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PROSPECTS OF THE MILK PRODUCTION DEVELOPMENT IN THE REGION

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Abstract

The issue contains scientifically stipulated offers and practical recommendations on improving the efficiency of producing milk in the region taking into account the state support. The authors considered the basic principles of state support for milk production, defined the level of efficiency of the milking herd in agricultural organizations, offered a mechanism of state support for agricultural organizations of the Krasnoyarsk Territory that is 50% based on prefunding the expenses for milk production taking into account the planned growth of the efficiency of livestock and milk quality.

Keywords: **Krasnoyarsk Territory, Agriculture, Milk Production, Subsidizing**

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INTRODUCTION

The dairy breeding is of special importance for the cattle breeding of the country. Milk and dairy products are included in the market basket and are high-value food products. According to their food characteristics, they almost do not have analogues. However, as a whole in the Russian Federation from year to year both the livestock and the gross output of milk have been decreasing. At the present time, as compared to 1990, the consumption of dairy breeding products has decreased 1.6 times. An average consumer of our country gets about 248 kg of these products per year. This is almost a quarter less than the medical standard.

The fundamental enactments that define the areas of the Russian agro-industrial complex development include Federal Law “On Agriculture Development” No. 264-FZ (2015) dated 29.12.2006 and Act of the Government of the Russian Federation “On State Program Related to Developing Agriculture and Regulating Markets of Agricultural Products, Raw Materials, and Food for 2013-2020” (2014) No. 717 dated 14.07.2012. The state pays special attention to the sector, but because of the imperfection of the taken measures, dairy breeding remains inefficient. At the same time in accordance with the Food Security Doctrine of the Russian Federation, the level of self-provision of the country with milk and dairy products must be not less than 90%, while in 2014 it was only about 80% [1].

Under the current conditions it is possible to increase the milk production and improve its quality only subject to expert state support that must be based on the specific principles, indicators of the sector development, new methodologies, and subsidizing mechanisms.

Such distinguished scientists as Altuhov [2], Baryshnikov [3], Bespahotny [4], Veklenko [5], Goncharov [6], Nechaev [7], Semin [1], Serkov [8], Tkach [9], and Ushachev [10] made a valuable contribution to studying the current state and solving problems related to the state support for the agriculture, particularly, milk production. Their works became a scientific basis for conducting researches [1-10].

Methodology

The following methods of research were used in the work: abstract and logical, monographic, economic and statistical, and calculation and constructive.

Using the abstract and logical method, the principles of the state support for milk production that exist today were formed. Basic principles of the state support for milk production, which are the basis of the state support for the milk production operation and define its efficiency, were offered.

When using the statistical method of the research, the dynamics of basic indicators was researched. It characterizes the development of the dairy breeding in the Krasnoyarsk Territory. Based on the developed economic and statistical model, the level of the milking herd efficiency was defined.

Based on the monographic method of research, the required indicators of expenses for achieving the relevant growth yield were determined.

The application of the calculation and constructive method allowed defining perspectives of the milk production in the Krasnoyarsk Territory on the basis of the offered mechanism of providing state support.

RESULTS

1. Main principles of the state support for milk production were specified. Basic principles were singled out. It is offered to refer the following ones to them: sufficiency of national milk, priority of the naturalness and quality of milk, parity rate of profits of producers, processing and trading companies, and economic return. These principles must be the basis of the state support for milk production.
2. Based on the developed economic and statistical models, it was revealed that total expenses for keeping a milking herd start returning under the yield of 3,350 kg/head, and the maximum value of the expenses return index is achieved under the efficiency of 7,000 kg/head. This level is offered as a reference point for the state support. If it is higher, the efficiency of milk production decreases, because expenses for milk production considerably grow.
3. The mechanism of providing agricultural organizations of the Territory with state support was offered. It is based on prefunding 50% of the expenses for milk production taking into account the planned growth of the efficiency of livestock and milk quality (subject to submitting the relevant business plan and given upon

property) with the further correction of the unified amount of the subsidy. These measures will enable agricultural producers and the state to plan the gradual growth of the livestock efficiency and quality of the produced milk. This mechanism will allow agricultural organizations of the region to achieve the yield in the amount of 7,247.4 kg/head by 2023, and produce 210.9 kg of milk per an average consumer of the Territory.

DISCUSSION

Analyzing the economic situation in the country, Tkach [9] specifies that "… various periods are singled out in the development of the national dairy production. At the beginning of the XX century the Russian dairy breeding was one of the top priority areas. Considerable volumes of butter were imported. The gold revenues for it twice surpassed the production of this metal at all goldfields of the country. At that time cooperation dominated almost on the whole territory of the country. Due to it, the area had a well-organized production of raw milk, its colleting and processing using the equipment imported from abroad and progressive technologies. High quality butter was produced. It was highly estimated on the European market. Raw zones were defined for milk processing enterprises, the integration and cooperation between milk producers and processors were developed and improved. The leading scientists think this period in the development of the national dairy breeding to deserve thorough study for using it under the current conditions taking into account the changes that took place" (2004).

Goncharov et al. [6] specify that since 1991 to 2013 holdings of all categories of the country considerably decreased the livestock of cows from 20.5 down to 8.6 mln. heads, or almost 2.4 times. The reformation of the agro-industrial complex affected the gross yield of milk, whose volume decreased by 25 mln. t. The milk production also dropped due to the unsatisfactory state of the food reserve. The tempos of the food production decrease surpassed the dramatic drop of cows' livestock. The deficit is acutely observed in providing protein food (2015).

Aganbegian et al. [11] note that milk and dairy products decrease every year: from 1986 to 1990 54.2 mln. t. of products on average were produced per year, from 1996 to 2000 – 33.5, from 2001 to 2005 – 32.5, from 2006 to 2010 – 32, and from 2011 to 2013 – about 31 mln.t. As a consequence, the import of milk and dairy products grew. At the present time, as compared to 1990, the consumption of dairy products decreased 1.6 times. According to the authors, "to a great degree the decrease in the production of milk is related to the fact that a greater part of cows (above 48% of the total livestock) is found in farm households" (2015).

A high share of dairy products import is explained by the insufficient volumes of raw milk for the processing industry and a decrease in the import duties for milk and dairy products down to 15%. Over the recent decade leaders of the Russian dairy market have included Wimm Bill Dann, whose share was 32.88% in 2013, Danone in Russia – 31.23%, as well as such companies as Ehrmann – 13.51%, Parmalat – 13.48, and Campina – 6.84% [12]. Veklenko et al. [5] specify the growth of the average efficiency of

cows as a positive moment. Since the early 1990s up to 2013 it increased from 2.4 up to 3.9 t. (2015).

The state plays an important role in the sector development. To our mind, today the state support for milk production is based on the following principles:

- **Limited financing:** Financing takes place on the basis of the determined limits whose amount cannot be surpassed in spite of the sector needs,
- **Focus on simple reproduction:** Provision of continuous repeated process of milk production in the amounts that do not change. Herewith, the target including the increase in the gross production of milk can be achieved subject to focusing at the extended production,
- **Co-financing:** Share financing of milk producers from regional and federal budgets takes place. Herewith, the greatest part of allotments comes from the regional budget,
- **Differentiated subsiding:** Since 2013 the milk of the highest and first sort is privileged in subsiding. Under the milk deficit it causes its falsification,
- Improving efficiency by decreasing livestock: in agricultural organizations the yield is increased not due to the growth of the gross production of milk but due to the milking herd decrease,
- **Selections from abroad:** Every year a lot of dairy cattle are imported to the Russian Federation from abroad. Herewith, there is a problem related to adapting imported animals to new ecological and farming conditions,
- **Free milk and dairy products market:** A considerable share of milk and dairy products on the national market is related to the foreign companies Wimm Bill Dann, a group of companies Danone in Russia, Ehrmann, Parmalat, and Campina,
- **Supporting the sector mainly at the expense of crop farming:** In the majority of cases in agricultural organizations the cattle breeding area is not profitable as a whole, and is maintained at the expense of crop farming.

The current principles do not comply with the strategic goals of the dairy breeding development. That is why we have formulated the basic principles that are the main reference point in the development of the dairy breeding at the modern stage and achieving the set efficiency:

- **Principle of national milk sufficiency:** The volume of the produced milk must be sufficient to meet the needs of consumers and processors.
- **Principle of priority of naturalness and quality of milk:** When supporting the milk production, the state must prefer the producers of high quality milk as well as the processors who use natural milk (without any additives) as a raw material when producing.
- **Principle of the parity rate of producers, processors, and trading:** The state must take measures on regulating prices of milk producers as well as extra charges of processors and traders, as well as acknowledging the milk as a socially important product.

- **Principle of expenses return:** When supporting, it is necessary to ensure the profitability of milk producers on the level that provides for the extended reproduction (30% and more) to return all the expenses related to the gross production and selling.

Among the Russian Federation regions, the Krasnoyarsk Territory holds position 16 according to the agricultural production, and position 11 according to the milk production. Herewith, according to food production the Krasnoyarsk Territory is on the medium level, and only according to meat, milk, and eggs production it is lower than the medium level in the Siberian Federal District.

As a whole, since 2009 till 2014 the Krasnoyarsk Territory decreased the average annual livestock of cows by 4.7% (Table 1). In agricultural organizations and population's households the livestock decreased respectively by 8.5 and 2.7%. It is only on farms where the growth of 2.2 times was observed. It is possible to define such reasons of the livestock decrease as disadvantages in organizing feeding, keeping, reproduction of the herd, low ratio of breeding stock, and animals' epizootic. In 2014 the ratio of cows in the structure of the Territory cattle moved to 40.1%, but this is less than optimal (50%). In spite of the decrease in the milking herd livestock, the production of milk increased by 2.1% (2010-2015).

Table 1: Basic Indicators of Developing Dairy Breeding in the Krasnoyarsk Territory*.

Indicator	Year						2014 as to 2009,%
	2009	2010	2011	2012	2013	2014	
Average annual livestock of cows in holdings of all categories, in total, thous. heads	173.2	173.3	174.6	172.7	168.5	165.1	95.3
Including: in agricultural organizations	89.6	88.9	89.5	87.5	84.0	82.0	91.5
In population's households	82.2	82.9	83.1	82.2	81.4	80.0	97.3
On farms	1.4	1.5	2.0	2.7	3.1	3.1	221.4
Share of cows livestock in the total cattle livestock, in total,%	39.2	39.9	39.7	39.2	39.4	40.1	100.3
Including: in agricultural organizations	37.0	37.8	37.5	36.6	37.0	38.2	103.2
In population's households	41.9	42.4	42.3	42.1	42.2	42.0	100.2
On farms	39.2	40.0	46.5	42.9	40.8	41.0	104.6
Milk production in holdings of all categories, in total, thous. t.	701.8	707.4	721.4	726.9	708.1	716.6	102.1
Including: in agricultural organizations	343.2	345.8	362.7	369.1	355.9	367.4	107.1
In population's households	352.3	355.6	355.3	351.4	345.4	342.5	97.2
On farms	6.3	5.9	5.7	6.4	6.8	6.7	106.3

*According to the data of collections “Agro-industrial Complex of the Krasnoyarsk Territory for 2009-2014”

For 2009-2014 the financial help for agricultural organizations of the region from budgets of all levels increased 1.1 times. The greatest support was fixed in 2013 – RUB 3,775.8 mln. Law of the Krasnoyarsk Territory “On State Support for Subjects of the Agro-industrial Complex of the Territory” No. 17-4487 dated 21.02.2006 provides various programs and measures on developing areas of the agricultural production in the region that are financed mainly from the Territory budget (2015). In the total volume of the state support for areas 75.0% falls on cattle breeding, and 50.6% of the Territory funds fall on crop production. For the analyzed period the volume of this support decreased by 38.5%, and was RUB 1,222 mln. The amount of the support for cattle breeding and crop production areas decreased by 34.6 and 41.9% respectively.

For 2009-2014 the total amount of subsidies for the milk production and selling decreased 2.7 times. The procedure of providing them also changed. Up to 2013 inclusively funds according to the article “Subsidies for cattle breeding products (excluding subsidies for processing) - milk” had been provided from the regional budget. In 2013 their amount was RUB 66.6 mln. This is 10.5 times less than the level of 2009 (Figure 1).

Since 2013, the support for milk production has been provided both from the regional and federal budgets in the form of subsidizing for co-financing of expenditure obligations of subjects of the Russian Federation related to compensating a part of expenses of agricultural producers per 1 kg (l) of the sold marketable milk.

It is known that the efficiency of the milking herd is one of the parameters that reflect the efficiency of the area development along with such indicators as milk production per person, profit from selling milk, profitability of production and selling products, expenses return in the dairy breeding, etc. Herewith, not all efficiency will be thought to be favorable. In accordance with the rule of the boundary utility, the efficiency also achieves its favorable value. When it is higher, it becomes unfavorable.

As a result, we obtained the following equation (1):

$$y=0.6390+0.0002x_1-1.0x_1^2-1.8665x_2+1.7178x_2^2+0.0420x_3-0.0034\ x_3^2 \qquad (1)$$

The coefficient of multiple correlation of the above relation is 0.64 ± 0.05. It means that the return of expenses depends on the selected indicators by 41%. It is possible to observe a direct relation between the features and factors in the model (Table 2). The relation of expenses return and efficiency and marketability of milk is medium and low in case of the livestock.

Figure 1: Dynamics of State Support for Milk Production and Selling in the Region.

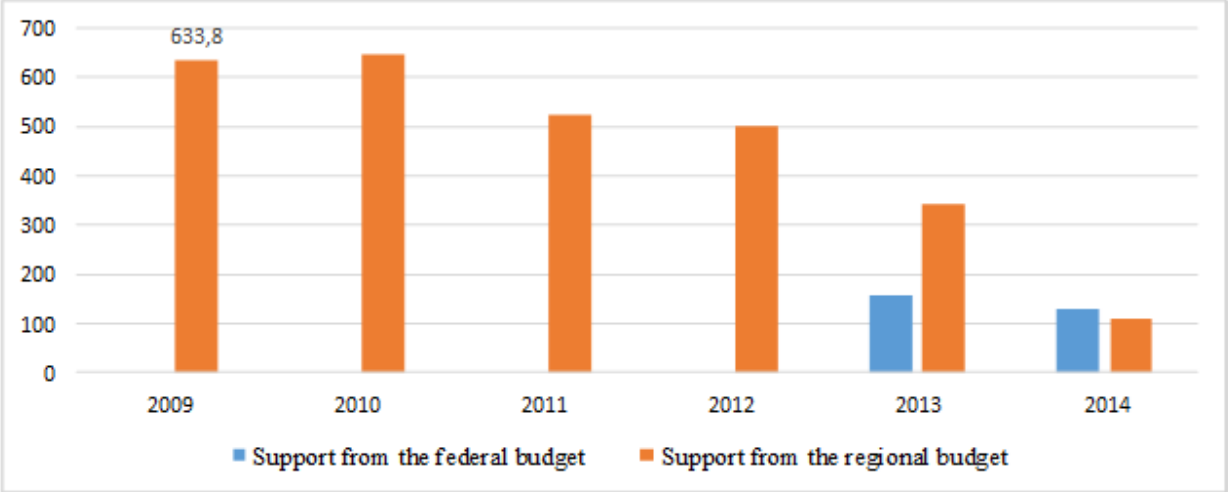


Table 2: Changes of Expenses Return Depending on Efficiency of Milking Herd under Average Indicators of the Livestock and Merchantability Level.

Efficiency, kg/head	Merchantability index	Livestock per 100 ha of agricultural lands	Rate of expenses return
1,000	0.85	6	0.64
2,000	0.85	6	0.81
3,000	0.85	6	0.96
4,000	0.85	6	1.07
5,000	0.85	6	1.15
6,000	0.85	6	1.19
7,000	0.85	6	1.20
8,000	0.85	6	1.18
9,000	0.85	6	1.12

Based on the above equation the dependence is revealed. It is revealed that the total amount of expenses for the milking herd starts returning under the efficiency that is above 3,350 kg/head. Herewith, the return coefficient is increased before the yield in the amount of 7,000 kg/head is achieved. This efficiency must be a reference point for the state when providing subsidies for the development of dairy breeding. The further growth of the yield also provides the return of expenses but to a less degree. The maximum achieved return of expenses in the researched organizations under the average level of marketability and livestock subject to the efficiency of 7,000 kg/head is 1.2.

On the basis of the revealed dependence, we offered the methodology of subsidizing milk producers. It is based on the principle of expenses return, i.e. the state pays subsidies to all milk producers who plan to increase the efficiency of the milking herd for a period ahead. The suggested expenses of agricultural organizations are subsidized until they achieve the yield of 7,000 kg/head and 130% level of return [13]:

$$S=(E_a+E_{ad})*(1.3 – C_{era}), \quad (2)$$

Where S – subsidies, RUB/head,

E_a – actual expenses, RUB/head,

E_{ad} – additional expenses that provide the growth of efficiency, RUB/head, and

C_{era} – actual coefficient of expenses return (relation of the actual income from selling milk and dairy products to the total expenses for keeping a milking herd).

When making the research, we forecasted the indicators related to developing milk production in agricultural organizations of the region (Table 3) on the basis of the methodology we had considered before [14,15]. In order to achieve forecasting indicators of the dairy production development, we reconsidered the mechanism of providing state support, too.

In the Krasnoyarsk Territory the mechanism of providing subsidies for selling milk is regulated by Order of the Government of the Krasnoyarsk Territory No. 112-p dated 22.03.2013 “On Approving Procedure on Providing Subsidies from the Federal Budget to Compensate a Part of Agricultural Producers’ Expenses per 1 Liter (Kilogram) of the Sold Marketable Milk Including a List, Form and Terms of Providing and Considering Documents Required for Obtaining the Above Subsidies” [16]. In accordance with this order, subsidies for compensating a part of expenses are provided by the Ministry of Agriculture of the Krasnoyarsk Territory. Subsidies are provided to the producers who sell and (or) process milk to compensate a part of expenses per 1 liter (kg) of the premium quality milk.

Table 3: Forecasting Indicators of Developing Milk Production in Agricultural Organizations of the Krasnoyarsk Territory.

Year	Subsidies for milk production, mln. RUB	Including prepayment	Average annual efficiency, kg/head	Milk self-provision, kg/head	Rate of expenses return
2016	920.2	460.1	4,706.9	135.3	1.14
2017	1,044.9	522.45	5,277.3	153.5	1.16
2018	878.6	439.3	5,866.8	170.7	1.18
2019	945.8	472.9	6,260.1	182.1	1.20
2020	735.8	367.9	6,588.2	191.7	1.22
2021	729.4	364.7	6,752.6	196.5	1.40
2022	732.9	366.45	6,994.7	203.5	1.50

2023	736.1	368.05	7,247.4	210.9	1.60
* According to the data of collections “Agro-industrial Complex of the Krasnoyarsk Territory for 2009-2014”					

The mechanism of subsidizing producers includes financing in a specific period of time upon selling milk [17]. It does not enable agricultural producers to return expenses at the milk production stage, and causes additional expenditure of finances from their own resources.

Today dairy breeding must be developed with the aid of the well-functioning mechanism of state support whose goal is to create favorable conditions for the development of the sector in the region and the increase in the volume of milk production [18]. We offer a mechanism related to subsidizing milk production at the production stage – advance payment with the further re-assessment taking into account actual indicators of production. The offered mechanism assumes the implementation of the following stages.

1. Submission by an agricultural producer of the electronic and paper versions of the defined set of documents to the self-governing authority of the municipal region. This set also includes a business plan for milk production that forecasts the production volume for the calendar year.
2. Verifying documents by self-governing authorities for the competence and satisfactory form. In case of the refusal to accept documents because they do not comply with the established requirements or incompetence, the self-governing authority must inform the producer about the refusal to accept the documents and explain the reason.
3. If the documents are accepted, they are sent to the Ministry of Agriculture of the Krasnoyarsk Territory that accepts them as received from the municipal regions.
4. The Ministry of Agriculture considers the received documents. In case of their incompliance, it informs the self-governing authority about it.
5. If the documents comply with the established requirements on the basis of standards determined by the enactments of the Government of the Krasnoyarsk Territory, the Ministry of Finances calculates the advance payments for agricultural producers.

The calculation of advance payments standards is based on the methodology of subsidizing milk production offered by the authors (as calculated per 1 head) [19]. Herewith, the advance payment must be 50% of the amount of the assumed subsidy volume, and is made upon the available property.

6. Sending a calculation certificate for the advance payments to the Ministry of Finances of the Krasnoyarsk Territory.
7. Documenting the advance payments made to the business account of the Ministry of Agriculture of the Krasnoyarsk Territory.
8. Settling advance payments to the business accounts of agricultural producers as of receiving funds from the Ministry of Finances of the Krasnoyarsk Territory.

9. Providing self-governing authorities with the reporting documents by agricultural producers.
10. Considering documents by self-governing authorities and sending the opinion about the need to pay the remaining volume of the subsidy on the basis of the actual indicators of the enterprise activity to the Ministry of Agriculture.
11. On the basis of the opinion of the self-governing authority, the Ministry of Agriculture sends a calculation certificate to the Ministry of Finances of the Krasnoyarsk Territory.
12. Paying funds to the business account of the Ministry of Agriculture with the future payment of the required amount of the subsidy to the producer's account.

If the actual indicators of the organization activity do not comply with the made advance payment, the local government body informs the enterprise about the necessity to fully repay the advance payment or its part.

CONCLUSION

1. Considering the system of the state support for milk production, the authors paid special attention to principles of the state support for milk production as a basis of its functioning. Basic principles of state support for milk production were singled out [19]. The following principles were referred to them: sufficiency of national milk, priority of the naturalness and quality of milk, parity rate of profits of producers, processing and trading companies, and economic return.
2. The basic method of the state support in the territory is direct subsiding of expenses for production and selling of products. The amount of financing agricultural organizations in the Krasnoyarsk Territory as compared to 2009 decreased by 13.7%, and in 2014 it was RUB 3,251.2 mln. Herewith, subsiding of the dairy breeding sector decreased 2.6 times. In 2014 19% of the Territory allotments assigned to the cattle breeding as a whole were spent for supporting the sector in the form of compensating a part of the expenses spent by agricultural producers per 1 liter (kg) of the sold marketable milk. However, in spite of the decrease in cows' livestock by 8.5%, their efficiency increased by 15.8%, and 2014 it was 4,670 kg/head.
3. Based on the correlation and regression models, it was calculated that the total amount of expenses for the milking herd starts returning under the efficiency of above 3,350 kg/head, and the expenses return index increases when the yield is 7,000 kg/head. This level is offered as a reference point for the state support for milk production.
4. The authors offer to use the methodology of subsiding milk producers (2) that is based on the principle of expenses return: budgetary funds must provide profitability of milk producers on the level that ensures the extended reproduction (30% and more) to cover all production expenses of its gross production and selling [20]. The assumed expenses of agricultural organizations are subsidized until they achieve the yield in the amount of 7,000 kg/heads, with the level of return being 130%.

5. The developed mechanism of subsidizing the milk production assumes providing agricultural producers with the advance payment in the amount of 50% of the forecasted amount of subsidies charged upon property taking into account the business plan with the further reassessment of actual indicators. It will enable milk producers to cover expenses at the production stage without sidewise borrowings [21]. Obtaining the unified amount related to the support for dairy production without classifying it according to areas will reduce the documents flow and increase the efficiency of their use in the organization.
6. The offered volumes of subsiding the milk production will allow to considerably increasing its quantity and quality in the Territory. The average livestock efficiency of the milking herd and expenses return will have increased by 1.6 times by 2023, and agricultural organizations of the region will be able to provide the population with milk on the level of 210.9 kg/person per year. The gross production of milk will have achieved 94.3 thous. t. while the livestock of the milking herd increases and its quality is improved.

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