Formation of the dairy industry production potential: innovations and problems of their implementation

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Abstract. The formation of the production potential in the dairy cattle industry through the implementation of innovative processes is caused by the need of the modern economy and is necessary for the effective functioning and successful development of the industry in the long term, as well as for the fullest satisfaction of the needs of potential consumers for final products, in accordance with the numbers reflected in the Russian Federation's Food Security Doctrine. The innovative activity of agricultural organizations is much lower than in Russia as a whole, which acts as a constraining factor for the development of the agricultural sector of the economy and the formation of production potential in a sectoral context. The development of tools to form the production potential of the industry on an innovative basis is an objective necessity in modern conditions of economic development and the functioning of domestic business entities.

1. Introduction

One of the main problems in the development of dairy cattle breeding is the low level of formation and use of the production potential of the industry. In order to more fully supply the population with milk, a necessary condition is the formation of the production potential of the dairy cattle industry, considering various kinds of innovations. However, it must be taken into account that in general in Russia and, in particular, in the dairy cattle industry, a very low level of innovative activity of enterprises is observed, which is unacceptable in the conditions of the formation of import-substituting production and the formation of an innovative economy in the state. In the cattle breeding industry, innovations are primarily focused on increasing the productivity of animals, as well as on creating conditions for more efficient production of products; accordingly, the development of tools for the formation of production potential on an innovative basis is necessary.

2. Purpose of the study

The purpose of the study is to identify the problems of introducing innovations and recommend tools for the formation of the production potential of dairy cattle breeding on an innovative basis.

Dairy cattle breeding is one of the priority areas for the development of agriculture in Russia, however, in 2018 there was another decline in the development of the industry, subject to the availability of administrative support. For the period 1990-2018 in Russia as a whole, there is a decrease in the number of cows by 61.36% and a decrease in gross milk production by 43.35% (table 1) [1]. A decrease

in gross milk production is also observed in the regional context, in particular in the Krasnoyarsk territory in 2018, the decrease amounted to 15.38% compared with the 1990 level.

Table 1. Milk production in farms of all categories [2].

Rates	Years								
	1990	1995	2000	2005	2010	2015	2016	2017	2018
Milk production on farms of all categories, thousand tons:									
- Russia - total	55715	39241	32259	31070	31847	29888	29787	30185	31564
- Krasnoyarsk territory	739.7	513.4	731	638.9	677	658.1	640.7	638.7	625.9

"The production potential of an enterprise (or an individual industry) is its capabilities, expressed in terms of volume of production in natural units of measurement, which depends both on the quantity, quality and ratio of resources, and on the level of their return as well" [3]. Comprehensive optimization of processes in dairy cattle breeding should take into account factors that ensure the conditions for expanded reproduction [4]. Under the influence of the prevailing economic conditions in the agricultural sector, the level of production is low, despite some investment injections, and milk production is no exception. These trends dictate the need to search for reserves for the development of the cattle breeding industry, first of all, it is necessary to consider the possibility of increasing the level of production potential of the industry. In addition, as practice shows, the sustainable development of an agricultural enterprise directly depends on the existing production potential, i.e. this factor is crucial in implementing the sustainable development strategy of an agricultural organization [5].

The fundamental form of influence, method of control and regulation of AIC in modern conditions is creation of conditions for innovative activity, scientific support and encourage agricultural producers to innovative development. The main objectives of innovation in manufacturing is highlighted in works of N. V. Sandu, among which we should mention "...cutting costs, improving profitability, increasing the revenue of the enterprise" [6], but the implementation of these goals is impossible without the implementation of a more primary purpose in the functioning of agricultural organizations, which supports the formation of productive capacity. Thus, the manufacturing application of achievements of scientific-technical progress is the basis of production potential forming. It should be noted that the content of innovations mastered in the basic industries and agriculture differ considerably because of their industry, functional, technical-technological, and organizational features. For the optimal formation of production capacity as well as successful innovation activity a detailed study of innovation is necessary, as according to the prevailing view of the improvements introduced, special features of innovation processes are derived that need to be considered at realization of technological processes that have industry specifity.

In modern conditions of development of economy in general and agricultural sector in particular, in agriculture it is possible to allocate four basic directions of innovation from the perspective of the development of dairy cattle breeding branch, that are shown in figure 1.

It should be noted that innovative development areas, which are able to improve product quality in a relatively short time, contribute to lower unit costs, ensure quick return on funds are considered as priority, in particular, the development of resource-saving technologies should be highlighted among technological areas. Among the technical areas, the machine-technical re-equipment of the industry, the technical equipment optimization of and the affordable service system formation are singled out.

Among the biological areas, the improvement of breeds of farm animals, as well as methods and tools of breeding are of priority. Organizational and economic areas include state regulation of innovation at the industry level, as well as improving the storage, processing, and marketing of products.

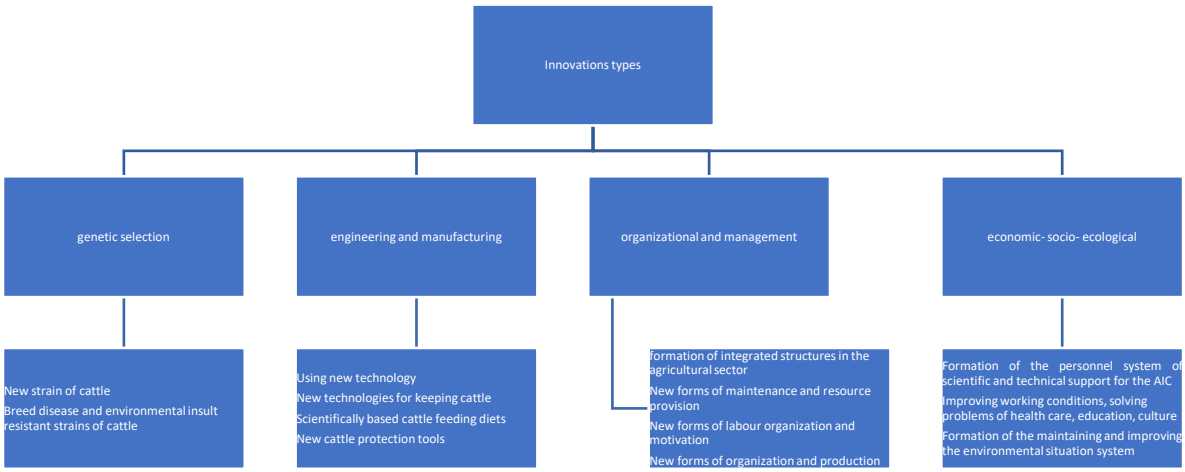

Figure 1. The classification of innovation types in AIC with the account of specificity of dairy cattle breeding industry.

The results of innovative activities in dairy cattle breeding are an increase in animal productivity, labour productivity, a decrease in the cost and material consumption of a unit of production, an increase in profits, as well as a decrease in economic damage from environmental pollution. The variety of types and kinds of innovations entails the need to create certain conditions conducive to their implementation within the framework of a specific agricultural organization, as well as at the industry level, which will more fully project the results obtained into the activities of other organizations.

Over the past 2013-2019, the Government of the Russian Federation adopted a set of measures to overcome the crisis in the country, including the agricultural sector, which made it possible to give greater stability to the agro-industrial complex. At the same time, ensuring the stable development of agricultural sectors can be achieved only on the basis of the mass implementation of the achievements of scientific and technical progress, respectively, the transition of the agrarian sector to an innovative development model. However, to understand the overall picture, it should be noted that the combined level of innovative activity of organizations in Russia in comparison with other countries is low, at least 22 states are ahead of it, including Brazil, Australia, Belgium, Lithuania, the Czech Republic, Colombia [7]. At the same time, a high cumulative level of innovative activity indicates the creation of favourable conditions of these countries economy, and a high level of support from the state. Innovative activity, by and large, reflects the willingness of organizations to update in all areas of functioning, this is the level of susceptibility to everything new as well as [8]. The level of innovation activity in the context of industry affiliation of organizations in Russia is as follows (table 2).

Table 2. The level of innovative activity of organizations by industry sector in Russia (2016) [9].

Industry affiliation	The proportion of organizations implementing innovations, in the total number of organizations %			
	total	technologic	marketing	organisational
Industrial production related	10.5	9.2	1.9	2.8

Service industry related	7.2	6.2	1.2	2.3
Building industry related	1.5	1.1	0.4	1.1
Agriculture related	4.0	3.4	0.4	0.9

Analysing the innovation activity distribution by industry, it should be noted that the share of organizations introducing innovations is higher in industrial production - 10.5% because of its general dominance in the structure of the Russian economy, and in agriculture - 4.0%, i.e. agricultural organizations in terms of innovation activity lag behind industrial production by 6.5 percentage points. Within the agricultural segment, the maximum introduction of technological innovations, in particular in industry, is 9.2%, and the minimum introduction of marketing innovations is 1.9%, while in agriculture, technological innovations accounted for only 3.4% and marketing innovations - 0.4%.

Table 3. Share of organizations implementing technological innovations in the total number of organizations surveyed in the livestock section, % [9].

Region	2016	2017
Russia - total	3.9	4.4
Krasnoyarsk territory	3.6	1.8

If we consider technological innovation activity in the industrial context (livestock) (table 3), as the most significant from the point of view of forming the industry production potential, we note that in 2017, Krasnoyarsk Territory organizations significantly lag behind the national level (4.4%) in terms of the livestock industry innovation implementation. In 2017 in the Krasnoyarsk Territory, the share of organizations mastering technological innovations in the cultivation of dairy cattle and the production of raw milk amounted to 2.3% [9]. Sandu I. notes the inconsistency of trends in the innovative processes development aimed at the formation of domestic agriculture production potential. He claims that "on the one hand, advanced farms, overcoming a negative situation, usually of an external nature, organize the development of innovations. On the other hand, instead of technical and technological modernization and production improvement based on the development of innovations, there is a forced return to imperfect methods and technologies, which in fact means a departure from the course towards the creation of high-tech production as an important direction of agricultural development "[6]. The introduction of innovations in agricultural production and, in general, the innovative activities of organizations are constrained by a weak level of investment activity (table 4).

Table 4. The volume of investment in fixed assets in the United States, Russia, and the Krasnoyarsk Territory [10].

Rate	2014	2015	2016	2017	2018
Volume of investments in fixed assets – total					
The USA, billion dollars	3562.8	3712.2	3786.9	3995.3	4260.7
Russia, billion rubles	13902.6	13897.2	14748.9	16027.3	17595.0
Krasnoyarsk territory, billion rubles	-	-	-	375.3	401.1
Volume of investments in fixed assets in agriculture, billion rubles					
Russia	524.3	518.8	623.4	705.5	777
Krasnoyarsk territory	-	-	-	5.2	6.3

The growth of investment in fixed capital for the period 2014-2018 years was 26,56 % in the whole Russia and of 19.59 % in the United States but taking into consideration that US investments expressed in dollars, then in 2018, in Russia, about 293,25 billion is invested in basic stock that is 14.5 times less than that invested in the US economy. The volume of investments in agriculture in Russia in 2018 accounted for just 4.4% of total investment inflows. The share of investment in agriculture in the

Krasnoyarsk territory amounted to only 0.81% of the total investment, respectively, is it worthwhile to talk about innovative activity in the agricultural organizations of the region?

However, in the modern realities of the domestic economy it is possible to identify a number of problems of development of innovation activity in the agrarian sector, among which we should highlight the low solvency of agricultural organizations, the lack of material-technical base necessary for the development of technological innovation, high risk of innovative processes, limited access to reliable and complete information about the latest scientific developments etc.

Thus, the solution to these problems, undoubtedly, will increase the productive capacity of agricultural organizations and will contribute to the growth in size and economic efficiency of their activities. For innovation in the activities of agricultural organizations it is needed to provide the preconditions for the realization mechanism of innovation development, i.e. to develop tools for the formation of productive capacity in dairy cattle on the basis of innovation development. During the development of this toolkit it is necessary to use the approaches of complexity and consistency. The recommended system tools are presented in figure 2.

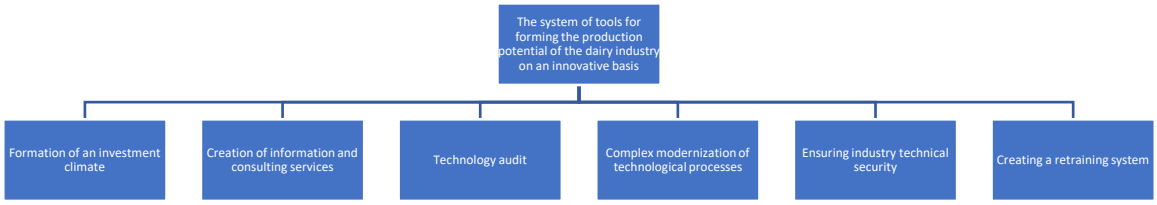

Figure 2. The system of tools for the formation of production potential in dairy cattle breeding on an innovative basis.

The set of tools should be justified with consideration to the economic conditions of a particular organization, which is necessary from the point of view of taking into account the specifics of the activity, as well as the implementation of the principles of consistency and targeted use of investments.

3. Conclusion

The systematization of the tools for forming the production potential of the dairy cattle industry is determined by the possibility of innovative development of the industry, the social and food significance of the development of the industry as a whole, and the need to increase the competitiveness of the industry.

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