INNOVATIVE DEVELOPMENT OF REGIONAL AGRICULTURE WITH THE PRIORITY OF PRODUCING BIOLOGICALLY VALUABLE FOOD PRODUCTS WITH MAXIMUM SAFETY FOR HUMAN HEALTH AND THE ENVIRONMENT

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Abstract. The article presents econometric and cluster analyzes of the limiting and stimulating factors and conditions for the innovative development of regional agriculture in Russian conditions. One of the main directions of this development is innovation, which ensures the production of biologically valuable food products. World agriculture is moving in the direction of enhancing the knowledge-intensive production. This is especially evident in the example of economically developed countries. This is what allows them to maintain the balance of the domestic food market by supply and demand, easily penetrate leading world markets, crowd out and ruin national producers. Therefore, the regions of the Russian Federation need to set and consistently solve the problem of the innovative development of the agricultural sector. There is no other way if we, Russia, have the goal of integrating into world agriculture and occupying a corresponding niche in it.

Keywords: agriculture, domestic food market, world agriculture.

1 Introduction

Innovative development is, first of all, constructive creative dynamics that ensure the creation and implementation of innovations. Some researchers consider innovative development in conjunction with science, while others believe that this is a post-scientific activity when a ready-made innovative product is used. An innovative product is the result of innovative activity, which must satisfy the following target requirements:

Be the sale of an intellectual property object;

Correspond to the required scientific and technical level;

To be produced for the first time and if not for the first time, then in comparison with another similar product, it should have higher scientific and economic indicators;

To be competitive

The carrier of an innovative product is an innovative agribusiness. In world practice, it is customary to attribute innovation to enterprises in which more than 70% of the total volume of production in monetary terms for the reporting tax period is formed by the production of innovative products. If this criterion is extended to domestic enterprises, it will become obvious: there are currently very few innovative enterprises in the agricultural sector of Russia. Based on the foregoing, it is possible to formulate the problem of regional innovative development: this is how to intensify innovative activity in the agricultural sector of the Russian Federation. This problem was especially acute in connection with the transition to market forms of farming. (Enright, 2003; Hufbauer et al 2008; Ostergaard & Park 2005; Peter, 2002; Khmeleva et al 2015).

Innovative activity is a type of activity that, based on the results of scientific research, leads to the creation of a fundamentally new product, new service, new knowledge, as a result of which there is something that did not exist before. An integral sign of innovation is the entry of a competitive product into the market. The combination of all these concepts in the classical sense is innovation. (Al-Qahtani et al 2008; Igor & Beilin 2018; Khmeleva & Bulavko 2016; Zadeh 2002; Beilin et al 2018).

2 Methods

Analysis and synthesis of statistical data is the final stage of statistical research, the ultimate goal of which is to obtain theoretical conclusions and practical conclusions about the trends and patterns of the studied socio-economic phenomena and processes. Analysis is a method of scientific research of an object by considering its individual sides and its constituent parts. Economic-statistical analysis is the development of a methodology based on the widespread use of traditional statistical and mathematical-statistical methods in order to control the adequate reflection of the studied phenomena and processes.

The tasks of statistical analysis are: determination and assessment of the specificity and features of the studied phenomena and processes, the study of their structure, relationships and patterns of their development. The main difficulties associated with the application of quantitative mathematical and statistical methods are that they are quite neutral to the studied socio-economic processes.

3 Results And Discussion

An analysis of the scientific support of the agro-industrial complex showed that of the total number of completed, accepted, paid for by the customer and recommended for implementation of applied scientific and technical developments, only 2-3% were implemented in limited volumes, 4-5% in one or two farms, and fate was 60- 70% of the development in 2-3 years was unknown neither by the customer, nor by the developer, nor by consumers of scientific and technical products. This situation is a consequence of a significant deterioration in the financial condition of agricultural enterprises. Recent years have been marked by a sharp reduction in the allocation of funds for scientific applied research. At the same time, in 18 developed countries of the world over the past three decades, they have increased from 0.96% to 2.2% of GDP per agricultural. In the US, this figure rose from 1.32 to 2.2%. In Australia, the cost of agricultural research for the indicated period in the industry is from 1.5 to 4.42%, in South Africa from 1.39 to 2.59%, and in 17 African countries from 0.42 to 0.58% of GDP for agriculture.

The weak link in the formation of effective innovative development of regional agribusiness is the study of demand for innovation. Marketing has not yet become an integral element in the formation of orders for research and development. As a rule, when selecting projects, a deep economic examination is not carried out, performance and risk indicators are not evaluated, and schemes for promoting the results in production are not worked out. This leads to the fact that, as already noted, many innovative developments do not become an innovative product.

The regression equation of the main factors of innovative development of regional agriculture with the priority of production of biologically valuable food products with maximum safety for human health and the environment (assessment of the regression equation) can be represented as:

$$Y = 4.657 + 1.542X_1 + 12.548X_2 + 0.953X_3 + 8.567X_4$$

The equation of this regression when brought into a standardized form has the form:

$$t_y = 2.375x_1 + 11.736x_2 + 0.698x_3 + 6.438x_4$$

By the largest coefficient $\beta 2 = 11.376$, we conclude that the maximum value on the result of Y is the factor X_4. Since the actual value is $F > Fkp$, the determination coefficient is statistically significant and the regression equation is statistically reliable (i.e., the bi coefficients are jointly significant). The statistical significance of the equation is also verified using the coefficient of determination. It is established that in the studied situation *99.97%* of the total variability of Y is explained by a change in factors Xj.

The introduction of highly adaptive, resource-saving technologies for the production of biologically valuable food products based on innovative activities with the widespread use of automation and computerization of production, machines and equipment of a new generation, robotics and electronic technologies, restoration and improvement of the production and technical potential of livestock complexes and poultry farms are determining directions for increasing production efficiency products. Accordingly, the constraints of the innovative development of regional agribusiness in Russia are numerous. These include:

1. Weak management of scientific and technical progress, lack of close interaction between the state and private business.
2. A sharp reduction in the cost of agricultural science in the context of sanctions.
3. The lack of training.
4. Low level of solvent demand for innovative products.
5. A sharp decrease in funding for the development of scientific and technological achievements in production and related innovative programs.
6. To date, no mechanisms have been developed that stimulate the development of the innovation process in the regional agro-industrial complex, etc.

Given the first four factors as the most influencing the innovative development of regional agribusiness in Russian conditions, the multiple regression equation has the form (estimation of the regression equation):

$$Y = 432.1 + 87.8X_1 + 328.6X_2 + 164.9X_3 + 284.2X_4$$

The equation of this regression when brought into a standardized form has the form:

$$t_y = 64.7x_1 + 287.2x_2 + 212.4x_3 + 198.5x_4$$

Over the past decade, for various reasons, there has been a decrease in the number of people employed in agricultural production by more than 2 million people. At the same time, the quality of staff has deteriorated. The proportion of managers of agricultural enterprises with higher education decreased from 86% to 70%. The share of key specialists with higher education decreased and amounted to 53%. Given the role of personnel, we can confidently say that this situation adversely affects the effectiveness of the innovative development of the agricultural sector. In crop production, innovative processes for the production of biologically valuable food products should be directed:

Increase in crop production based on increasing soil fertility;

Increase crop yields and improve product quality;

Overcoming the processes of degradation and destruction of the natural environment and greening production;

Reducing energy consumption and reducing the dependence of crop productivity on natural factors;

Increasing the efficiency of the use of irrigated and drained lands;

Saving labor and material costs;

Conservation and improvement of the ecology of the environment

In this regard, the innovative policy for the production of biologically valuable food products in the field of crop production should be based on the improvement of breeding methods - the creation of new varieties of crops with high productive potential, the development of scientifically based systems of agriculture and seed production (Fig. 1).
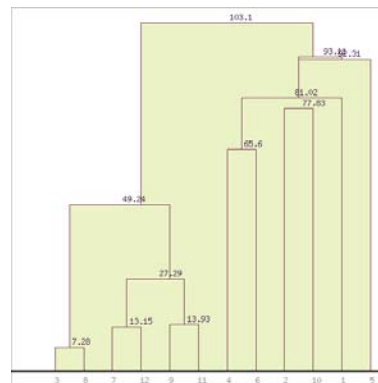

Figure 1. Cluster analysis (nearest neighbor method) of stimulating factors for the innovative development of biologically valuable food products in the field of crop production

One of the main areas of innovation is biotechnological animal breeding systems using genetic and cellular engineering methods aimed at creating and using new types of transgenic animals with improved disease-resistant productivity. Equally important in the development of the innovation process in animal husbandry belongs to the technological and scientific-technical groups of innovations that are related to industrialization of production, mechanization and automation of production processes, modernization and technical re-equipment of production, the development of high technology, growth of labor productivity, which ensure a high level and livestock production efficiency (Fig. 2).
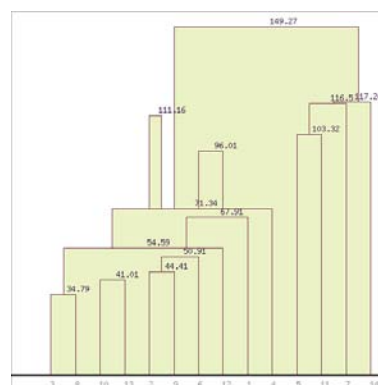

Figure 2. Cluster analysis (nearest neighbor method) of stimulating factors for the innovative development of biologically valuable food products in the field of animal husbandry

In the current conditions of instability in the development of livestock production, a sharp decline in livestock production in order to increase the production potential of the industry, it is important to use the biological block of innovations, the achievement of domestic and world breeding, reflecting the most important areas for improving the selection and genetic potential. The level of animal productivity, the efficient use of feed resources, the development of resource-saving technologies aimed at increasing the level of intensity and production efficiency directly depend on this.

4 Summary

To activate innovative processes in the production of biologically valuable food products, it is necessary to provide conditions for expanded reproduction in the agricultural sector, first of all, to improve the financial condition of organizations. Most regional agricultural enterprises have long lost their working capital, their accounts payable exceeded the annual revenue from sales of products, cannot take new loans, which fights off the normal production process. Even taking into account subsidies and compensations from the budget, a large number of regional agricultural enterprises were unprofitable. With a lack of financial

resources, they are primarily directed to current goals, and not innovative development.

5 Conclusions

The conditions and factors hindering the development of innovations in the agricultural sector include the contraction of domestic demand for food, the reduction of state support for the agricultural sector and state funding of scientific and technical programs. This is also the underdevelopment of the lending system, high loan rates, lack of innovation infrastructure and state innovation policy and strategy, insufficient training of personnel of the agro-industrial complex organizations in the field of innovation management. The innovative type of development of the agricultural economy is largely determined by the scientific and technical policy of the region, the formation of a regional innovation mechanism. Subjects have an important role in the implementation of the anti-crisis program, using innovations of the selection-genetic, technological, organizational-managerial and social type.

Acknowledgements

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