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DEVELOPMENT PARADIGM OF THE INNOVATIVE TECHNOLOGY TRANSFER IN THE AGRO-INDUSTRIAL COMPLEX OF RUSSIA

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Abstract

The article emphasizes the significance and defines basic stages of agricultural advisory services formation in Russia, its actual status and current activities of its subjects, as well as development prospects. Based on the study of current development status of the contemporary services, main indicators of its activity and the demand for advisory services, the authors conclude that the country has established the basis of the agricultural advisory system, and formed the body of professional advisors, ready to provide quality advisory services that are largely becoming of demand. Special attention is paid to the innovative component of the agricultural advisory services functioning, consisting in informing about the scientific and technological achievements of Russian and foreign scientific organizations, advanced production practices, providing assistance in the modernization of production, increasing the level of knowledge of agricultural producers, as well as analyzing demand for advisory services. Based on the analysis of advisory group activities, forms and types of the most demanded services, the authors identify the main innovation and advisory directions in consulting activities. Moreover, it is noted that innovative direction should serve the basis of the industry modernization and be an object of state agrarian policy. Conceptualizing the activity priorities, the authors predict two directions of further development of the Russian system of agricultural advisory services. These are involvement of public institutions providing the state innovation policy, and more complete use of private commercial consulting structures providing assistance to rural entrepreneurs in the development of innovations and in other areas of their activities.

***Key words**: innovations, modernization, agricultural consulting, advisor, advisory service.*

INTRODUCTION

The purpose of this article is analyzing the status of the agricultural advisory services in Russia and the development of a paradigm of its development in the future. The relevance of the study is due to the increasing role of the institution of agricultural advising in information and consulting support of modernization and innovative transformation of the agricultural sector of the Russian economy.

Changing economic conditions in the relatively new market economy has contributed to emergence of dualistic organizational model of rural entrepreneurship: the formation of large agricultural enterprises, as well as the development of farming and small businesses that in turn requires the revision and amendment of the development concept of agricultural advising service system.

MATERIALS AND METHODS

Conducted study was based on generalization of theoretical and methodological approaches to the organization of the agricultural advisory

services system, outlined in the works of Russian and foreign researchers.

To formalize and generalize the research results, the authors used the methods of comparative and abstract-logical analysis, as well as inductive-deductive and statistical analyses. In particular, for the analysis and evaluation of information and advisory system the authors used monitoring of advisory services provision to agricultural producers and rural population in the Russian Federation, conducted annually by the Federal Center of Agricultural Consulting.

RESULTS AND DISCUSSIONS

One of the most important activity elements of any company, including agro-industrial enterprise, is the ability being continuously improved, keeping competitiveness, and being able to implement the necessary innovative changes. These factors are often decisive for enterprise's existence in today's market.

Successful development of contemporary business in a competitive environment is impossible without implementation of innovative activities, that is, without the implementation of new or upgraded products and technologies. The main tool of conducting a competitive struggle currently becomes the ability to develop and implement innovations rather than the possession of capital resources and material assets.

The successes achieved in recent years in agriculture, expressed in a record for Russia harvests of grain crops, partly confirm this viewpoint. At that, one of the success factors consists in technical updating of the grain industry. The old tillage and sowing machinery are replaced by modern agricultural vehicles, able to ensure the uniformity of crops, and create optimal conditions for plants germination and growth. Modern multipurpose machines, in contrast to the old unproductive ones, allow timely harvesting with minimal losses.

When discussing modernization issues, it is quite common to bring a charge against science as if it insufficiently supplies industry with scientific and technical developments. However, it's not really fair because the innovation market offers quite a lot of efficient developments either domestic, or borrowed, or imported, which under certain conditions could have provided the domestic agro-industrial complex with the most advanced technologies, modern efficient and resource-saving equipment and machinery, high-yielding varieties and hybrids of field crops, high-producing animal breeds, as well as agricultural chemicals. Therefore, the problem is not in the availability of innovative products, but in their promotion, in the lack of conditions for large-scale modernization of the agricultural industry and effective mechanisms of implementation. Out of the total number of scientific and technical developments that are completed, accepted and recommended for implementation into production, up to 40-50% remain unclaimed. At that, technological innovations are used by less than 10% of agro-industrial enterprises. Not more than 12% of rural producers use intense resource-saving technologies [16].

The contemporary policy of innovative development of agriculture should be aimed at modernization of production with maximum use of:

- domestic scientific and technical developments;
- foreign innovative products;
- strategies for implementing innovative products of foreign production.

The institution of agricultural advising should ensure the innovative development of agriculture.

The need for universal training of peasants in the land management techniques appeared in Russia in the XVIIIth century with the abolition of serfdom when peasants, becoming self-employed, have experienced the lack of knowledge in the most essential issues of agriculture.

The first Institute of Agriculturists (advisors, in the current concept) was founded in 1765, when an agricultural society was established to help peasants. The revival of the domestic advisory services refers to the beginning of 90-ies of the last century, when the first attempts were made to reform the domestic agricultural

sector. In 1993, according to the instructions of the Russian Ministry of Agriculture, Central Research Institute of Innovative Problems and Marketing in Agribusiness has developed the "Pilot project for the establishment of the Russian advisory services for agricultural producers of all forms of ownership". A significant step in the development of the domestic advisory services was the "Agricultural Reform Implementation *Support* Project (ARIS)". Information and advisory services, created in the framework of the project in 26 regions of the country, contributed to the acceleration of scientific and technical progress in industry, implementation of agrarian and land reforms, and the adaptation of producers to new economic conditions. A successful example of centers created at that time and still working is a consulting center "Samara-ARIS" in the Samara Region.

Thus, the development of national agricultural advisory services in Russia has more than 150-year history and 24-year period of its development in contemporary conditions.

During this period a variety of global and domestic models of organizational forms applicable for advisory services were explored and tested, a methodology for agricultural advising was proven, and the forms, methods, and mechanisms of consulting activities were developed.

The development (since 1993) of contemporary services has passed a number of stages:

Scientific research stage. During this stage we have studied historical experience of social agronomy and the today's international experience. We made attempts to use foreign advisory services models trying to adapt them to Russian conditions. But the specifics of agricultural production in Russia, namely multi structurality of the domestic agricultural sector, the diversity of climatic conditions, large volumes and territorial scattering, poor technical support and financial-economic state of the industry, do not allow using even the most successful model of agricultural advisory support developed abroad.

In the world, there are long-established schemes of technology development activities, where the operation of information and advisory services is the main factor contributing to the achievement of scientific progress. In different countries these services have their own peculiarities and specifics, though consideration of two systems seems to be the most suitable for Russia, namely American and European approaches, with quite significant differences, both in terms of structure, operational methods and principles.

The American system of knowledge transfer with a very longtime history starting since 1862 (it was created in the same years, as in Russia), is built on the principles of knowledge dissemination and training of farmers. Simultaneously with the diffusion of innovation, the staff provides feedback of farmers with research institutions. Farmers inform scientists about the effectiveness of scientific advices and identify the range of production problems to define research areas [4; 18; 19]. The American model of information and advisory services fully justifies the term "Extension service", meaning a special kind of targeted training of farmers, aimed at solving specific production tasks.

A number of Western European countries have a slightly different system of transferring scientific developments into production [1; 4; 5; 7; 13; 14; 15; 17; 18; 19; 20]. Along with the training and innovation functions this model is focused mainly on practical assistance. The Danish Agricultural Advisory Service (DAAS) may serve as an example of successful advisory services, which is focusing its efforts on direct assistance to agricultural producers in decision-making and practical farming. Working methods of the Danish advisers have a more pronounced and individual character. The advisor continually maintains a close relationship with a farmer, knows his farm thoroughly, as well as educational and professional level of workers, the economic situation and opportunities, and even the psychology of the farmer. He gives recommendations, supervises production, provides help, and in fact takes care of the farmer.

Experience of the DAAS is of particular interest in matters of innovation, such as shaping research plans and implementing them, up to a wide assimilation of the scientific research achievements. All applications for research and development are formed by the farmers through the advisory services [4; 18; 19].

What we can borrow from the Western experience? In the context of size, mentality, and statehood, Russia largely comes close to the American experience. However, there are some essential differences.

• American approach requires state (budgetary) money, which is constantly in short supply;

• Ministry of Agriculture and especially regional and district authorities, after many years of involvement in command-style administration, were not ready to refuse from such style of management, and considered the agricultural consulting institution as being identical to Ministry of Agriculture. The Ministry has not used the opportunities of the supplementary vocational education system and agricultural universities functioning in almost every region, which could become the basis for the state consulting system.

In connection with the farming development and the arrival to the villages of merchants, incompetent in agricultural technologies, as well as decrease in the number of rural specialists, technology advices are becoming increasingly demanded. In this respect it would be possible to use a European (Danish) experience, where the advisor practically "takes care" of farmer. But this is hindered by differences in mentality of the Russian farmer comparing to the western farmer. The latter, as a rule, is sufficiently trained and confident in his abilities, while Russian farmer is not yet ready to hire an advisor (for 75 years, rural producers have received knowledge for free, and now many of them remain confident that someone should come and help them for free). Thus, Russia is not able to fully copy someone else's experience. Nevertheless, it is quite possible and reasonable using world experience in the development of agricultural advisory services in Russia.

Stage of finding own place in the actual system of agriculture management and scientific support (2003 - 2015). Having no possibility to manage and influence the new economic conditions, but still having the opportunity of receiving state support of the industry, the management bodies of the agro-industrial complex resisted in every way the new technologies of influence on the rural commodity producer (resource capabilities made it possible making believe of controllability over a long time). The need of creating advisory structures was denied almost everywhere. Neither management personnel, who were losing their powers, nor scientific community, which did not try to understand the real situation, did not perceive a few existing advisory centers as serious institutional system.

Unfortunately, up to the present day, the Russian Ministry of Agriculture could not develop clear vision of prospects in development of the system providing dissemination of new knowledge in practice. As a negative example we can note the loss of the ability to create a clearly structured state system for information and advisory support of the agricultural complex with the use of the supplementary vocational education. Nowadays, among more than 90 supplementary vocational education institutions, previously located in all regions of the Russian Federation, factually there remained slightly more than 20. The attempt to involve agricultural universities in advising activities is not quite good due to different tasks of the institutions providing agricultural advisory services and higher education institutions.

At the same time, real conditions (the structures, which newly came into the agricultural business, farmers and private farms of citizens deprived of support) required technological, legal, economic and other advisory support, and thus advisory centers were created initially in a single, and then in most regions.

It was probably the most difficult stage in the system’s development. Now, in many regions, there are as a rule, new top managers at

different levels (especially those who came from other industry sectors). Time to time, they are trying to curtail, redirect, replace, and introduce new functions, often unusual for agricultural advisory services, and set other tasks, in other words, try to complicate the development process.

The third stage of development has come now.

Information and advisory structures are operating with varying degrees of intensity in most regions, while in 63 regions they operate at regional and district level (regional level is represented by 28 governmental, 6 commercial, 8 non-profit organizations, and 21 educational institutions).

In five regions (the Kostroma Region, the Ryazan Region, the Amur Region, the Zabaikalye Territory, and the Jewish Autonomous Oblast) advisory services to agricultural producers and rural population are assigned to the agribusiness management bodies [2; 11].

Due to heterogeneity of conditions, different perceptions of needs, and the lack of clearly governing legal acts, regional and district centers are established in the frameworks of various organizational-legal forms. In addition, a significant niche in advisory services is occupied by various dealer structures involving in the market promotion of innovative goods of foreign companies and domestic enterprises.

In general, about 4 thousand specialists are involved in advisory services, whereas more than 2 thousand of advisors are working on a regular (professional) basis in advisory centers. Agricultural advisory services of all organizational-legal forms, as well as educational institutions, rendered more than 500 thousand advisory services to agricultural producers and rural population in 2016.

Information and advisory centers and advisory units of educational institutions have organized over 800 demo events including 334 "Field Days" (13 at the interregional level, 80 at the regional level, and 240 at the district level) and 474 exhibitions (67 at the interregional level, 187 at the regional level, and 220 at the district level). At that, 378 demonstration sites were organized (22 interregional, 104 regional, 93 district, and 159 – based on contracts with agricultural organizations). More than other three thousand events were conducted, including meetings, seminars, conferences, gatherings of citizens, etc.

The most in demand (Fig. 1) are technological advisory services in the field of crop farming (84.4 thousand services) and animal farming (84.0 thousand services), as well as advisory services on economy and lending matters (to 66.4 and 23.3 thousand, respectively) as well as accounting issues (58.7 thousand services).

Advices on issues of state support (42 thousand services), legal coverage and software support (30.5 and 27 thousand, respectively) are of great demand.

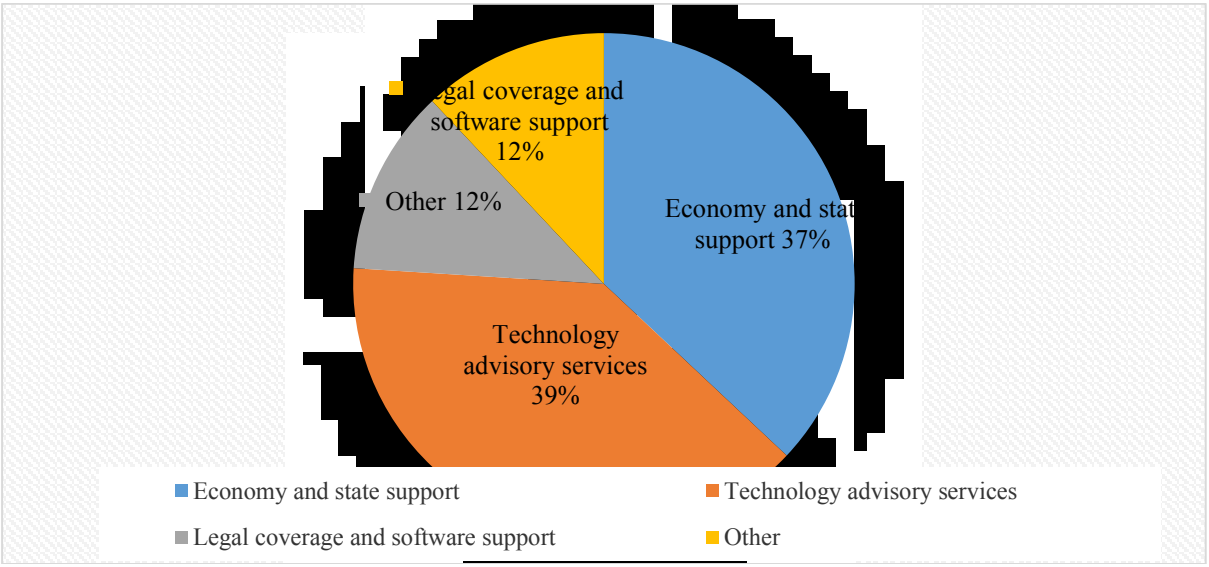

Fig. 1. Structure of agricultural advisory services rendered in 2016
Source: The Federal Center for Agricultural Consulting

Among the recipients of advisory services (Fig. 2), peasant (farmer) economies (45%) are in the first place, similarly as in 2015, followed by agricultural enterprises specialists (23%), and private subsidiary farming (20%). Further, as demand decreases, the management bodies of agribusiness (7%), processing enterprises (3%), and cooperatives (2%).

Fig. 2. Distribution of agricultural advisory services in 2016 by user groups
Source: The Federal Center for Agricultural Consulting

Monitoring of advisory activities in recent years shows the stability in the structure of the advisory services demand. The portfolio of orders for advisory services remains virtually unchanged and includes the production technology, issues concerning economy, government support and credit, accounting, legal support, as well as other services (social development of village, alternative employment in rural population, rural tourism, and environment).

Development analysis of the existing advisory groups, forms and types of advisory services allows defining two main directions: *innovative* path in relation to the ongoing need to modernize production, and *advisory* path in the form of supporting large producers, farmers and their associations as well as rural population - on technological, organizational and other issues.

(1)The first innovative path is significantly associated with the competitiveness of the industry in general, and should be an area of state agricultural policy (The fundamentals of the Russian Federation policy in the field of science and technology development for the period up to 2010 and beyond). In the state structures, the main form of innovation advancement in manufacturing is information, exhibition, demonstration and educational activities [6; 9]. This direction should be implemented by a state and regional information and advisory centers.

(2)Information policy includes organization of information networks, exhibitions, "Field Days" and conferences, which should be scheduled (and funded) by the Federal

Ministry and regional agribusiness authorities. Their organization is entrusted to subordinate agencies and major regional advisory centers. Their working methods are similar to those of the American "Extension Service" method. Successful examples of such activities can be called advisory services rendered by the Yaroslavl and Samara regions, Bashkortostan, Chuvashia and other regions, working on the instructions of regional administrations of agro-industrial complex. Advisory services towards implementing the state agrarian innovation policy are increasingly offered also by institutions of supplementary vocational education [8].

The state should determine the vectors of its interests. And it is not only technical and technological modernization. For example, it is absolutely clear that the development of farming is constrained by the problem of distribution. Currently, retail chains have almost occupied the market for agricultural products, and they will not work with disparate farms. And the reason is quite understandable – the majority of farmers are not able to perform fair requirements of trade networks (standardization, packaging, and regularity of supplies). The most effective solution is cooperation. Consequently, the objective of the state structures is ensuring the development of cooperatives including their advisory support. The state should encourage this direction as socially significant, as well as provide financing of advisory services at the initial stage.

First and foremost, this concerns the state advisory services, which of course need to be developed. But the state cannot embrace all agricultural producers. As known, an entrepreneur is a person, who organizes his business at his own risk. Therefore, the state is not obliged to provide various services including free advisory services. In this regard, agricultural advises should be carried out on a paid basis.

Now that the system of agricultural advisory services has entered a period of demand by rural producers, it can cover at least part of its expenses through payments of own services.

Currently, the agricultural sector is represented by two types of economic management. We can talk about the gradual formation of a dualistic structure of trade agricultural sector in Russia. On the one hand, there are large and often giant structures, integrated horizontally and vertically (holdings), while on the other hand there are relatively small farms [3; 12].

Representatives of the first the most developing sector are large farms, called agricultural holdings, which provide a full production cycle, combining enterprise associations, and operating based on the principle "from field to shop board".

According to the Institute of Agrarian Market Studies, in Russia, on the area of 18 million hectares (15.3% of the total arable land) there are over 100 largest agricultural enterprises operating on arable land of 100 thousand hectares, and another about 200 farms with arable land of more than 30-50 thousand hectares.

In Russia, the total number of peasant (farmer) households amounts to 170 thousand. These farms labor 19.7 million hectares of arable land (16.3%).

In addition to these two opposing forms of agricultural business organization, in the country agriculture is managed with varying degrees of effectiveness by establishments of other legal forms, transformed from the former state farms and collective farms. Among them the dominated place is occupied by the companies (or partnership) with limited liability as well as agricultural production cooperatives.

Agricultural holdings bring real benefits to the economy, supplying products, creating jobs, paying taxes to the state treasury. Thanks to them, some regions turned from food importers to exporters. They employ the most effective latest domestic and foreign technologies and equipment, multilevel automated management system, and are the main recipients of finance. The state provides holdings tax incentives, cheap loans, and access to infrastructure [3].

Large agricultural enterprises use services of advisory agencies, as a rule, in the context of the choice of contemporary high technologies, searching inventions, business planning, and

supporting of investment projects. The specialists of the agricultural holdings often visit and participate in exhibitions and demos, actively attend seminars and conferences organized with the involvement of advisory centers. All these contribute to innovative development of the enterprises.

The creation of farming aims at forming a diversified rural economy, recreating the institution of private ownership of land, and replacing on this basis administrative methods of economic management by new approaches based on market principles, creating conditions for entrepreneurship and competition in the countryside. Among the peasant and farmer households there are a lot of highly-profitable farms, but for the most part these are still weak, technically poorly equipped farms that have a lot of problems. The main problems are the following.

1. One of the main problems, which is common to farming and agriculture in general, is high prices for fuel, agricultural machinery, fertilizers, and means of protection, which are incommensurable with prices for agricultural products, and thus greatly complicate the highly profitable agricultural production;
2. High loan interest rates (up to 12%, and in some cases up to 20% per annum). Small soft loans at a rate of up to 5% cannot meet the existing needs and are difficult to get;
3. Today, property rights to land are an acute problem for farmers. Farmers and agricultural enterprises of the country still suffer from corruption and raids.
4. Most acute problem concerns products sale and relationships with the trade. Large retailers expand to the regions and currently are trading with monopolies. Such monopolies are extremely dangerous for the medium-sized agricultural enterprises and farm economies in general. Distributive networks have almost occupied the agricultural product market not willing to work with disparate farms.

Farmers, as well as medium-sized and small agricultural enterprises are the main category of users of advisory centers. In addition to above mentioned innovation related services, the owners and specialists of small and medium-sized agricultural enterprises employ services of consulting lawyers, accountants, agronomists and veterinary professionals. They need help in products' sales, establishment of cooperatives, preparation of reporting documents [10; 11]. As a rule, they are not involved in large projects, though willing to pay for nonrecurrent consulting services.

Activities of commercial structures, established by the consultants having experience and credibility with rural entrepreneurs in a particular region confirm the possibility of self-financing of part of advisory services.

For example, advisory center "Helper" in Kalmykia was organized by the former head of the national agricultural advising service. At the same time, together with this center, there is enough work for state advisory center. Commercial services of the Smolensk, Irkutsk, Vladimir, and Leningrad regions are vivid examples of such collaboration. This became possible because the country has already formed a relatively large body of professional advisors, who are willing and able to provide quality advisory services, for which the customer is willing to pay.

Currently, the agro-industrial complex of Russia and its integral part - agriculture, being in the course of transformation, are increasingly becoming a high-tech innovative industry. At present the main goal is to further increase yields and productivity of agriculture, turning it into the largest exporter of agricultural products. The solution of these problems must be directly linked to the strengthening of advisory support to producers of all forms of ownership, including large holdings and small farms. For this purpose it is necessary to extend a network of advisory services, creating them on the basis of higher agricultural educational institutions and institutions of supplementary vocational education. It is impossible not to recognize that the development of existing agricultural advisory services is largely constrained due to lack of a law about "Agricultural advising," which would have defined legal, economic, and organizational basis for the development of the agricultural advisory system in order to

create conditions contributing to increase of agricultural production efficiency, improvement of the living standard of the rural population, and ensuring sustainable development of rural regions through the implementation and adaptation of the achievements of scientific and technological progress, innovative developments, and advanced production practices. The adoption of such a law would have facilitated the development of agricultural advisory services in Russia that is the most important tool in implementing of the state agrarian policy. The challenge of training professional advisors at the universities is in the same context.

CONCLUSIONS

In consequence of the present study we revealed the availability of supply and demand for agricultural advisory services. Thus, we can assume that there are two main paths for the advisory system development.

– The state agencies providing the main function of innovation support including that conducted through the organization of the information process, exhibitions and demos, as well as education. This category should also include the municipal centers for agricultural consultancy, the challenge of which is the execution of municipal tasks and the implementation of municipal projects (all that, which not long ago was the responsibility of the district agricultural departments).

– Private agencies with the advisory functions, which would provide assistance in the development of innovation and render various advisory services, such as technology consulting, business planning, documentation, accounting and legal support, etc. (all that, which cannot be paid from the state budget).

The first state direction in development of agricultural advisory system should include also supplementary vocational education institutions subordinated to the Ministry of Agriculture of the Russian Federation [8]. But in this case the paradigm of their activities (education, science, business) needs to be changed. At that, in our view, we could benefit from using the experience of the American system, where exactly universities are agents of state policy. Now it is exactly the period, which is characterized by restructuring of the national scientific system, reorganization of agricultural research institutes, and release of scientific personnel.

Unfortunately the Russian agrarian universities and supplementary vocational education institutions, possessing technological capabilities and human recourses, virtually are very little involved in advisory support of the industry. This is absurd. Communication experience and monitoring of ongoing activities have confirmed that at present neither Ministry, nor university rectors have serious intentions in addressing this acute problem.

Based on the current situation, it is necessary, in our opinion, implementing the following suggestions:

1. All existing supplementary vocational education institutions should officially be given the status of federal information and advisory centers. They should be given the responsibility to implement the state innovation policy and organize proper retraining of personnel. They should provide agricultural producers with information about the innovative possibilities of modernization of regional agriculture (databases, information assurance, exhibitions, seminars, "Field Days", and training).
2. Agricultural universities need to radically change the approaches to advisory services. The state agricultural universities situated in the regions can become powerful educational-scientific and advisory centers for development of regional agro-industrial complex. Responsible executives of the Ministry and universities should reconsider the relationship of educational institutions to advisory support of agricultural business. These activities should occupy an equivalent position with the educational process and scientific activity, and should be taken into account as academic load of lecturers.

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