

Artículo de investigación

Efficiency of state regulation and subsidizing of the dairy cattle industry in the Russian Federation from the view of indicative planning agricultural industry

Эффективность государственного регулирования и субсидирования отрасли молочного скотоводства в РФ с точки зрения индикативного планирования аграрной отрасли

Recibido: 17 de agosto del 2019

Aceptado: 14 de octubre del 2019

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ORCID: <https://orcid.org/0000-0003-2869-2312>**Abstract**

The agro-industrial complex and the dairy cattle-breeding industry in Russia receive quite serious and diverse state support, including from various directions of budget financing. Not the entire volume of state subsidies contributes directly to the development of the dairy cattle breeding industry, while it is difficult to single out the exact amounts that affect the industry's development indicators. Budget support to agricultural producers is provided with an orientation to achieving the country's food security in the product category of milk and dairy products, as well as the necessary production indicators of the industry. Therefore, the purpose of the study was to identify the main directions and the size of state budget support for the dairy subcomplex in the Russian Federation, as well as to analyze the dynamics of dairy industry development indicators and its economic efficiency, including correlation with the amount of budget support. Our purpose requires the following tasks: 1) consideration of the regulatory framework for state regulation of dairy cattle breeding; 2) analysis of the dynamics of budget financial support for the dairy cluster; 3) assessment of the current state of the industry; 4) a correlation analysis of the development

Аннотация

Агропромышленный комплекс и отрасль молочного скотоводства России получает достаточно серьезную и разноплановую государственную поддержку, состоящую в том числе и из различных направлений бюджетного финансирования. Далеко не весь объем государственных субсидий содействует развитию непосредственно отрасли молочного скотоводства, при этом достаточно сложно вычленить точные суммы, влияющие на показатели развития отрасли. Бюджетная поддержка сельскохозяйственным товаропроизводителям предоставляется с ориентацией на достижение продовольственной безопасности страны по товарной категории молока и молочных продуктов, а также необходимых производственных показателей отрасли. Поэтому целью проведенного исследования явилось выявление основных направлений и размера государственной бюджетной поддержки молочного подкомплекса в Российской Федерации, а также анализа динамики индикаторов развития молочной отрасли и ее экономической эффективности, в том числе в корреляции с объемами бюджетной поддержки. Поставленная нами цель требует выполнения следующих

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indicators of the dairy industry and the size of budget support. The authors used the following methods of economic research: monographic (study of scientific sources), abstract-logical, analysis and synthesis, comparison and correlation analysis. By calculating the Pearson correlation coefficient, the relationships between various factors and the development results of the dairy industry were revealed, including the dependence of its development indicators and reporting indicators on dairy cattle breeding depending on the volume of federal allocations. In the summarizing part of the article, relevant conclusions and suggestions are developed.

Keywords: Budget subsidies, state regulation, dairy cattle breeding, milk production, balance of dairy products, economic efficiency of milk production

Introduction

The current policy of budget subsidizing of dairy cattle producers, coupled with other measures of state regulation of the market and industry, leads to an increase in the volume of raw milk in agricultural and farming organizations, respectively, and increases the level of food independence of the country for milk. However, a number of global problems of the industry are also found, including a decrease in gross milk yields in subsidiary farms of the population, as well as low and unstable profitability of the dairy industry, taking into account the unprofitable sales of cattle meat. State regulation of agricultural production in developed countries makes the functioning of the agricultural sector more difficult.

At the beginning of 90s reforms of the XX century, within the framework of state agrarian regulation, including dairy farming, it was assumed that no state support and regulation was required – the market should regulate everything. By and large, in the 90s it was this paradigm that determined the actions of government representatives in the economy, including the agricultural cluster, of which the dairy and food complex is a part. Now the insolvency of such an

задач: 1) рассмотрение нормативной базы госрегулирования молочного скотоводства; 2) анализ динамики бюджетной финансовой поддержки молочного кластера; 3) оценка современного состояния отрасли; 4) проведение корреляционного анализа индикаторов развития молочной отрасли и размеров бюджетной поддержки. Авторами использованы следующие методы экономических исследований: монографический (изучение научных источников), абстрактно-логический, анализ и синтез, сравнение и корреляционный анализ. С помощью расчета коэффициента корреляции Пирсона выявлены взаимосвязи между различными факторами и результатами развития молочной отрасли, в том числе и зависимость показателей ее развития и отчетных индикаторов по молочному скотоводству в зависимости от объема выделяемых федеральных ассигнований. В резюмирующей части статьи выработаны соответствующие выводы и предложения.

Ключевые слова: бюджетные субсидии, госрегулирование, молочное скотоводство, производство молока, баланс молочной продукции, экономическая эффективность производства молока

excessively liberal point of view and the need to strengthen government action on the national market to reasonable limits, taking into account the principles of the search for a “middle ground”, is now absolutely clear.

Despite the fact that market relations have been forming in our country for almost 30 years, one of the most pressing scientific and practical problems remains the dialectical struggle of public and individual agricultural businesses for the necessary freedom of their economic activity, as well as the development of the most favorable or at least adequate, the so-called “rules of the game” developed by executive and legislative authorities at the federal and relevant regional levels, which should be expressed in the end, at reasonable intervals, the boundaries of economic independence and responsibility of domestic producers of agricultural food.

When analyzing the world experience of state intervention in the economy using the most developed countries of Europe and America as an example, it becomes completely clear that even in absolutely market conditions with a rich historical tradition and the evolution of their

formation, states masterly apply the widest range of replenishing and developing measures and instruments of state regulation. This includes all types of state financial and economic policy: structural intersectoral, stimulating investment financial policy, budget state orders, social support of the population, soft tax policy, market interventions in production and financial markets, stimulating financial and credit regulation, emission policy, as well as foreign economic a policy of double standards and hidden (agrarian) protectionism. None of the known economic models, whether North American (declaratively calling itself the most liberal) or Scandinavian (with a significant amount of state socially equalizing budget support for business entities and the population), ensures the absence of regulatory state functions and the responsibility of national governments for what happens in their country. Moreover, it is the strengthening of government intervention in the economies of the most developed OECDs that is one of the key elements of their transformation into a modern post-industrial economy, which is characterized, first of all, not as production, but as financial, scientific-innovative and digital economies. It is the experience of the advanced countries of the modern world that showed that the most efficient market institutions today are created only if a strong state is formed that can effectively manage market processes, manage its income, and, at the same time, is responsible for social and other obligations, severely punishing as a fined agribusiness that does not comply with the current regulatory framework, and the bureaucratic apparatus that impedes the effective development of the economy.

The aim of the study was to analyze the program activities and volumes of the federal budgetary subsidiary support for the dairy subcomplex in the Russian Federation, as well as to analyze the dynamics of key production and indicative indicators of the industry's development and its economic efficiency. The scientific hypothesis of our study adheres to the assumption of the effectiveness of the policies and budget expenditures for the development of the dairy industry with the unconditional possibility of improving the system of state regulation of the industry.

At present, the need to strengthen the influence of the state and regional governing bodies on the processes of forming a free market environment is becoming more and more conscious. In this regard, the most acute scientific and applied problem is the struggle of economic individuals

and economic entities for the freedom of production activity, which implies the establishment of adequate "rules of the game" on the part of the state and its territorial bodies, that is, the definition of the boundaries of economic independence and self-government.

When turning to the experience of state participation in the economies of developed countries, it becomes obvious that in market conditions the state is very skillfully using a whole arsenal of regulatory tools. This is a structural and investment policy, budget, social, tax, production and market, financial and credit, issue, foreign economic. Not a single model, whether American (liberal) or Scandinavian (with a higher level of state regulation), exempts the state from regulatory functions and responsibility for everything that happens in the country. Moreover, the strengthening of the role of the state in the economies of developed countries is one of the most important moments of their transformation towards a post-industrial society. Using the experience of economically developed countries as an example, M. M. Galeev shows that new effective market institutions can only be created by a strong state that knows how to manage its property, meets its obligations and severely punishes both market agents who do not comply with the current rules of the game and own apparatus, distorting these rules with bureaucratic tricks (Galeev, 2008).

According to the current WTO rules, the instruments of state budgetary support for agriculture are classified in accordance with the so-called three "baskets": red (prohibited, mainly export subsidies), yellow or amber (limited to use) and blue basket (measures to reduce production). This aspect affects negatively on scientific research in the field of efficiency of state regulation and budget support of industries, including the dairy complex, as there are insurmountable difficulties in allocating the exact amounts of budget allocations for a particular industry.

Today, no one doubts the need for budget support for dairy cattle breeding, at the federal level, all the necessary regulatory frameworks have been developed for this, there are many scientific studies on the topic of state support for the dairy industry and regulation of the dairy market, however, in our opinion, there is a lack of systematic studies on the effectiveness budget investments in the dairy cluster, including with justification by the methods of mathematical statistics (correlation analysis).

Materials and methods

The aim of the study was to analyze the program activities and volumes of the federal budgetary subsidiary support for the dairy subcomplex in the Russian Federation, as well as to analyze the dynamics of key production and indicative indicators of the industry's development and its economic efficiency. The scientific hypothesis of our study adheres to the assumption of the effectiveness of the policies and budget expenditures for the development of the dairy industry with the unconditional possibility of improving the system of state regulation of the industry. To achieve the aforementioned goal, the following methods of economic research were used: monographic (a review of scientific sources on the topic of the article, including foreign ones), abstract-logical, analysis and synthesis, comparison (determining the dynamics of development of milk production and other indicators, as well as the fact-plan of analysis comparing the planned and actual values of the development indicators of the dairy industry) and economic and mathematical methods (correlation analysis).

To study the dependence of milk production and other indicators on the level of budget support and other factors, the formula for calculating the Pearson correlation coefficient was applied. This technique is convenient, it can be used to determine the likelihood of promising areas of government support for the industry in the future (Klevtsov, Tevyashova, 2017).

The Pearson correlation coefficient is calculated to assess the presence or absence of linear relationship between two variables by the formula:

$$r_{xy} = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{i=1}^n (Y_i - \bar{Y})^2}}$$

where r_{xy} -- correlation coefficient;

X_i - values taken in the sample X (factors);
 Y_i - values taken in the sample Y (export / import);
 \bar{X} - average X;
 \bar{Y} — average Y.

The following results may occur. If:

1. $r_{xy} = 0$ – no connection;
2. $0 < r_{xy} < 1$ – connection is direct (with increasing x y increases);
3. $-1 < r_{xy} < 0$ – connection is inverse (with increasing x y decreases);
4. $r_{xy} = 1$ – absolute connection.

If connection between the indicators is direct, then in its turn it can be:

1. Weak (range of values from 0 to 0.3);
2. Average (range of values from 0.3 to 0.7);
3. Strong (range of values greater than 0.7).

Results

For the purposes of state support and ensuring the development of the agricultural sector, serious amounts of budget finances are allocated from the federal budget, amounting to about 250 billion rubles annually. The federal budget expenditures which are the most affecting the development of the dairy farming sub-sector are shown in Table 1. These items of federal budget expenditures are passed by the Ministry of Agriculture for targeted financing of the State Program for the Development of the Agricultural Industry (Klevtsov, Tevyashova, 2017).

Table 1. Federal budget expenditures most affecting the development of the dairy cattle sub-sector, mln. rubles

Budget items	2017 year	2018 year	change over period
Total government spending on agriculture	233 775	249 503	15 728
Subsidies for increasing the productivity of dairy farming	8 073	7 962	-111
Subsidies for achieving the target indicators of the programs of the subjects of the federation	38 960	39 828	868
Stimulation of investments in agribusiness	82 973	93 045	10 072

The state of the dairy and food cluster and the domestic dairy market does not always directly depend on the size of the total budget financing of the agro-industrial complex according to the aforementioned State program, as well as directly allocated for financing the food production of milk. Not the entire amount of budget subsidies allocated by the state directly affects the dairy subcomplex, certain areas (for example, support for export and reindeer husbandry) do not benefit cattle farmers at all, others are only able to indirectly participate in increasing its efficiency and development (this includes support for related livestock industries, crop production, fodder production, technical re-equipment of agricultural enterprises, support to farms and small agribusiness, social and market infrastructure, maintenance of veterinary services, etc.).

Cost items that affect the growth of milk production, the development and investment attractiveness of dairy cattle breeding, as well as solving the problems of equalizing the seasonality of gross milk production, increasing the livestock of the main herd, and stimulating an increase in the marketability of milk may include the following items of the state budget and the State program.

Almost direct budget subsidies for the dairy and food sector are prescribed in the State Program as a subprogram for the development of industries capable of accelerating import substitution of the main types of food, privately expressed as the main event, "Increasing Productivity in Dairy Cattle Breeding". In violation of the logic, despite the non-compliance with the standard for self-sufficiency of food independence for dairy products (Fig.1), for 2018 there was a slight reduction in budget allocations for this article.

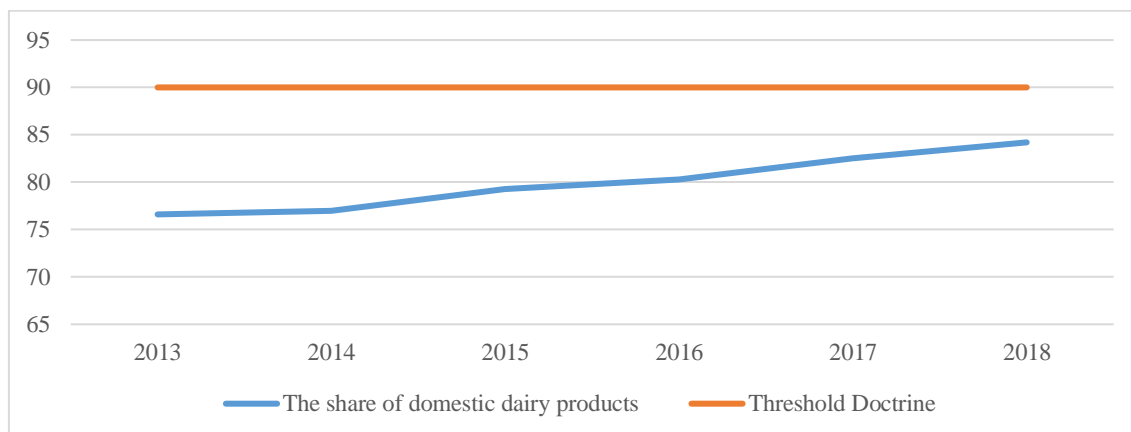


Figure 1. Self-sufficiency schedule for dairy products in the Russian Federation compared to food safety doctrine, %

The reduction in budget allocations related to the production of dairy products recorded in 2018 is shown in Table 2. For understanding, it should be

noted that 6168 million rubles were allocated directly for this event in 2015, and in 2016 – 12,665 million rubles.

Table 2. Aggregated balance of resources and use of dairy products (in terms of milk) for 2016-2018, thousand tons

Indicators	2016	2017	2018	2018 /2016	
				+/-	%
Stocks at the beginning of the year	1947,7	1746	1638,9	-308,8	84,1
Production	29787,3	30185	30639,9	852,6	102,9
Import	7578,6	6996,9	5687,9	-1890,7	75,1
Total resources	39313,6	38927,9	37966,7	-1346,9	96,6

Production consumption	3043,4	2883	2746,8	-296,6	90,3
Losses	30,3	29,4	23,4	-6,9	77,2
Export	644,8	607,6	574,5	-70,3	89,1
Personal consumption	34190,3	33736,9	33072	-1118,3	96,7
End of year stocks	1746	1638,9	1701	-45,0	97,4

In fairness, it should be noted that certain positive trends in the development of dairy cattle breeding and the self-sufficiency of our country with dairy products would have been impossible or much less noticeable if not for the action of foreign economic regulation that did not pass through the Ministry of Agriculture - the notorious food embargo or anti-sanction. According to V.I. Trukhachev, until 2014, the share of imported milk in the total volume of its consumption in the country was more than 23% (Trukhachev, 2014). As a result of an adequate policy of agri-food anti-sanctions for 2016-2018 imports declined by more than 1.9 million tons, or 24.9%. Exports for this period also declined slightly, in just three years, 10.9%. O. I. Katlishin notes that from the point of view of the trade balance, even taking into account the favorable dynamics of the ratio of imports and exports, the import of dairy products into Russia exceeds export by almost 10 times (Katlishin, 2018). At the same time, the consumption of milk and dairy products is falling due to reduced imports, even despite a slight increase in production.

The development of dairy farming is influenced by funding for such subprograms of the Ministry of Agriculture as "Promoting the achievement of targets for the implementation of regional programs for the development of the agro-industrial complex" and "Stimulating investment activity in the agro-industrial complex" (Balance of food resources. Resources and use of milk and dairy products, 2019).

Within the framework of the budget system of the Russian Federation, it is possible to co-finance the development of the dairy-food subcomplex from the budgets of the regions, as well as increase funding from the federal budget for high milk cow productivity (from 5000 kg / year). In the state regulation of the dairy complex there is a built-in mechanism of both individual and regional competition, which in the strategic plan will contribute to its development. Financing from the state budget and state support measures are shown in Table 3.

Table 3. Implementation of the main indicators for the development of the dairy industry in 2018

Indicators	2017	2018			2018/ 2017, %
		Plan	Fact	Completion (%)	
Cattle production for slaughter, thousand tons	14624,1	13847,4	14875,3	107,4	101,7
Gross milk yield, thousand tons	31120,6	31310,0	30639,7	97,9	98,5
Milk production by enterprises and farmers, thousand tons	18008,1	17160,0	18725,0	109,1	104,0

In general, the policy of state support for dairy producers contributes to the development of the dairy cluster. The industry specificity of the technological process in dairy cattle breeding does not allow isolation of the production of milk and meat of cattle. In recent years, volumes of production of raw milk meat in agricultural enterprises and peasant farms have been increasing. At the same time, the total gross milk yield of all categories of farms has decreased by

1.5%. Only in the segment of agribusiness and peasant farms there is an organic production growth of 4% per year, which is quite expected. The system of state regulation and financial support contributes to the growth of production in these enlarged categories of milk producers. Peasant farms, in addition to the general financing system, can also apply for financial assistance from support programs for small entrepreneurs in rural areas, including through

investment grants. However, the accelerated reduction in the number of livestock and the decrease in milk yields in personal subsidiary plots of the population level the state policy for

the development of the industry. The problem is that private farms still provide too much of the total volume of whole milk produced in the country (Fig.2).

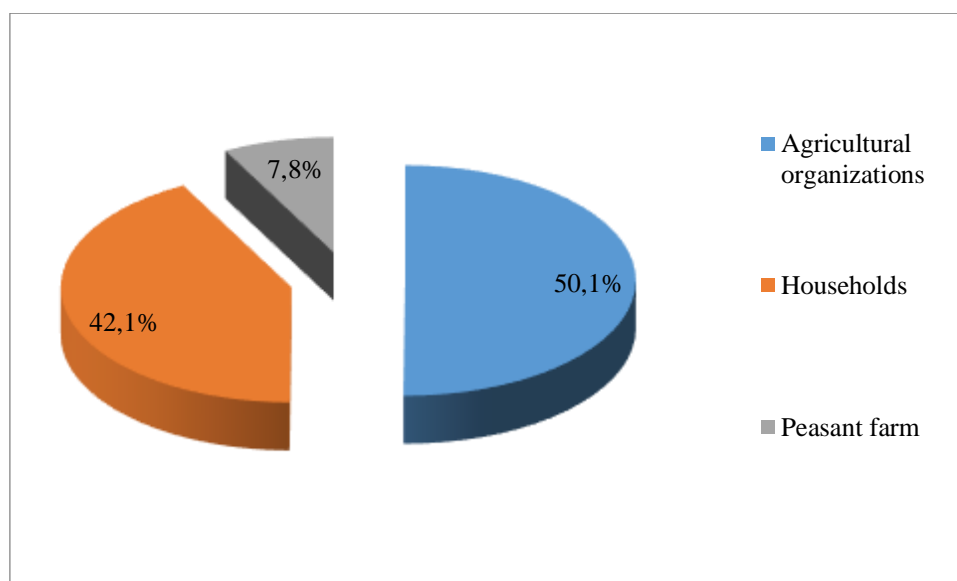


Figure 2. Structure of whole milk production by categories of farms, %

Budget support, according to logic, should have a positive impact on the profitability and efficiency of dairy farming in general. Compared with industry average profitability indicators in the agricultural sector and animal husbandry, the profitability level for the sale of raw milk and raw materials in recent years is relatively higher

(National Report on the Implementation of the State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets in the Russian Federation, 2019). The level of average industry profitability of agriculture and dairy farming is presented in Table 4.

Table 4. The level of average industry profitability of agriculture and dairy farming, %

Profitability indicators, %	2017	2018
Profitability from sales of agricultural products	13,6	14,4
Profitability level from livestock sales	10,1	9,2
Profitability from the sale of raw milk	26,2	15
The level of profitability from the sale of milk and dairy products, %	25	14,4
Profitability level from sales of cattle meat, %	-30,1	-31,4

Given the above-mentioned specifics of the dairy cattle sub-sector, where the technology involves writing off costs not only for milk, but also for meat gain, it is necessary to take into account not only good profitability of milk, but also high loss ratio of by-products – cattle meat. As a result,

profitability is reduced not by the product of whole milk, but by the dairy industry, which does not always allow analyzing the profitability of milk through an independent indicator of the economic efficiency of the industry. In addition,

there is a fairly strong profitability fluctuation in two analyzed years, which is also a negative sign. Paradoxical as it may seem at first glance, direct support for dairy production hasn't practically effected milk production increase. According to WTO rules, its reduction is contrary to the

general trend of milk production growth in the country to date. The correlation between production indicators, the balance of the aggregated market and budget financing is shown in Table 5.

Table 5. The scheme of correlation between indicators of production, the balance of the aggregated market and budget financing

Indicators	Gross milk yield	Consumption	Export	Import	The total amount of budget support for the agro-industrial complex	Dairy allocations
Gross milk yield	x	moderate inverse	weak inverse	moderate inverse	high	high inverse
Consumption	moderate inverse	x	weak inverse	high	noticeable inverse	weak inverse
Export	weak inverse	weak inverse	x	weak inverse	moderate inverse	high
Import	moderate inverse	high	weak inverse	x	high inverse	weak
The total amount of budget support for the agro-industrial complex	high	noticeable inverse	moderate inverse	high inverse	x	x
Dairy allocations	high inverse	weak inverse	high	weak	x	x

The inconsistent data on the dependence of domestic dairy production volumes is explained by the fact that this particular type of financial support is extremely small for such a significant cluster-forming sector of the agro-industrial complex as dairy cattle breeding, and the bulk of the support falls on other items of the federal budget for agricultural development. There is a high correlation between the total appropriations for the State Program and gross milk yields in the country.

The inverse relationship between traditionally correlating factors is also explained by the strong influence of such factors as foreign economic policy and the conditions of foreign economic

activity. In particular, the decline in imports as a result of pro-embargo led to a reduction in both personal and industrial consumption of milk and its processed products despite the growth of domestic production.

Discussion

According to A. T. Stadnik, the practice of state regulation of agricultural production in developed countries shows the impossibility of the efficient functioning of the agricultural sector without subsidiary budget support (Stadnik, 2015). V. Erokhin notes that under WTO conditions, according to a special agreement on agriculture and other multilateral agreements,

most participating countries support domestic farmers with a variety of instruments (Erokhin, 2014). M. Petrick and L. Götz emphasize the importance of the system-forming sector of the agro-industrial complex – dairy cattle breeding, which, according to scientists, provides the population of the Russian Federation with milk, dairy and other products daily (Petrick, Götz, 2019). B. P. Mokhov shares the scientific point of view that modern dairy production ensures not only the country's food security in milk, but also provides jobs and an increase in the value of the national product gross (Mokhov, 2009). S. Achchuthan, R. Kajanathan claim that, due to its central position in the dairy cluster, dairy cattle breeding unites the value chain from a number of resource sectors in agriculture and agribusiness, as well as processing and trade sectors (Achchuthan and Kajanathan, 2012). The relevance of the above facts is confirmed by a deep understanding by the country's top leadership, which is expressed in the provisions of the fundamental documents directing the strategic development of both the food market and the agro-industrial complex as a whole, and directly the dairy cattle breeding industry. The main methodological normative act determining the direction of development of the dairy industry is the Food Security Doctrine of the Russian Federation, which, while not a development program, determines the necessary standards for self-sufficiency (import substitution) of the domestic market with domestic milk and dairy products (Food Security Doctrine, 2019). To fulfill the requirements of the Doctrine, “State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets for 2013-2020” (State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets for 2013-2020, 2019) was developed. O. I. Katlishin and A. I. Panyshv draw attention to the fact that in the structure of the state program at least two subprograms are directly designed to ensure the growth of dairy production (Katlishin, Panyshv, 2018).

Conclusions

1. Within the framework of existing system of state regulation of domestic market and support for the agricultural sector, including the budget, the federal center annually allocates about 250 billion rubles for country's agriculture. Some part of the funds from this significant amount (8 billion rubles) directly affects the efficiency of the

dairy cattle breeding industry, another (according to our estimates, up to 70 billion rubles) is indirect.

2. These funds are allocated free of charge in the form of subsidies, but for strict purpose in accordance with the principles of budgeting, oriented on the result. In other words, the funds spent by the state should provide planned indicative indicators for the development of agribusiness sectors and, in particular, dairy cattle breeding. For the dairy cluster, the State Program for the Development of Agriculture of Russia has a roadmap for achieving the necessary level of self-sufficiency (taking into account current trends in import substitution) with milk and dairy products, taking into account the requirements of Food Security Doctrine.
3. Of course, subsidizing the dairy cluster from the state budget contributes to an increase in production volumes and the level of food security for dairy products. As a result of the outstripping reduction in the number of livestock and gross milk production in the personal subsidiary plots of Russians, the efforts of the state and the dairy agribusiness to increase the total production of milk and the necessary products of its processing are nullified. Summarizing all above, it should be concluded that there is a need to increase the efficiency and / or volume of budget support, especially under the articles ensuring the development of dairy cattle breeding.
4. It will be difficult to ensure production growth without solving the problems of low profitability of the dairy cattle breeding industry caused by the loss-making of beef meat (cattle gain). One way to address this issue may become the related task resolution of providing the population with high-quality meat of specialized cattle breeds.

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