an information field in the system of agricultural consulting;
- * Methodological support for the process of transfer of technical and technological innovation, improving the mechanisms, forms and methods of innovation of agricultural consulting organization.

As a rule, forms of activities for the implementation of tasks of the federal level center have a massive, group and only occasionally, the individual nature. The main innovation functions of agricultural consulting centers of the regional level are the following:

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- * The formation of the database of innovative products of regional importance, provision of information to regional centers and rural producers;
 - * Developing and provision of recommendations for the development of technical and technological innovation to the regional centers and rural producers, taking into account regional specific features;
 - * Assisting the agricultural producers in the development of innovation;
 - * Provision of marketing services to rural producers to identify and select the most appropriate options for the technical and technological support of production;
 - * Organization of exhibition and demonstration, and congress events;
 - * Participating in the formation of regional orders for the applied research on problems of improvement of agricultural production efficiency.

The main innovative features of regional centers of agricultural consulting are the following:

- * Monitoring of the agricultural producers' need in solving the problems requiring research solutions, and in new technologies, technical means and other innovations;
- * Distribution of information materials among agricultural producers using new technologies, technical and other means of scientific support of production, providing guidance on their use;
- * Consulting and assistance in the selection of innovative solution and the development of innovation.

Conclusion

The present study of mechanisms of innovation transfer in the agro-industrial production is based on a systematic analysis of innovative processes in the agro-industrial complex of the Russian Federation and the innovation activity of the agricultural consulting organizations.

It was revealed that along with investment factors, the organizational factors, which not always require large financial investments, are largely present in the issues of the sector modernization. Improving the transfer mechanism should be directed towards the structuring of innovative processes, integrating the efforts of administrative structures, intellectual resources of scientific, educational, promotional areas and agro-industrial enterprises focused on bringing the scientific research to specific customers, and should assist in the development of innovation.

The allocation of innovative activities as a specific and special one for the innovation process is new for the scheme proposed. The consulting centers must reveal the existence of the innovative proposals available and useful in the region, and determine in situ the need of agricultural producers for the new developments, which can serve as a reference for the science and the basis for drawing up the state order for scientific research projects. Based on innovation products implemented by Russian scientific organizations and / or other carriers of innovation, the databases

available for potential users are created. The agricultural consulting entities are distributing the innovative resources. They also assist in the development of innovation and provide monitoring of the use of scientific and technological achievements in agroindustrial complex.

In terms of science funding gap in general, and in particular the applied scientific research and the issues of investment of innovation in production, it is advisable to switch to the management of scientific and technological activities through the adoption and implementation of targeted innovative programs for basic and the most essential areas of the industry.

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